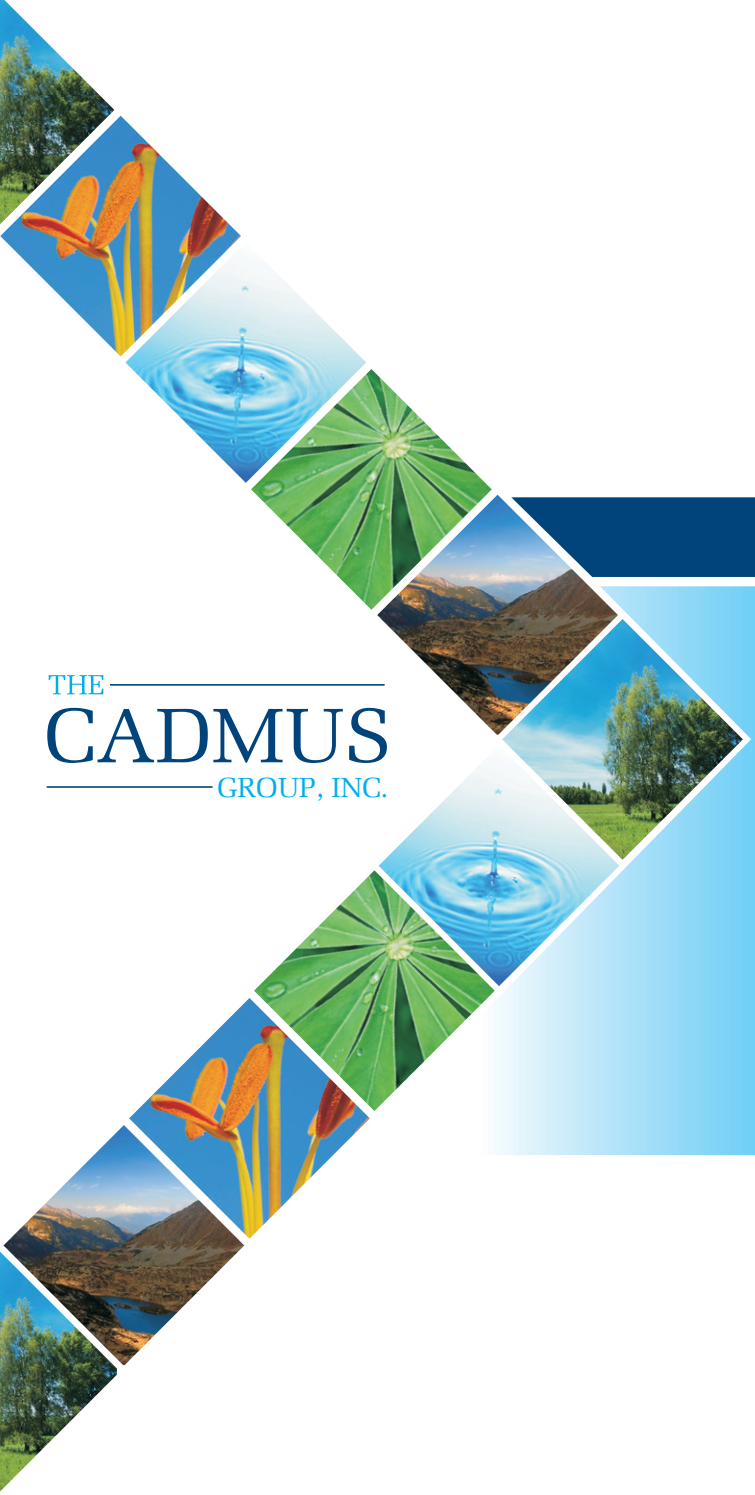


THE CADMUS GROUP, INC.

ASSESSMENT OF ELECTRIC AND NATURAL GAS ENERGY-EFFICIENCY POTENTIAL (2010–2016): APPENDICES

VOLUME II

FINAL REPORT

March 12, 2010

Prepared by:
The Cadmus Group, Inc. / Energy Services
720 SW Washington Street, Suite 400
Portland, OR 97205
503.228.2992
In Collaboration With Nexant, Inc.

Prepared for:
Ameren Illinois Utilities

(This page deliberately left blank.)

Table of Contents: Volume II

Appendix A: Data Collection Instruments

Appendix B: Summary of Findings from Primary Data Collection

Appendix C: Measure Descriptions

Appendix D: Measure Details

Appendix E: Energy-Efficiency Inputs and Detailed Results

Appendix F: List of Energy-Efficiency Potential Studies Used in Achievable Benchmarking

(This page deliberately left blank.)

Appendix A: Data Collection Instruments

A.1 – Residential ApplianceSaturation Survey 1

A.2 – Residential On-Site Survey..... 21

A.3 – Commercial On-Site Survey 33

A.4 – HVAC Trade Ally Survey 48

A.5 – Premium Efficiency Motors Survey 55

A.6 – Non-Residential Builders and A&E Firms Survey 61

A.7 – Compressed Air Service Provider Survey 68

A.8 – Non-Residential Lighting Wholesalers and Vendors Survey 74

A.9 – Non-Residential Mechanical Contractors Survey 81

A.10 – Plumber Trade Ally Survey 88

A.11 – Refrigeration Specialist Survey..... 93

A.12 – Residential New Home Builders Survey..... 99

A.13 – Retailer Survey..... 106

A.1 – Residential Appliance Saturation Survey

Ameren IL Residential Appliance Saturation Survey
The Cadmus Group

INTRODUCTION

Hello, my name is _____, I'm calling on behalf of Ameren Illinois Utilities which includes CIPS [pronounced "Sips"], CILCO ["Silko"], and IP [say the letters separately, "I" then "P"]

AA. ON-SITE SURVEY INVITATION (Skip for phone survey only)

We are conducting a study about household energy use in Illinois and would like offer you a $35 prepaid Visa Card to collect information on how energy is used in your home. We are conducting in-person visits of a small sample of homes in your area. These visits are conducted by professionals, and are useful for understanding the different types of energy using equipment in households. The information gathered will be used by Ameren IL to build and refine energy conservation programs for their customers.

AA1. If you agree, a technician will come to your home to inspect the type of energy using equipment installed in your home. Most visits will last about an hour, and will also include a few questions for you about how you use the equipment. Would you be interested in participating in this study?
1 Yes
2 No ***[THANK AND TERMINATE]***

AA2. We will be in your neighborhood the week of _____. Which day and time would work best for you?
_____[Record appointment preference]

AA3. If we need to notify you of a schedule change, what phone number is the best way to reach you?
1. PHONE1
2. PHONE2 [if needed]

You can expect a visit from one of our technicians on _[*date*]__at __[*time*]. The technician will carry an Ameren IL contractor identification badge and an authentication letter from an Ameren study contact person. If you need to reschedule the visit, please call: _[*Nexant contact #]*__.

We appreciate your willingness to participate in this study.
[End call]

A. PHONE SURVEY

We are conducting a study about household energy use in Illinois. In order for Ameren IL to design and refine conservation programs for its customers, information is needed about customer preferences and what is currently installed homes. Your participation will help with future decisions regarding energy-efficiency programs for consumers. I'd like to ask you a few questions about the home at [insert address].

[If respondent wants to verify that caller is indeed conducting the study on behalf of Ameren IL, he/she can call: [Dave Costenaro at 314-554-4550]

A1. Do you have a few minutes to speak now?
1 Yes [CONTINUE]
2 No [SCHEDULE CALLBACK]

A2. First, can I verify that you are one of the people in your household who would be most likely to make decisions concerning your electric and gas utilities for the home at _____?
1 Yes [CONTINUE]
2 No, [SCHEDULE CALLBACK FOR DECISION MAKER]

3 Refused [TERMINATE]

A3. Thank you. Do you own or rent this property?
1 Own
2 Rent
3 Other (specify) _____
-99 Don't know

A4. Does [Ameren] supply both the electricity and the natural gas for your home?

1 Yes, both natural **gas** and **electricity** [GO TO B1]
2 No, just the **electricity** [Go to A6]
3 No, just the **natural gas** [Go to A5]
DK
REF

{IF A4=3 ASK A5, OTHERWISE GO TO FILTER BEFORE A6}

A5. Which company supplies the electricity for your home?

_____(Record Electric provider)

DK
REF

_{IF A4=2 ASK A6, OTHERWISE CONTINUE}

A6. Which company supplies the natural gas for your home?

_____(Record Natural gas provider)

DK
REF

A7. What is your average Ameren Illinois Utilities bill in the summer?

_____ Dollars

A8. What is your average Ameren Illinois Utilities bill in the winter?

_____ Dollars

PRELIMINARY QUESTIONS: ENERGY ATTITUDES

B1. Within the past year, what have you done to reduce energy use in your home? (select all that apply) [*Randomize order*]

1. Turn off lights when not in use
2. Replace light bulbs with Compact Fluorescent Light (CFL) bulbs
3. Adjust thermostat setting at night
4. Adjust thermostat setting when not at home

5. Reduce thermostat setting in the winter
6. Increase thermostat setting in the summer
7. Installed programmable thermostat
8. Unplug adapters and charging devices when not in use
9. Unplug electronic devices with “instant on” feature
10. Purchase energy efficient appliances/equipment
11. Take shorter showers
12. Increase level of insulation
13. Reduce air infiltration or leaks (by caulking, adding storm windows, etc.)
14. I don’t do anything to reduce energy in my home (SKIP TO QUESTION #3)
15. Other [specify]:_____

B2. What is your primary motive to reduce energy use in your home? [*Randomize order*]

a. To save energy

b. To save money on utility bill

c. Reduce pollution/carbon footprint

d. Other [specify]:_____

B3. Which of the following high-efficiency equipment (eg. ENERGY STAR®) have you installed in your home in the past five years? (select all that apply)

a) Compact Fluorescent Light Bulb(s) (CFL)
b) central air conditioner
c) window/through-the-wall air conditioner
d) Heat-Pump
e) Water Heater
f) refrigerator
g) dishwasher
h) clothes washer
i) Other [specify]:
j) Have not installed any energy efficient equipment in my home

[SURVEYOR READ*] Part of designing new programs that customers find attractive is identifying offerings that match customer needs. The following questions will highlight some of the programs and offerings currently*

under review. Using a scale of 1 to 5, please indicate your perception of the following program elements and/or offerings.

B4. How likely would you be to take the following actions if offered by Ameren Illinois Utilities? Please give a number between 1 to 5, where 1 is 'Very Unlikely' and 5 is 'Very likely.'

1	2	3	4	5
VERY UNLIKELY				VERY LIKELY

a. **Have an on-site home energy audit.** An energy audit is an evaluation of home energy efficiency performed by a professional auditor who conducts a visual inspection of your home and diagnostic tests on your heating and cooling system. They identify major air leakage and insulation gaps, look for general energy-saving opportunities, and provide recommendations for energy efficiency upgrades.

A residential energy audit can help homeowners identify the most cost-effective, highest-priority energy efficiency upgrades for their home, which can reduce monthly utility bills and increase comfort.

How likely would you be to pay for an on-site energy audit of your home if the final cost to you was:

1. $200
2. $250
3. $300

b. **Recycle an old Appliance.** You would be paid for somebody to pick-up and recycle your old working refrigerator and/or freezer. [RATING:_____]

[SURVEYOR READ] Generally it costs extra to purchase energy efficient products (such as Energy Star® products) over standard products that are not energy efficient. The next series of questions assess your likelihood to purchase energy efficient products.

B5. For each measure option in the table below please rate your likelihood to purchase the following items by assigning a number between 1 to 5, where 1 is 'Not at all likely' and 5 is 'Extremely likely.'

1	2	3	4	5
NOT AT ALL LIKELY				EXTREMELY LIKELY

Options	A Without a utility incentive, how likely would you be to install energy efficient [Option] in the next five years? [If response 1-4, continue to B]	B What if Ameren paid 50% of the cost to upgrade to the energy efficiency model? [If response 1-4, continue to C] [If necessary, provide the related approximate incremental cost]	C How about if the incentive were 75% of the cost to upgrade? [If necessary, provide the related approximate incremental cost]	**Initial Cost Difference** [for surveyor use, read as necessary]
B5A. Lighting (CFLs)				$3 for 19W CFL (equivalent to 75W incandescent bulb)
B5B. Air Conditioning (central)				$550 for Central A/C
B5C. Space Heating (gas furnace)				$320 for gas furnace
B5D. Appliances (refrigerator)				$30 for top-mount refrigerator w/o ice dispenser
B5E. Electronics (TV, computer)				$100 for HDTV or $80 for computer
B5F. Weatherization (energy efficient insulation)				$400 for insulation

[SURVEYOR READ] In the next four questions please tell me how you make your decisions about energy efficiency.

B6. Please rate the level of importance each of the following factors has in your decision to participate in an Ameren sponsored energy efficiency program on a scale from 1 to 5 where 1 is 'not important at all' and 5 is 'extremely important',

1	2	3	4	5
NOT AT ALL IMPORTANT				EXTREMELY IMPORTANT

a. Effect on the value of your home [RATING:_____]

b. Environmental impact [RATING:_____]

c. Effect on your monthly electric bill [RATING:_____]

d. Out-of-pocket cost for new high-efficiency electric equipment/appliances

[RATING:_____]

e. Level of comfort [RATING:_____]

f. Payback period from new high-efficiency equipment
[RATING:_____]

g. Impact on lifestyle/convenience [RATING:_____]

B7. We understand that at times there may be barriers that can prevent you from becoming more energy efficient. Please indicate your level of agreement with the following statements, where 1 is 'Completely Disagree' and 5 is 'Completely Agree.'

1	2	3	4	5
COMPLETELY DISAGREE				COMPLETELY AGREE

a. High-efficiency measures are generally too expensive for me (Cost)

b. I don't know enough about high-efficiency measures (Information)

c. I am not responsible for purchasing these items in my household (Not Decision Maker)

d. I do not know enough about my home's current energy usage (Knowledge)

e Energy prices are not high enough to motivate me to take action (Status quo)

B8. What other barriers often prevent you from becoming more energy efficient in your home?

a. (specify):_____

b. No other barriers exist

RESIDENCE DESCRIPTION

C1. Which of the following best describes how the residence is occupied? [Prompt]
1 Year-round, full-time
2 Seasonal or part-time use [TERMINATE]
3 Landlord of vacant unit [TERMINATE]
4 Other (specify) _____ [TERMINATE]
-99 Don't know [TERMINATE]

C2. Which of the following best describes your home? [READ IF NECESSARY]
1 Single family **detached** house (on a separate lot) not connected to other living units
2 Single family **attached**, such as a duplex, condominium, **row- or townhouse**
(TECH NOTE: If necessary say: "It shares walls, ceiling and/or floor with another residence" **NO MORE THAN 2 UNITS**)
3 A unit in a multifamily **apartment, condominium, row- or townhouse** building that has 3 or more units
(TECH NOTE: If necessary emphasize: "The building has 3 or more attached units.")
4 Manufactured home or house trailer, or
5 Something else (specify) _____
-99 Don't know [TERMINATE]

C3. ***[IF C2=3]*** How many living units or apartments are in the building where this residence is located? Please answer only for the building that contains this residence; do not consider other buildings that may exist in the complex.

Number of units***:*** _____
Don't know ***[PROBE FOR GENERAL SIZE]***
A 3-10 units
B 11 – 50 units
C 51 – 100 units
D more than 100 units
-99 Don't know

C4. ***[IF C2 = 1 OR 2]*** How many levels or stories are there in this residence? Please do not include an unfinished attic, unfinished basement, garage, or other floors that are never heated and are not used for living space.
[DO NOT PROMPT.]

1 One story
2 One and a half stories
3 Split level or two stories
4 Two and a half stories
5 Tri-level or three stories
6 More than three stories
7 Other (specify) _____
-99 Don't know

HOME CHARACTERISTICS/WEATHERIZATION / EFFICIENT EQUIPMENT

D1 What is the approximate age of your home?

____ years
-99 Don't know
-88 Refused

D2. {skipped intentionally to maintain survey instruction sequencing.}

D3. Is your home ….?
If different portions of your house have different configurations, please answer based on the largest portion of your home's footprint.
1 Above a finished basement
2 Above an unfinished basement
3 On top of a foundation meaning on a concrete slab with no basement or
4 Above a crawl space
-99 Don't know

D4. Approximately what percentage of this residence's windows are **double or triple-pane**?
[RECORD PERCENT:] _____
-99 Don't know
IF D4 = 100%, SKIP TO D6

D5. Approximately what percentage of your home's windows are equipped with **storm windows**?
[Tech Note: If asked, a storm window is a secondary window, or perhaps a plastic sheet, that you place inside or outside your regular window to protect against the wind and cold. Storm windows are typically put on or pulled down before the winter, and removed or pulled up after the weather warms up each year.]
[RECORD PERCENT:] _____
-99 Don't know

D6. What is the approximate square footage of **conditioned either heated or cooled floor space** in this residence?
[IF NECESSARY, PROMPT WITH "MAKE A GUESS IF YOU CAN"]
RECORD NUMBER: _____ [SKIP TO D8]
IF ANS > 6000, SHOW: I WANT TO CONFIRM THAT IT IS ____
-99 Don't know [GO TO D7]

D7. Although you aren't sure about the actual **conditioned either heated or cooled floor space**, can you estimate the square footage of your home using these categories?
[IF Q1=2 OR 3, SHOW: "PLEASE INDICATE THE CATEGORY THAT PERTAINS TO YOUR UNIT ONLY."]
[READ AS NECESSARY]
1 Under 1,000 square feet
2 1,000 – 1,500 square feet
3 1,501 – 2,000 square feet
4 2,001 – 2,500 square feet
5 2,501 – 3,000 square feet
6 More than 3,000 square feet *[SPECIFY]* _____ square feet
-99. DON'T KNOW

D8. How many heated rooms are in this residence?
(Please include all heated areas. Do not include halls or foyers, bathrooms, closets, unheated porches, unheated garages, or unheated basement areas and rooms.)
[RECORD NUMBER:] _____
-99 Don't know

D9. How many bathrooms are in this home?
Definition:
1 = Full bath - has a bathtub, toilet, and a sink

0.75 = Three quarter bath - has a toilet, shower, and sink
0.5 = Half bath - has a toilet and a sink
0.25 = Quarter bath - has a toilet only.

[RECORD NUMBER:] _____
-99 Don't know

E. HOME HEATING SYSTEM

My next few questions are about the **main heating system** in your home. Please answer the questions about the heating system that is used most.

E1. What type of heating system do you have? Is it …?
1 Natural gas heating
2 Electric heating
3 Other (specify) _____ (i.e. Wood, Propane)
4 No heating [SKIP TO F0]
5 Combination of types (Specify)_____
-99 Don't know

E2. What is the approximate age of your heating system?
1 0-2 years
2 3-9 years
3 10-19 years
4 20 or more years
-99 Don't know

E3. Do you have a service contract for regular maintenance on your heating unit?
1 Yes
2 No
-99 Don't know

E4. What was the approximate month and year of the last maintenance on your heating unit?
Select month: Drop-down Menu
Select year: Drop-down Menu

E5. ***[SKIP IF C2=1 OR 4]*** Does the main heating system serve only this residence or does it serve more than one residence?
1 Only this residence
2 More than one residence
-99 Don't know

E6. What is the type of system that is used to heat the majority of your home?
[ASK AS OPEN END; ACCEPT ONE MENTION.]
[PROBE FOR SPECIFICS: FOR EXAMPLE, THERE ARE 2 DIFFERENT TYPES OF HEAT PUMPS.]
1 Natural gas central forced air furnace
2 Natural gas hot water boiler (with radiators or baseboards) gas hydronic heating
3 Natural gas steam boiler (with radiators)
4 Natural gas radiant floor heating
5 Natural gas fireplace
6 Electric baseboard
7 Electric central forced air furnace
8 Air-Source Heat pump
9 Ground-source heat pump
10 Portable heaters
11 Oil central forced air furnace
12 Oil hot water boiler (with radiators or baseboards)

13 Oil steam boiler (with radiators)
14 Bottled gas central forced air (propane, butane or kerosene)
15 Bottled gas portable heaters (propane, butane, or kerosene)
16 Wood stove
17 Wood fireplace
18 Solar
19 Other System & Fuel [SPECIFY]
20 None (No heating system)
-99 Don't know

E7. What type of temperature control is on the **main** heating system?
[IF NECESSARY SAY: "THE ONE USED MOST OFTEN."]
[READ IF NECESSARY]
1 Regular thermostat(s) with temperature settings
2 Clock or programmable thermostat(s)
3 Dial control **without** temperature settings
4 Simple on/off switch or no temperature control, or
5 Something else (specify) _____
-99 Don't know

E8. I will read some ways that **heating** systems are used. Please indicate which ones describe how you use the main heating system in your home. Indicate all that apply.
[SELECT ALL THAT APPLY; IF NECESSARY, READ CODES 1-4.]
1 The thermostat(s) is kept at a constant setting or temperature
2 The thermostat is adjusted when occupants are sleeping
3 The thermostat is adjusted when occupants leave the house
4 The heater is adjusted only when someone is cold
5 Other (specify) _____
-99 Don't know

E9. When you are **heating** your house, at what temperature do you normally keep your thermostat?
RECORD NUMBER: _____
If response is <50 or >85, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

E10-12
When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations?

E10. When one or more people in your household are at home and everyone is awake?
RECORD NUMBER: _____
If response is <50 or >85, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

E11. When one or more people in your household are at home and everyone is asleep?
RECORD NUMBER: _____
If response is <50 or >85, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

E12. When no one is at home?
RECORD NUMBER: _____
If response is <50 or >85, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

E12a. And, on a typical weekday, for about how many hours is there no one at home?
A RECORD NUMBER 0 TO 24: _____
-99 Don't know

E12b. On a typical weekend day, for about how many hours is there no one at home?
A RECORD NUMBER 0 TO 24: _____
-99 Don't know

E13-15
My next few questions are about any supplementary heating systems you may have in your home.

E13. Do you have any other heating systems or space heaters in your home? [Select all that apply]
1 Yes, secondary system
2 Yes, space heater
3 Yes, other: _____ (Specify)
4 No ***[SKIP TO F0]***
-99 Don't know ***[SKIP TO F0]***

E14. ***[IF E13=2 (OR INCLUDES 2)]*** How many space heaters do you have?
[RECORD NUMBER:] _____
-99 Don't know

E15. In what room(s) do you typically use a space heater, and how many days per year do you use a space heater in that room?
IF E14 > 3, SHOW: Let's talk about the 3 space heaters that you use most often.

A. Record room: _____ AA. Record # of days use: _____
B. Record room: _____ BB. Record # of days use: _____
C. Record room: _____ CC. Record # of days use: _____
-99 Don't know

F. HOME COOLING SYSTEM

F0 Now, moving on to your home's cooling system. Do you have any cooling system or equipment?
1. Yes
2. No (Indicate K in F1 and then SKIP TO G Intro)

F1. How many of each of the following do you have?

		F1 Enter 0 for None	**F2**	**F4**	**F5**
A	Central air conditioner	F1A	F2A	F4A	F5A
B	Air-source heat pump	F1B	F2B	F4B	F5B
C	Ground-source (geothermal) heat pump	F1C	F2C	F4C	F5C
D	Room air conditioners	F1D	F2D	F4D	
E	Ductless mini-split air conditioner	F1E	F2E	F4E	F5E
F	Portable fans	F1F	F2F		
G	Whole-house fan	F1G	F2G		
H	Ceiling fans	F1H	F2H		
I	Something else (specify) _____	F1I	F2I		
J	No cooling system or equipment	F1J	F2J		

F2. Which one would you say is your primary or main cooling system (the system that gets used most often)? Is it the ….
OFFER ONLY A - F AS OPTIONS **AND ONLY IF** F1 >0
1. Central air conditioner
2. Air-source heat pump
3. Ground-source (geothermal) heat pump
4. Room air conditioners
5. Ductless mini-split air conditioner
6. Evaporative cooler (Swamp cooler)
9. Don't know

F3. *{eliminated F3, but preserved numbering and skip patterns going forward}*

F4. ***[IF F1=1]*** Approximately how old is this _____?
[IF F1>1] Approximately how old are these _____ on average?
[RECORD NUMBER:] _____
-99 Don't know

F5. ***[IF C2 ≠1,4]*** Does this equipment cool any other units (i.e. apartments) at your location?
1 Yes
2 No
-99 Don't know

[IF F1A, F1B, F1C, F1D, F1E & F1F ARE ALL 'NO', SKIP TO G1]
F6. Do you have a service contract for regular maintenance on your main (primary) cooling unit?
1 Yes
2 No
-99 Don't know

F7. What was the approximate month and year of the last maintenance on your main (primary) cooling unit?
Select month: Drop-down Menu
Select year: Drop-down Menu

F8. What type of temperature control is on the main (primary) cooling system?
[IF NECESSARY: "THE ONE USED MOST OFTEN."
[IF NECESSARY, READ CODES 1-4]
1 Regular thermostat(s) with temperature settings
2 Clock or programmable thermostat(s)
3 Dial control **without** temperature settings
4 Simple on/off switch or no temperature control
5 Other (specify) _____
-99 Don't know

F9. I will read some ways that **cooling** systems are used. Please indicate which ones describe how you use your main cooling system. Indicate all that apply.
[READ CODES 1-5 AND SELECT ALL THAT APPLY.]
1 The thermostat(s) is kept at a constant setting or temperature
2 The thermostat is adjusted when occupants are sleeping
3 The thermostat is adjusted when occupants leave the house
4 The cooling system is turned on only when someone is warm
5 We rarely use this cooling system
-99. Don't know

F10. When you are **cooling** your house, at what temperature do you normally keep your thermostat?
RECORD NUMBER FROM 60 TO 90 DEGREES FAHRENHEIT: _____
If response is <60 or >90, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

F11. When one or more people in your household are at home and everyone is awake?
RECORD NUMBER FROM 60 TO 90 DEGREES FAHRENHEIT: _____
If response is <60 or >90, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

F12. When one or more people in your household are at home and everyone is asleep?
RECORD NUMBER FROM 60 TO 90 DEGREES FAHRENHEIT: _____
If response is <60 or >90, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

F13. When no one is at home?
RECORD NUMBER FROM 60 TO 90 DEGREES FAHRENHEIT: _____
If response is <60 or >90, say: I want to confirm that you mean Fahrenheit and not Celsius
-99 Don't know

G. WATER HEATING

Now, I have a few questions about the water heater that you use to heat water for activities like dishwashing and bathing.

G1. ***[SKIP IF C2 = 1 OR 4]*** Does the water heater, or the source of the hot water, serve only this residence or does it serve more than one residence?
1 Only this residence
2 More than one residence
3 This residence has no hot water [Skip to H1]
-99 Don't know

G2. How many water heaters are at this residence?
[RECORD NUMBER:] _____
-99 Don't know

[PROGRAMMING NOTE: FOR QUESTIONS G3 – G11, PLEASE REPEAT THIS SEQUENCE OF QUESTIONS AS NEEDED TO COLLECT THE INFORMATION ON THE TWO MAIN WATER HEATERS IDENTIFIED IN G2. EACH REPETITION SHOULD BE IDENTIFIED WITH AN UNDERSCORE, AND THEN THE SEQUENTIAL UNIT NUMBER (I.E. G3_1, G4_1, …, G10_1 FOR THE FIRST WATER HEATER; THEN G3_2, …, G10_2 FOR THE SECOND.)]

G4. What is the approximate age of this water heater?
1 0-2 years
2 3-9 years
3 10-19 years
4 20 or more years
-99 Don't know

G6. What type of fuel or energy does this water heater use?
[READ CODES 1 THROUGH 4 AS NECESSARY. RECORD ALL THAT APPLY IF MORE THAN ONE.]
1 Electricity
2 Natural gas
3 Propane or bottled gas (LP, propane, butane),
4 Solar, or
5 Something else (specify) _____
-99 Don't know

G7. What type of water heater is this? [READ AS NECESSARY]
1 Tank-type storage water heater. This is **the most common** type of water heater.
2 Heat pump water heater
3 Indirect water heater that uses the home's boiler as the heat source or an integrated water heater that is also used to heat the home.
4 Solar water heater
5 Tankless hot water heater, also called Demand or instantaneous water heaters
-99 Don't know

G8. ***[IF G7 = 4]*** What type of system is used in conjunction with your solar water heater?
[READ CODES 1-2, AS NECESSARY.]
1 Tank-type water heater (this is the "standard" type, with a water storage tank)
2 Tankless hot water heater, also called Demand or Instantaneous water heaters
-99 Don't know

G9. What is the secondary or back-up type of fuel you use to heat water at this residence?
[READ CODES 1-2.]

1 Electricity
2 Natural gas
3 Propane or bottled gas (LP, propane, butane), or
4 Something else [SPECIFY]
-99. Don't know

G10. At what **specific temperature** is this water heater thermostat set?
RECORD NUMBER: _____
-99 Don't know

G11. ***[ASK ONLY IF G10 = -99 OR 'DOESN'T APPLY', OR 'NO TEMPERATURE SETTING AVAILABLE']*** Then which of these statements best describes where your water heater thermostat is set?
[READ CODES 1-5, AS NECESSARY.]
1 On the "low" setting
2 Between the "low" and "medium" settings
3 On the "medium" setting
4 Between the "medium" and "high" settings
5 On the "high" setting
-99 Don't know

G12-13
Which of the following items do you have for your **main** water heater? Do you have …

	Yes	No	DK
G12. Either a water heater tank wrap or insulation blanket			
G13. Pipe insulation			
G14. A water heater timer			

H. APPLIANCES & OTHER EQUIPMENT

In this section, I'll ask about the appliances and other equipment you have in your home.
H1. How many refrigerators are in your home? These can be anywhere in your home, but please only count the ones that are used regularly.
[RECORD NUMBER:] _____
-99 Don't know

H2. IF H1 > 3, SHOW: Let's talk about the 2 refrigerators that you use most often.
What is the approximate age of your (primary / second) refrigerator?
[RECORD NUMBER:] _____
-99 Don't know

[IF H2 = 99] Is it …
1 6 or less years old
2 7 to 14 years old
3 15 or more years old
-99 Don't know

H4. How many stand-alone freezers are in your home?
[RECORD NUMBER:] _____
-99 Don't know

H5. IF H4 > 1, SHOW: Let's talk about the 1 that you use most often.
How many years old is your stand-alone freezer?
[READ CODES 1-3]
1 6 or less years old
2 7 to 14 years old
3 15 or more years old
-99 Don't know

H6. How many dishwashers are in your home?
[RECORD NUMBER:] _____
-99 Don't know

H7. Please describe your clothes washer. Is it…?
1. Used only by the people in your household?
2. Shared among other units in the residence? ***[SKIP TO H9]***
3. Exclusively off-site—either a laundry service, drycleaner, or Laundromat? ***[SKIP TO H9]***
-99 Don't know

H8. Which of the following best describes the type of clothes washer(s) in your residence?
[READ CODES 1-2.]
1 Front Load Washing Machine
2 Top Load Washing Machine
3 Other (specify) _____
-99 Don't know

In an average week, how many loads of laundry does your household wash?
[RECORD NUMBER:] _____
-99 Don't Know

H9. Please describe your clothes dryer. ***[CLARIFY IF NEEDED: 'ONE YOU USE AT ALL, EVEN IF NOT FREQUENT']***
1. Used only by the people in your household?
2. Shared among other units in the residence? ***[SKIP TO H11]***
3. Exclusively off-site—either a laundry service, drycleaner, or Laundromat? ***[SKIP TO H11]***
-99 Don't know

H10. What fuel or energy source do you use for your clothes dryer(s)?
[READ CODES 1-4, AS NECESSARY.]
1 Electricity
2 Natural gas

3 Propane or bottled gas (LP, propane, butane)
4 Something else (specify) _____
-99 Don't know

H11. Do you use a dehumidifier?
1 Yes
2 No → ***[SKIP TO H13]***
-99 Don't know → ***[SKIP TO H13]***

H12. {intentionally skipped to preserve numbering and skip patterns}

H13. Does your residence have a swimming pool?
1 Yes
2 No → ***[SKIP TO H18]***
-99 Don't know → ***[SKIP TO H18]***

H14. Is the pool...?
1 Your own private outdoor pool
2 Your own private indoor pool
3 Shared outdoor pool
4 Shared indoor pool
5 Other
-99 Don't know

H15. Most pools have two main energy using devices, the heater and the pumps. While the pump is always electric, the heater can be natural gas, electric, or sometimes something else. What fuel or energy source is used to **heat** your swimming pool?
[READ CODES 1-5, AS NECESSARY.]
1 Electricity
2 Natural gas
3 Solar
4 Propane or bottled gas (LP, propane, butane)
5 Not heated
6 Something else (specify) _____
-99 Don't know

H16. ***[SKIP IF H14 = 3 OR 4]*** When do you operate your pool pump and filtration system?
[READ CODES 1-2, AS NECESSARY.]
1 All day and all night
2 Turned off at night
3 Something else (specify) _____
-99 Don't know

H17. ***[SKIP IF H14 = 3 OR 4]*** Do you use an insulating cover for your pool?
1 Yes
2 No
-99 Don't know

H18. Do you have a hot tub or spa at your residence?
1 Yes
2 No ***[SKIP TO H20]***
-99 Don't know ***[SKIP TO H20]***

H19. What fuel or energy source is used to heat your hot tub or spa?
[READ CODES 1-3, AS NECESSARY.]
1 Electricity
2 Natural gas
3 Propane or bottled gas (LP, propane, butane)
4 Something else (specify) _____
-99 Don't know

H20-21. {skipped intentionally}

Next, I'd like to ask about your cooking equipment. Some people have cook-tops that are separate from their ovens. Others have a range where the cook-top and oven are contained in one appliance. For the next few questions, please think of your cook-top and oven as two separate items.

H22. What fuel or energy source do you use for your cook-top(s)?
[READ CODES 1-4, AS NECESSARY.]
1 Electricity
2 Natural gas
3 Propane or bottled gas (LP, propane, butane)
4 Something else (specify) _____
-99 Don't know

H23. How many cook-top units do you have?
[RECORD NUMBER:] _____
IF MORE THAN TWO: "NOTE THAT YOU MAY HAVE MULTIPLE BURNERS IN YOUR COOK-TOP, BUT ONLY ONE UNIT" – RECODE AS NECESSARY.
-99 Don't know

H24. What fuel or energy source do you use for your oven(s)?
[READ CODES 1-4, AS NECESSARY.]
1 Electricity
2 Natural gas
3 Propane or bottled gas (LP, propane, butane)
4 Something else (specify) _____
-99 Don't know

H25. How many ovens do you have?
[RECORD NUMBER:] _____
-99 Don't know

H26. How many microwave ovens do you have?
[RECORD NUMBER:] _____
-99 Don't know

H28. Have you heard of Compact Fluorescent Lights – also known as CFLs?

1 Yes [Skip to H29]
2 No ***[GO TO H28B]***
-99 Don't know ***[SKIP TO H28B]***

H28B. Compact fluorescent light bulbs – also known as CFLs – usually do not look like regular incandescent bulbs. The most common type of CFL is made with a glass tube bent into a spiral, resembling a soft-serve ice cream, and it fits in a regular light bulb socket. Before today, were you familiar with CFLs?

1 Yes
2 No ***[SKIP TO H31]***

-8 DON'T KNOW ***[SKIP TO H31]***

-9 REFUSED ***[SKIP TO H31]***

H29. Do you have any CFLs installed either inside or outside of your home?
1 Yes
2 No ***[SKIP TO H31]***
-99 Don't know ***[SKIP TO H31]***

H30. Approximately how many CFLs would you estimate are installed in your home?
[RECORD NUMBER FROM] _____
-99 Don't know

H31. Do you have any hard wired, non-solar outdoor security lighting?
1 Yes
2 No ***[SKIP TO SECTION I]***
-99 Don't know ***[SKIP TO SECTION I]***

H32. Approximately how many outdoor security lights do you have?
[RECORD NUMBER:] _____
-99 Don't know

H33. ***[ASK ONLY IF H32 =1 OR MORE]*** Are these outdoor security lights….
1 Operated by a manual switch
2 On a timer
3 On a photo sensor which means they automatically activate when it gets dark
4 Motion activated
5 A combination of motion and photo sensor activated which means they automatically activate when it senses motion after dark
6 Other (specify) _____
-99 Don't know

I. AUDIO-VISUAL EQUIPMENT

Now, to get an idea of the way your home is using energy, I'd like to ask about your audio/video equipment and your home office equipment. For each piece of equipment I mention, please tell me how many of each you have in your home. What is the total number of the following: ***[RECORD 0 FOR NONE]***

I1.	Televisions, **of all types**	
I2.	Of those, how many are large flat screen TVs over 32 inches?	
I2B	***[SKIP IF I2 = 0]*** How many of your large TVs are plasma TVs? (As opposed to LCD, DLP or other projection)	
I3.	Game console (Playstation, Wii, Nintendo, xbox, Game Cube, etc)	
I4.	Combination VCR and DVD unit	
I5.	Standalone VCRs or DVD players	
I6.	Stand-alone DVR (not TIVO)	
I7.	TIVO, Cable or satellite TV set-top boxes or receivers	
I9.	Computer monitors	
I10.	Personal computers, including laptops	

I17. Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month?

1 Yes →[Please specify what type of equipment: _____]
2 No
-99 Don't know

J. OCCUPANCY CHARACTERISTICS

The next set of questions asks about demographic characteristics of your household. These characteristics are very helpful in understanding energy usage among our customers.

J1. Which of the following best describes your age?

1 Less than 18 years old

2 18-24 years old

3 25-34 years old

4 35-44 years old

5 45-54 years old

6 55-64 years old

7 65 or older

-99 DON'T KNOW

-88 REFUSED

J2. Including yourself, how many people usually live in this residence at least six months of the year? Please include all members of your household whether or not they are related to you, but do not include anyone who is just visiting or children who may be away at college or in the military.
[RECORD NUMBER:] _____
-99 Refused

J2B. How many of them are under 18?
[RECORD NUMBER:] _____
-99 Refused

J2C. How many of them are retired?
[RECORD NUMBER:] _____
-99 Refused

J3. What is the highest level of education attained by a head of the household?
[DO NOT PROMPT UNLESS NEEDED]

1 High School or GED
2 Junior College or Vocational
3 Undergraduate Degree / Bachelors
4 Masters
5 Doctorate/PhD
6 Other (specify) _____
8 Don't know
9 Refused

J4. Would you please tell me what your **total family income** was in **2008** before taxes (and including Social Security or other payments)? Just stop me when I read the correct category. ***[READ CODES AS NECESSARY]***

1 Less than $15,000
2 $15,000 to $24,999
3 $25,000 to $34,999
4 $35,000 to $49,999
5 $50,000 to $59,999
6 $60,000 to $74,999
7 $75,000 to $99,999
8 $100,000 to $149,999
9 $150,000 or more

-99 Don't know
-88 Refused

J5. RECORD GENDER OF RESPONDENT *[DO NOT ASK]*

1 Male
2 Female
-99 DON'T KNOW

"Thank you very much for your cooperation and assistance!"

A.2 – Residential On-Site Survey

RESIDENTIAL ON-SITE SURVEY

Survey ID # : _____ *Date :* _____

Name : _____ *On-Site Inspector :* _____

Address : _____

Phone : _____

Check Number : _____

RASS #	Response from phone svy	MEASURE	1	2	3	4	5	Don't Know	Photo	Other/Notes
C2		TYPE OF RESIDENCE	SF Detached	SF Attached	Condo/Apt	MH/Trailer		DK/-99	☐	
D3		FOUNDATION TYPE	Finished basement	Unfinished basement	Slab	Crawl Space		DK/-99		
N/A		ROOF COLOR	Light/White	Dark				DK/-99		
C3		NUM OF UNITS IN BLDG.		*(Record Number)*				DK/-99		
N/A		NUM LED EXIT SIGNS - (MF Common Area ONLY)		*(Record Number)*				DK/-99	☐	
N/A		NUM CFL EXIT SIGNS - (MF Common Area ONLY)		*(Record Number)*				DK/-99		
N/A		NUM INCANDESCENT EXIT SIGNS - (MF Common Area ONLY)		*(Record Number)*				DK/-99		
N/A		SECURITY SYSTEM	Yes	No				DK/-99		
H31		OUTDOOR SECURITY LIGHTING – (HARD WIRED / NON-SOLAR)	Yes	*No*				DK/-99		
H33		OUTDOOR SECURITY LIGHTING – ACTIVATION	Manual	Timer	Photo sensor	Motion sensor	Combination	DK/-99		
D6/D7		SQ FT LIVING SPACE		*(Record Number)*				DK/-99		
C4		NUM OF LEVELS OR STORIES		*(Record Number)*				DK/-99		
N/A		NUM WINDOWS		*(Record Number)*				DK/-99	☐	
N/A		NUM SINGLE PANE		*(Record Number)*				DK/-99		
D4		NUM DOUBLE PANE		*(Record Number)*				DK/-99		
NA		NUM TRIPLE PANE		*(Record Number)*				DK/-99		
D5		NUM STORM WINDOWS (VERIFY FRAMES)		*(Record Number)*				DK/-99		
N/A		NUM INSULATED BLINDS		*(Record Number)*				DK/-99		
N/A		WEATHERSTRIPPING	Yes	No				DK/-99		
N/A		ATTIC TYPE	Heat/Cond.	Uncond.				DK/-99		
N/A		ATTIC INSULATION		*(Record R-value)*				DK/-99	☐	

RASS #	Response from phone svy	MEASURE	1	2	3	4	5	Don't Know	Photo	Other/Notes
N/A		SIDE WALL INSULATION (if accessible)		*(Record R-value)*				DK/-99		
N/A		CRAWL SPACE INSULATION		*(Record R-value)*				DK/-99		
N/A		BASEMENT WALL INSULATION (if accessible)		*(Record R-value)*				DK/-99		
N/A		BASEMENT TYPE	Heat/cond.	Uncond.				DK/-99		
N/A		WALL FRAMING	2x4 wood	2x6 wood	2x4 metal	2x6 metal		DK/-99		
N/A		DUCT LOCATION - % IN CONDITIONED SPACE		*(Record Number)*				DK/-99		
N/A		DUCT INSULATION	Yes	No				DK/-99		
Heating --collect Heating system detail (after system type)										
E5		SHARED HEATING (ANOTHER RES) - (MF ONLY)	*Yes*	*No*				DK/-99	☐	
E6		HEAT SYS TYPE *(ATTACHED - TABLE 1)*		*(Record Number)*				DK/-99	☐	
NA		HEAT SYSTEM MAKE/MODEL – PRIMARY		*(Record type)*				DK/-99		
E2		HEAT SYSTEM AGE-MFG DATE- PRIMARY		*(Record year)*				DK/-99		
F3		SECONDARY HEAT ING SYSTEM TYPE *(ATTACHED - TABLE 1)*		*(Record Numbe or N/Ar)*				DK/-99		
E4		HEAT SYS MAINTENANCE	Annual	Every 2 yrs	Every 3-5 yrs	Repair only/never		DK/-99		
E9		TEMPERATURE CONTROL - MAIN HEAT	Regular Temp	Clock/ Programmable	Dial w/o temp	Switch/ none	Other	DK/-99		
E10		AWAKE TEMP - HEAT		*(Record Number)*				DK/-99		
E11		SLEEP TEMP - HEAT		*(Record Number)*				DK/-99		
E12		AWAY TEMP – HEAT		*(Record Number)*				DK/-99		
Cooling										
F5		SHARED COOLING (ANOTHER RES) - (MF ONLY)	*Yes*	*No*				DK/-99	☐	
F1		COOLING SYSTEM TYPE *(ATTACHED - TABLE 2)*		*(Record Number)*				DK/-99	☐	
N/A		COOLING SYSTEM EFFICIENCY - PRIMARY		*(Record Number; Usually SEER)*				DK/-99		
N/A		COOLING SYSTEM MAKE/MODEL - PRIMARY		*(Record Type)*				DK/-99		
F4		COOLING SYSTEM AGE – MFG DATE - PRIMARY		*(Record Year)*				DK/-99		
F7		COOLING SYSTEM MAINTENANCE	Annual	Every 2 yrs	Every 3-5 yrs	Repair only/never		DK/-99		
F10		TEMPERATURE CONTROL - MAIN COOL	Regular Temp	Clock setting/ Programmable	Dial w/o temp	Switch/ none	Other	DK/-99		
F11		AWAKE TEMP - COOL		*(Record Number)*				DK/-99		
F12		SLEEP TEMP - COOL		*(Record Number)*				DK/-99		
F13		AWAY TEMP - COOL		*(Record Number)*				DK/-99		
F3		SECONDARY COOLING SYSTEM TYPE (ATTACHED - TABLE 2)		*(Record Number)*				DK/-99		

RASS #	Response from phone svy	MEASURE	1	2	3	4	5	Don't Know	Photo	Other/Notes
F1H		WHOLE HOUSE FAN	Yes	No				DK/-99		
F1I		NUM CEILING FAN		*(Record Number)*				DK/-99		
Water Heater – collect detail (after fuel type)										
G1		SHARED WATER HEAT (ANOTHER RES) - (MF ONLY)	*Yes*	*No*				DK/-99	☐	
G7		TYPE OF WH *(ATTACHED TABLE 3)*		*(Record Number)*				DK/-99	☐	
G6		FUEL TYPE FOR PRIMARY WH	Electricity	Nat Gas	Propane/ Bottled			DK/-99		
G8		[IF WH = SOLAR] ALT OR B/U WH TYPE	Standard Storage	Tankless				DK/-99		
G2		QTY WATER HEATERS		*(Record Number)*				DK/-99		
G10		WATER HEATER TEMP – 1		*(Record Number)*				DK/-99		
G11		WH NO TEMP - L/M/H -1	Low	Med - Low	Med	Med - High	High	DK/-99		
N/A		WH EFFICIENCY -1		*(Record Number)*				DK/-99		
N/A		WH MAKE/MODEL -1		*(Record Type)*				DK/-99		
G4		WH AGE - MFG DATE - PRIMARY		*(Record Year)*				DK/-99		
N/A		WH SIZE - GAL – PRIMARY		*(Record Number)*				DK/-99		
G12		WH BLANKET/WRAP ON MAIN WH	Yes	No				DK/-99		
G14		WH TIMER	Yes	No				DK/-99		
N/A		DRAIN HEAT RECOVERY	Yes	No				DK/-99		
Laundry / Bathroom										
H9		CLOTHES DRYER	Private	Shared	None			DK/-99	☐	
N/A		NUM CLOTHES DRYERS		*(Record Number)*				DK/-99	☐	
NA		CLOTHES DRYER MAKE/MODEL – PRIMARY		*(Record Type)*				DK/-99		
NA		CLOTHES DRYER AGE – MFG DATE – PRIMARY		*(Record Year)*				DK/-99		
H10		CLOTHES DRYER FUEL	Electricity	Nat Gas	Propane/ Bottled			DK/-99		
N/A		NUM CLOTHES DRYER – W/ MOISTURE SENSOR		*(Record Number)*				DK/-99		
H7		CLOTHES WASHER	Private	Shared	None			DK/-99	☐	
H8		NUM CLOTHES WASHER (Vertical Axis)		*(Record Number)*				DK/-99	☐	
H8		NUMCLOTHES WASHER (Hor izontal Axis)		*(Record Number)*				DK/-99		
N/A		CLOTHES WASHER EFFICIENCY	Energy Star	Non Energy Star				DK/-99		
N/A		LOW-FLOW SHOWERHEADS (GPM ≤ 2.5)		*(Record Number)*				DK/-99		
N/A		TOTAL NUM SHOWERS		*(Record Number)*				DK/-99		

RASS #	Response from phone svy	MEASURE	1	2	3	4	5	Don't Know	Photo	Other/Notes
N/A		LOW-FLOW AIRATORS (GPM ≤ 2.5)		*(Record Number)*				DK/-99		
N/A		TOTAL NUM SINKS		*(Record Number)*				DK/-99		
Cooking / Kitchen										
H25		NUM OVENS		*(Record Number)*				DK/-99		
H24		OVEN FUEL – PRIMRY	Electricity	Nat Gas	Propane/ Bottled			DK/-99		
N/A		CONVECTION OVEN – PRIMARY	Yes	No				DK/-99		
H23		NUM COOKING STOVES		*(Record Number)*				DK/-99		
H24		COOKING STOVE FUEL	Electricity	Nat Gas	Propane/ Bottled			DK/-99		
H1		NUM REFRIGERATORS		*(Record Number)*				DK/-99	☐	
NA		REFRGERATOR MAKE/MODEL - PRIMARY		*(Record name)*				DK/-99	☐	
H2		AGE PRIMARY REFRIGERATOR	6 or less	7 to 14	15+			DK/-99		
N/A		REFRIGERATOR EFFICIENCY	Energy Star	Non Energy Star				DK/-99		
H4		NUM STAND-ALONE FREEZERS		*(Record Number)*				DK/-99	☐	
NA		STAND-ALONE FREEZER MAKE/MODEL		*Record name)*				DK/-99	☐	
H5		AGE PRIMARY STAND-ALONE FREEZER	6 or less	7 to 14	15+			DK/-99		
N/A		FREEZER EFFICIENCY	Energy Star	Non Energy Star				DK/-99		
H6		NUM DISHWASHERS		*(Record Number)*				DK/-99	☐	
NA		DISHWASHER MAKE/MODEL		*(Record name)*				DK/-99	☐	
NA		AGE DISHWASHER		*(Record year)*				DK/-99		
N/A		DISHWASHER EFFICIENCY	Energy Star	Non Energy Star				DK/-99		
H26		NUM MICROWAVES		*(Record Number)*				DK/-99		
H11		DEHUMIDIFIER	Yes	No				DK/-99	☐	
NA		DEHUMIDFIER MAKE/MODEL		*(Record name)*				DK/-99	☐	
NA		DEHUMIDIFIER AGE		*(Record year)*				DK/-99		
N/A		DEHUMIDIFIER EFFICIENCY	Energy Star	Non Energy Star				DK/-99		
Recreational Equipment										
H14		SWIMMING POOL	Private	Shared (MF)	None			DK/-99	☐	
H15		SWIMMING POOL HEATING FUEL	Electricity	Nat Gas	Propane/ Bottled			DK/-99		
N/A		SWIMMING POOL – TIMER – ON		*(Record Time)*				DK/-99		
N/A		SWIMMING POOL – TIMER – OFF		*(Record Time)*				DK/-99		

RASS #	Response from phone svy	MEASURE	1	2	3	4	5	Don't Know	Photo	Other/Notes
N/A		SWIMMING POOL – TIMER – ON – 2		*(Record Time)*				DK/-99		
N/A		SWIMMING POOL – TIMER – OFF – 2		*(Record Time)*				DK/-99		
H18		HOT TUB/SPA	Private	Shared	None			DK/-99	☐	
H19		HOT TUB/SPA FUEL	Electricity	*Nat Gas*	Propane/ Bottled			DK/-99		
H20		SAUNA	Private	Shared	None			DK/-99	☐	
H21		SAUNA FUEL	Electricity	*Nat Gas*	Propane/ Bottled			DK/-99		

Lighting*[Auditors, please note unusual or high bulb count fixtures such as candelabra fixtures with more than 20 bulbs.]

	Screw Based Lamps			Pin Based Lamps				Canned lighting (top floor only)	
Room	# Incandescent	# CFL	# Halogen	# Florescent	# CFL	# Halogen	TOTAL Bulbs	# of canned light sockets in top floor	% sealed
Bathroom 1									
Bathroom 2									
Bathroom 3									
Bedroom 1									
Bedroom 2									
Bedroom 3									
Bedroom 4									
Bedroom 5									
Closet 1									
Closet 2									
Closet 3									
Closet 4									
Closet 5									
Formal/Separate Dining Room									
Garage									
Hallway/Entry 1									
Hallway/Entry 2									
Hallway/Entry 3									
Kitchen/Dining Area									
Laundry/Utility Room									
Office/Den									
Other/Secondary Living Space									
Outside Lamps									
Primary Living Space (LR or Family Room where residents spend most time)									
Unconditioned Basement									
Total Installed									
In Storage (Not Installed)									

Total # of rooms in home:	
Notes:	

Table 1 - Heating Equipment

Code	Equipment Description
1	Natural gas central forced air furnace
2	Natural gas hot water boiler (with radiators or baseboards); also called natural gas hydronic heating
3	Natural gas steam boiler (with radiators)
4	Natural gas radiant floor heating
5	Natural gas fireplace
6	Electric Baseboard
7	Electric central forced air furnace
8	Air-source Heat pump (ELEC)
9	Ground-source heat pump (ELEC)
10	Portable heaters (ELEC)
11	Oil central forced air furnace
12	Oil hot water boiler ((with radiators or baseboards); also called oil hydronic heating)
13	Oil steam boiler (with radiators)
14	Bottled gas central forced air (propane, butane, or kerosene)
15	Bottled gas portable heaters (propane, butane, or kerosene)
16	Wood stove
17	Wood fireplace
18	Solar
19	Other System & Fuel [SPECIFY]
20	None (No heating system)
-99	DK
-99	REF

Table 2 - Cooling Equipment

Code	Equipment Description
1	Central air conditioner
2	Air-source heat pump
3	Ground-source heat pump
4	Room air conditioners
5	Ductless mini-split air conditioner
6	Evaporative cooler (Swamp cooler)
7	Portable fans
8	Whole-house fan, or
9	Ceiling fans
10	Something else [SPECIFY]
11	No cooling system
-99	DK
-99	REF

Table 1 – Water Heating Equipment

Code	Equipment Description
1	Tank type storage water heater.
2	Heat pump water heater
3	Indirect water heater that uses the home's boiler as the heat source or an integrated water heater that is also used to heat the home.
4	Solar water heater
5	Tankless hotwater heater, also called Demand or instantaneous water heaters
-99	DK
-99	REF

B1. Within the past year, what have you done to reduce energy use in your home? (select all that apply) [In field, circle letters of affirmative responses. *For data entry, enter 1 for each affirmative response]*

a. Turn off lights when not in use
b. Replace light bulbs with Compact Fluorescent Light (CFL) bulbs
c. Adjust thermostat setting at night
d. Adjust thermostat setting when not at home
e. Reduce thermostat setting in the winter
f. Increase thermostat setting in the summer
g. Installed programmable thermostat
h. Unplug adapters and charging devices when not in use
i. Unplug electronic devices with "instant on" feature
j. Purchase energy efficient appliances/equipment
k. Take shorter showers
l. Increase level of insulation
m. Reduce air infiltration or leaks (by caulking, adding storm windows, etc.)
n. I don't do anything to reduce energy in my home (SKIP TO QUESTION B3)
o. Other [specify]:_____

B2. What is your primary motive to reduce energy use in your home? [*Randomize order*]

a. To save energy
b. To save money on utility bill
c. Reduce pollution/carbon footprint
d. Other [specify]:_____

B3. Which of the following high-efficiency equipment (eg. ENERGY STAR®) have you installed in your home in the past five years? (select all that apply)

a)Compact Fluorescent Light Bulb(s) (CFL)
b)central air conditioner
c)window/through-the-wall air conditioner
d)Heat-Pump
e)Water Heater
f) refrigerator
g)dishwasher

h)clothes washer

i) Other [specify]:

j) Have not installed any energy efficient equipment in my home

[SURVEYOR READ*] Part of designing new programs that customers find attractive is identifying offerings that match customer needs. The following questions will highlight some of the programs and offerings currently under review. Using a scale of 1 to 5, please indicate your perception of the following program elements and/or offerings.*

B4. How likely would you be to take the following actions if offered by Ameren Illinois Utilities? Please give a number between 1 to 5, where 1 is 'Very Unlikely' and 5 is 'Very likely.'

a. **Have an on-site home energy audit.** An energy audit is an evaluation of home energy efficiency performed by a professional auditor who conducts a visual inspection of your home and diagnostic tests on your heating and cooling system. They identify major air leakage and insulation gaps, look for general energy-saving opportunities, and provide recommendations for energy efficiency upgrades.

A residential energy audit can help homeowners identify the most cost-effective, highest-priority energy efficiency upgrades for their home, which can reduce monthly utility bills and increase comfort.
How likely would you be to pay for an on-site energy audit of your home if the final cost to you was:

1. $200 [RATING 1-5]_____
2. $250 [RATING 1-5]_____
3. $300 [RATING 1-5]_____

b. **Recycle an old Appliance.** You would be paid for somebody to pick-up and recycle your old working refrigerator and/or freezer. [RATING:_____]

[SURVEYOR READ] Generally it costs extra to purchase energy efficient products (such as Energy Star® products) over standard products that are not energy efficient. The next series of questions assess your likelihood to purchase energy efficient products.

B5. For each measure option in the table below please rate your likelihood to purchase the following items by assigning a number between 1 to 5, where 1 is 'Not at all likely' and 5 is 'Extremely likely.'

Options	A Without a utility incentive, how likely would you be to install energy efficient [Option] in the next five years? [If response 1-4, continue to B]	B What if Ameren paid 50% of the cost to upgrade to the energy efficiency model? [If response1-4, continue to C] [If necessary, provide the related approximate incremental cost]	C How about if the incentive were 75% of the cost to upgrade? [If necessary, provide the related approximate incremental cost]	**Initial Cost Difference** [for surveyor use, read as necessary]
B5A. Energy Efficient Lighting (CFLs)				$3 for 19W CFL (equivalent to 75W incandescent bulb)
B5B. Air Conditioning (central)				$550 for Central A/C; $50 for Room A/C
B5C. Space Heating (gas furnace)				$320 for gas furnace
B5D. Appliances (refrigerator)				$30 for top-mount refrigerator w/o ice dispenser
B5E. Electronics (TV, computer)				$100 for HDTV or $80 for computer
B5F. Weatherization (energy efficient insulation)				$400 for insulation

[SURVEYOR READ] In the next four questions please tell me how you make your decisions about energy efficiency.

B6. Please rate the level of importance each of the following factors has in your decision to participate in an Ameren sponsored energy efficiency program on a scale from 1 to 5 where 1 is 'not important at all' and 5 is 'extremely important',

a. Effect on the value of your home [RATING:_____]
b. Environmental impact [RATING:_____]
c. Effect on your monthly electric bill [RATING:_____]

d. Out-of-pocket cost for new high-efficiency electric equipment/appliances [RATING:_____]
e. Level of comfort [RATING:_____]
f. Payback period from new high-efficiency equipment [RATING:_____]
g. Impact on lifestyle/convenience [RATING:_____]

B7. We understand that at times there may be barriers that can prevent you from becoming more energy efficient. Please indicate your level of agreement with the following statements, where 1 is 'Completely Disagree' and 5 is 'Completely Agree.'

a. High-efficiency measures are generally too expensive for me (Cost)
b. I often need more information about high-efficiency measures (Information)
c. I am not responsible for purchasing these items in my household (Not Decision Maker)
d. I do not know enough about my home's current energy usage (Knowledge)
e Energy prices are not high enough to motivate me to take action (Status quo)

B8. What other barriers often prevent you from becoming more energy efficient in your home?

a. (specify):_____
b. No other barriers exist

A.3 – Commercial On-Site Survey

Ameren Commercial On-Site Survey

****Confidential: All data collected on this form is confidential and may only be used for this study.*

1. General Building Information

Site Name			
Site Address			
City/State/Zip			

Primary Contact for Site Visit

Contact 1		Title					
Address		City		State		Zip	
Phone 1a		Phone		Email			

Alternate Contact for Site Visit

Contact 2		Title					
Address		City		State		Zip	
Phone 2a		Phone		Email			

General Building/Complex Information

NAICS code		
Is this site a **S**ingle building or a **M**ultiple building complex?	S M	
Economic use of the building/complex? (Table 1)		
Total Bldg. **GROSS** Floor Area (SqFt) including enclosed parking		☐ Est?
Primary Heating Fuel Type (Table 2)		
No. of Floors above grade		
No. of Floors below grade		
Are there areas within bldg. with dedicated server room(s)?	Y N	
Back-Up Generation (kW)		

Table 1-Economic Use	
1 Food Service	7 Fabricated Metals
2 Food Stores	8 Food & Kindred Products
3 Office Building	9 Rubber & Misc Plastics
4 Retail	10 Warehouse
5 Health Services	11 Other
6 Educational	

Table 2-Fuel Type
1 Electricity
2 Natural Gas
3 Fuel Oil
4 Propane
5 Other

Comments:

Utility Information

Electric Accounts	E1	E2	E3
Electric Utility Name:			
Meter #			

Gas Accounts	G1	G2	G3
Gas Utility Name:			
Meter #			

General Space Information	Primary Space	Secondary Space	Tertiary Space	Common Space	Indoor Parking
Functional Use (Table 1)					
% Of Total Building Area					
Space Cooled?	Y N	Y N	Y N	Y N	
After Hours Shutoff/Setup?	Y N	Y N	Y N	Y N	
Space Heated?	Y N	Y N	Y N	Y N	
After Hours Shutoff/Setback?	Y N	Y N	Y N	Y N	

Table 1 – Space Type Functional Use			
1	Assembly / Recreation	7	Office
2	Classroom	8	Sales
3	Dining	9	Storage (Low bay)
4	Guest room	10	Vacant
5	Kitchen	11	Warehouse (High bay)
6	Laundry / Housekeeping	12	Process (Industrial only)

2. Business Hours of Operation

Hours of Operation - Primary Space

Day Type	Hours (01-24)	Closed All Day?	Open 24 Hours?
Weekday	From _____ To_____	☐	☐
Saturday	From _____ To_____	☐	☐
Sunday	From _____ To_____	☐	☐

Hours of Operation - Secondary Space

Day Type	Hours (01-24)	Closed All Day?	Open 24 Hours?
Weekday	From _____ To_____	☐	☐
Saturday	From _____ To_____	☐	☐
Sunday	From _____ To_____	☐	☐

Hours of Operation - Tertiary Space

Day Type	Hours (01-24)	Closed All Day?	Open 24 Hours?
Weekday	From _____ To_____	☐	☐
Saturday	From _____ To_____	☐	☐
Sunday	From _____ To_____	☐	☐

Hours of Operation - Common Space

Day Type	Hours (01-24)	Closed All Day?	Open 24 Hours?
Weekday	From _____ To_____	☐	☐
Saturday	From _____ To_____	☐	☐
Sunday	From _____ To_____	☐	☐

Hours of Operation – Indoor Parking

Day Type	Hours (01-24)	Closed All Day?	Open 24 Hours?
Weekday	From _____ To_____	☐	☐
Saturday	From _____ To_____	☐	☐
Sunday	From _____ To_____	☐	☐

3. Building Envelope

EXTERNAL WALLS	North	East	South	West
Surface Type: **B** = Brick **C** = Concrete **CB** = Concrete Block **F** = Wood **M** = Metal **AW** = Adjoining Wall	B C CB F M AW	B C CB F M AW	B C CB F M AW	B C CB F M AW

WINDOWS

(Predominant window type by direction)	North	East	South	West
Window Area (% of wall area)				
# Panes of Glass	1 2 3	1 2 3	1 2 3	1 2 3
Glazing Material: **C** = Clear, **O** = Opaque **R** = Reflective, **T** = Tinted	C O R T	C O R T	C O R T	C O R T
Frame Type: **M** = Metal **V** = Vinyl **W** = Wood	M V W	M V W	M V W	M V W

ROOFS

Roof Type: **F** = Flat **P** = Pitched	F P
Surface Material: **B** = Built-up **C** = Cool Roof **E** = Membrane **M** = Metal **S** = Shingles/Felt	B C E M S
Roof Area (SF): [Flat Roof Only]	

FLOORS

Floor Type: **B** = Basement **C** = Crawl **S** = Slab **U** = Unconditioned	B C S U

SKYLIGHTS

Skylights?	Y N
Skylight Area: (SF)	
Lighting Dimming Control?	Y N

4. Unitary HVAC System

Packaged System ID:	PS1	PS2	PS3
Space ID (s) Served	1 2 3 C	1 2 3 C	1 2 3 C
Packaged HVAC System Type (Table 1)			
Number of Units			
Age of Unit (Years)			
Manufacturer			
Model Name / Number			
Rated Cooling Capacity (Tons)			
Performance Rating (Circle one)	*EER SEER*	*EER SEER*	*EER SEER*
Performance Rating Value			
Temperature Control Type (Table 2)			
Supply Fan: Volume Control: [VAV only] **D**ischarge Damper **I**nlet Vane **V**FD	D I V	D I V	D I V
Return Fan?	Y N	Y N	Y N
Economizer: **A**ir **W**ater **N**one	A W N	A W N	A W N
Primary Heating Type (Table 3)			
Primary Heating Fuel Type (Table 4)			
Supplemental Heating Type (Heat Pump only) (Table 3)			
Supplemental Heating Fuel Type (Heat Pump only) (Table 4)			

Table 1-Packaged HVAC System Type	
0 - Packaged Single Zone – HEAT only	7 - Heat Pump, ground source
1 - Packaged Single Zone – A/C only	8 - Heat pump, water source
2 - Packaged Single Zone – A/C w/ heat	9 - Split System
3 - Packaged Multi Zone	10 - Unit Heater
4 - Packaged VAV	11 - Unit Ventilator
5 - Evaporative Cooler	12 - Window / Wall A/C unit
6 - Heat Pump, air source	13 - Window / Wall Heat Pump

Table 2-Temperature Control Type
1 - Thermostat – Programmable
2 - Thermostat - Manual
3 - EMS
4 - Always On
5 - Manual on/off
6 - Time clock

Table 3-Heating Type
1 - Forced Air
2 - Resistance
3 - Central Boiler
4 - Heat Pump
5 – Other

Table 4–Fuel Type
1 - Electricity
2 - Natural Gas
3 - Fuel Oil
4 - Propane
5 – Other

5a. Central HVAC System – Air Distribution

Air Handler ID:	AH1	AH2	AH3
Air Distribution System Type (Table 1)			
Temperature Control Type (Table 2)			
Age of Air Handler (Years)			
Supply Fans: Volume Control: **N**one **I**nlet Vane **V**FD	N I V	N I V	N I V
Supply Fan Motor HP			
Motor Efficiency (% or S, H, P)			
Return Fans?	Y N	Y N	Y N
Return Fan Motor HP			
Motor Efficiency (% or S, H, P)			
Economizer?	Y N	Y N	Y N
Terminal Reheat: **E**lectric **H**ot Water **S**team **N**one	E H S N	E H S N	E H S N

Table 1-Air Distribution System Type	
1 - CV Single Zone	8 - VAV Terminal Reheat
2 - CV Multi Zone	9 - VAV Dual Duct
3 - CV Dual Duct	10 - Fan Coil
4 - CV Terminal Reheat	11 - Baseboard
5 - FPS Fan Powered VAV - Series	12 - Heat & Vent
6 - FPP Fan Powered VAV - Parallel	13 - Hydronic Heat Pump
7 - VAV Cooling Only	14 - Induction

Table 2-Temperature Control Type
1-Thermostat – Programmable
2-Thermostat - Manual
3-EMS
4-Always On
5-Manual on/off
6-Time clock

5b. Central HVAC System – BOILER

Boiler ID:	B1	B2	B3
Boiler Service: **H**ot Water **S**team	S H	S H	S H
Number of Boilers			
Age of Boiler(s) (years)			
Fuel Type (Table 1)			
Manufacturer			
Model Name/Number			
Input Capacity (kW or kBtu/hr)			
EMS Control?	Y N	Y N	Y N

HOT WATER PUMPS

Quantity			
Motor HP			
Motor Efficiency (% or S, H, P)			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V	1 2 V	1 2 V
EMS Control?	Y N	Y N	Y N

Table 1 – Fuel Type
1 - Electricity 2 - Natural Gas 3 - Fuel Oil 4 - Propane 5 – Other

5c. Central HVAC System - CHILLER

Chiller ID:	C1	C2	C3
Chiller Type (Table 1)			
Number of Chillers			
Age of Chiller(s) (Years)			
Manufacturer			
Model Name/Number			
Rated Cooling Capacity (Tons)			
Full Load kW			
EMS Control?	Y N	Y N	Y N

HEAT REJECTION SYSTEM

Condenser Type (Table 2)			
Fan Control: **Co**nstant **Cy**cle **P**ony motor **T**wo-Speed **V**ariable Speed	CO CY P T V	CO CY P T V	CO CY P T V
Condenser Fans: Quantity			
Total Motor HP			
EMS Control?	Y N	Y N	Y N

CHILLED WATER PUMPS

Pump Use: **P**rimary **S**econdary	P S	P S	P S
Quantity			
Total Motor HP			
Motor Efficiency (% or S, H, P)			
Capacity Control: **1** speed **2** speed **V**ariable	1 2 V	1 2 V	1 2 V
EMS Control?	Y N	Y N	Y N

CONDENSER WATER PUMPS

Quantity			
Total Motor HP			
Motor Efficiency (% or S, H, P)			
Capacity Control: **1** speed **2** speed **V**ariable			
EMS Control?			

Table 1-Chiller Type	Table 2-Condenser Type
1 - Centrifugal	1 - Air Cooled Condenser
2 - Reciprocating	2 - Cooling Tower
3 - Rotary	3 - Evaporative Cooler
4 - Absorption, hot water	4 – Other
5 - Absorption, natural gas	
6 - Absorption, steam	

6. Domestic Water Heating

Water Heater ID:	WH1	WH2	WH3	WH4
Water Heater Type (Table 1)				
Fuel Type (Table 2)				
Number of Units				
Age of Water Heater (years)				
Tank Capacity (gallons)				
Input Capacity (kW or kBtu/hr)				
Tank Wrap?	Y N	Y N	Y N	Y N
Recirculation Pump?	Y N	Y N	Y N	Y N

Table 1 – Water Heater Type
1 - Heat Pump
2 - Heat Recovery
3 - Instantaneous (tankless)
4 - Self-Contained
5 - Storage Tank (central boiler)
6 - Solar
7 - Other

Table 2 – Fuel Type
1 - Electricity
2 - Natural Gas
3 - Fuel Oil
4 - Propane
5 - Other

8. Indoor Lighting

Space ID	Lamp Type (Table 1)	Fluor. Type	Length	Usage Type (Table 3)	Ballast Type	Lamps / Fixture	Watts / Lamp	Est.	# of Fixtures	Est.	Control Type (Table 4)	% Con-trolled
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							
					E M							

Table 1-Lamp Type	
F	Linear Fluorescent
U	U-Tube Fluorescent
CF	Compact Fluorescent
CIR	Circline
MH	Metal Halide
H	High-Pressure Sodium
I	Incandescent
Q	Quartz/Halogen
LED	Exit LED
XI	Exit Incandescent
XCF	Exit CFL
XO	Exit Other

Table 2-Fluor. Type
T5
T8
T12

Table 3-Usage Type	
G	General Area
R	Retail Display
T	Task

Table 4-Control Type	
E	EMS
DC	Daylighting -Continuous
DS	Daylighting -Step
MB	Manual – circuit breaker
MS	Manual – wall switch
OS	Occupancy sensor
P	Photocell
T	Timeclock
N	None (continuous)

9. Outdoor Lighting

Space ID	Lamp Type (Table 1)	Fluor. Type	Length	Usage Type (Table 3)	Ballast Type	Lamps / Fixture	Watts / Lamp	Est.	# of Fixtures	Est.	Control Type (Table 4)	Controls Used?
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N
					E M							Y N

Table 1-Lamp Type	
F	Linear Fluorescent
U	U-Tube Fluorescent
CF	Compact Fluorescent
CIR	Circline
MH	Metal Halide
H	High-Pressure Sodium
N	Neon
I	Incandescent
Q	Quartz/Halogen

Table 2-Fluor. Type
T5
T8
T12

Table 3-Usage Type	
A	Advertising
D	Display
F	Façade
P	Parking Lot
S	Safety/Security
O	Other

Table 4-Control Type	
E	EMS
MB	Manual – circuit breaker
MS	Manual – wall switch
OS	Occupancy sensor
P	Photocell
PT	Photocell & Timeclock
T	Timeclock
N	None (continuous)

10. Miscellaneous Equipment

Economic Use Type	Equipment		
Food Service (Restaurant)	Meals per day	(#)	
	Kitchen – Full Service	(1=Yes, 0=No)	
	Kitchen – Warming	(1=Yes, 0=No)	
Food Stores (Grocery)	Point-of-use terminals	(#)	
	Food Prep – Meat Dept.	(1=Yes, 0=No)	
	Food Prep – Deli	(1=Yes, 0=No)	
Office Buildings	PCs	(#)	
Retail	Point-of-use terminals	(#)	
Misc. Retail (Lodging)	Rooms	(#)	
	Annual Average occupancy	(%)	
	Kitchen – Full Service	(1=Yes, 0=No)	
	Kitchen – Warming	(1=Yes, 0=No)	
	Laundry Facility	(1=Yes, 0=No)	
Health Services	Beds	(#)	
	Laundry Facility	(1=Yes, 0=No)	
Educational	Classrooms	(#)	
	PCs	(#)	
	Kitchen – Full Service	(1=Yes, 0=No)	
	Kitchen – Warming	(1=Yes, 0=No)	
	Laundry Facility	(1=Yes, 0=No)	
Warehouses	Forklifts (electric only)	(#)	

Food Service Equipment			Electric	Gas
If Kitchen–Full Service	Broilers / Fryer	(#)		
	Griddle / Grill	(#)		
	Oven	(#)		
	Range	(#)		
	Hot Boxes	(#)		
	Conveyor Toasters	(#)		
	Heat Lamps	(#)		
	Door-type dishwasher	(#)		
	Conveyor dishwashers	(#)		
	Flight dishwashers	(#)		
	Dishwasher Booster	(#)		
If Laundry	Clothes Dryer–Commercial	(#)		
	Clothes Dryer–Residential	(#)		

11. Refrigeration Equipment

COMPRESSORS ID #:	Cp-1	Cp-2	Cp-3	Cp-4	Cp-5
Type: **R**eciprocating **S**crew	R S	R S	R S	R S	R S
Temp: **L**ow (0 to -10 °F) **M**edium (30 to 40 °F) **H**igh (50 to 55 °F)	L M H	L M H	L M H	L M H	L M H
Total Motor HP:					
Quantity:					
VSD compressors?	Y N	Y N	Y N	Y N	Y N
Heat Recovery?	Y N	Y N	Y N	Y N	Y N

CONDENSERS ID #:	Cn-1	Cn-2	Cn-3	Cn-4	Cn-5
Type: **A**ir-cooled **W**ater-cooled	A W	A W	A W	A W	A W
Total Fan HP: (all types)					
Fan VSD?	Y N	Y N	Y N	Y N	Y N
Pump Motor HP (water-cooled only)					
Pump VSD?	Y N	Y N	Y N	Y N	Y N

REFRIGERATED DISPLAY CASES

	Enclosed	Open	Other
Case Length: (LF)			
Anti-sweat heater control?	Y N		
Lighting Type:	T12 T8 T5 LED	T12 T8 T5 LED	T12 T8 T5 LED
Lamp Length: (Feet)			
Total number of lamps:			

PACKAGED REFRIGERATION EQUIPMENT	Count
Vending Machines	
Beverage Merchandisers	
Ice Machines	
Reach-in upright Refrigerator	
Reach-in upright Freezer	
Reach-in under-counter Refrigerator	
Reach-in under-counter Freezer	
Walk-in Cooler	
Walk-in Freezer	

12. Server Rooms

Hardware in Use:	Count	Energy Star
Servers		Y N

Total Floor Area: (sf)		
Separate electric meter?	Y	N
Does space have its own cooling system?	Y	N
Cooling capacity: (tons)		
Is power management system installed?	Y	N

A.4 – HVAC Trade Ally Survey

The Cadmus Group
AIU – HVAC Trade Ally Survey

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Dealer Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with HVAC dealers and distributors regarding the marketability of energy efficient products and ways the Utilities might help increase sales of the most efficient equipment. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes → Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, THANK& TERMINATE.

_____

C. INTRODUCTORY QUESTIONS

C1 First, I'd just like to confirm that you sell air conditioners, heat pumps, boilers or furnaces to the residential market. Is this correct?

1 Yes
2 No ➔ ***CONFIRM NON-RESIDENTIAL ONLY***
-99 Don't Know ➔ Go to 0

C2 Do you sell unitary AC systems to the non-residential market?

1 Yes
2 No
-99 Don't Know

C2.b. What is the type of your company?

1 Retailer
2 Distributor
3 Manufacturer
4 Contractor
5 Maintenance
6 Other
-99 Don't know

C3 In the past 12 months, have you done any advertising or promotions regarding rebates that are available for high efficiency central air conditioning systems, heat pumps, or furnaces?

ENTER ALL THAT APPLY.

a. Print ads ➔ Go to
b. Radio ads
c. TV ads
d. Circulars/Direct mail
e. Other [SPECIFY: _____]
f. No (Did not promote incentives)
-99 Don't Know ➔ Continue

C4 Why have you not promoted the rebates?

1 Not enough money/budget
2 Utility's job
3 Other [SPECIFY: _____]
-99 Don't Know

C5 In the past 12 months, have you sold any central air conditioning units or heat pumps for which the customer received an incentive or rebate from a utility?

1 Yes
2 No
-99 Don't Know ➔ Go to 0

D. AIR CONDITIONER MARKET SHARE

For the next several questions, I am going to ask about the percent of units that you sell to each the existing home new equipment market, the existing home replacement equipment, the new construction and the non-residential markets. The following questions are specific to equipment used or installed within Ameren Illinois' Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border.

ENTER RESPONSES FOR THE FOLLOWING QUESTIONS INTO TABLE 1, OVERALL.

D1A – D4A

In the past 12 months for all cooling systems that your company has sold what percent would you estimate {Measure}?

D2B – D7B

In the past 12 months for all heating systems that your company has sold what percent would you estimate {Measure}?

D1C – D5E

In the past 12 months for all cooling systems that your company sold that were {Measure}, what percent were sold to the {SECTOR} market?

D2F – D7H

In the past 12 months for all heating systems that your company sold that were {Measure}, what percent were sold to the {SECTOR} market?

ENTER RESPONSES FOR THE FOLLOWING QUESTIONS INTO TABLE 2, RESIDENTIAL NEW CONSTRUCTION.

D1I – D5I

What is the average size in (**TONS** –for central ac/heat Pumps / **Btu** – for electric furnaces) for {MEASURE} that you sell to the residential new construction market?

D1J – D4M

Of the {MEASURE} that you sell to the residential new construction market, what percent are rated {EFFICIENCY – Baseline through Advanced}?

ENTER RESPONSES FOR THE FOLLOWING QUESTIONS INTO TABLE 3, RESIDENTIAL EXISTING HOMES.

D1N – D4N

What is the average size in (**TONS** –for central ac/heat Pumps / **Btu** – for electric furnaces) for {MEASURE} that you sell to the residential existing home market?

D1O – D4R

Of the {MEASURE} that you sell to the residential existing home market, what percent are rated {EFFICIENCY – Baseline through Advanced}?

ENTER RESPONSES FOR THE FOLLOWING QUESTIONS INTO TABLE 4, NON-RESIDENTIAL

D1S – D6S

What is the average size in (**TONS** –for central ac/heat Pumps / **Btu** – for electric furnaces or boilers) for {MEASURE} that you sell to the non-residential market?

D1T – D6W

Of the {MEASURE} that you sell to the non-residential market, what percent are rated {EFFICIENCY – Baseline through Advanced}?

D9. In the past 12 months how many electric heating systems in total would you estimate that your company has sold?

_____ Number of units

D10. In the past 12 months how many cooling systems in total would you estimate that your company has sold?

_____ Number of units

D11. In what percent of the residential buildings in which you have worked is the ductwork located within conditioned spaces?

_____ Percent

E. CONCLUSION

That is all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1	Yes
2	No
-99	Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

Table1. Overall

		A	B	C	D	E	F	G	H
		Share of Cooling Equipment (column total should come close to 100%)	**Share of Heating Equipment** (column total should come close to 100%)	**Cooling** (Percent of column A)			**Heating** (Percent of Column B)		
	Measure			**Residential New Construction**	**Residential Existing Homes**	**Non-Residential**	**Residential New Construction**	**Residential Existing Homes**	**Non-Residential**
1	Central Air Conditioners								
2	Air Source Heat Pumps								
3	Open Loop Ground Source (geothermal) Heat Pumps								
4	Closed Loop Ground Source (geothermal) Heat Pumps								
5	Chiller								
6	Electric Furnaces								
7	Gas Heating								

Table 2. Residential New Construction

		I	J		K		L		M	
		Residential New Construction Efficiency Levels								
	Measure	**Average Size (Tons/BTUs)**	**Baseline Efficient**	**%**	**High Efficient**	**%**	**Premium Efficient**	**%**	**Advanced Efficient**	**%**
1	Central Air Conditioners		13 SEER		14 or 15 SEER		16 or 17 SEER		Over 17 SEER	
2	Air Source Heat Pumps		13 SEER & 7.7 – 8.4 HSPF		14 - 15 SEER & 8.5 - 8.7 HSPF		16 - 7 SEER & 8.8 - 8.9 HSPF		18 SEER & 9.0 HSPF or greater	
3	Open Loop Ground Source (geothermal) Heat Pumps		EER = 16.2, COP = 3.6		EER = 17, COP = 4.0					
4	Closed Loop Ground Source (geothermal) Heat Pumps		EER = 13.4, COP = 3.1		EER = 14.1, COP = 3.3		EER = 16.2, COP = 4.1			

Table 3. Residential Existing Homes

		N	O		P		Q		R	
		Residential Existing Homes Efficiency Levels								
	Measure	**Average Size (Tons/BTUs)**	**Baseline Efficient**	**%**	**High Efficient**	**%**	**Premium Efficient**	**%**	**Advanced Efficient**	**%**
1	Central Air Conditioners		13 SEER		14 or 15 SEER		16 or 17 SEER		Over 17 SEER	
2	Air Source Heat Pumps		13 SEER & 7.7 – 8.4 HSPF		14 - 15 SEER & 8.5 - 8.7 HSPF		16 - 7 SEER & 8.8 - 8.9 HSPF		18 SEER & 9.0 HSPF or greater	
3	Open Loop Ground Source (geothermal) Heat Pumps		EER = 16.2, COP = 3.6		EER = 17, COP = 4.0					
4	Closed Loop Ground Source (geothermal) Heat Pumps		EER = 13.4, COP = 3.1		EER = 14.1, COP = 3.3		EER = 16.2, COP = 4.1			

Table 4. Non-Residential

		S	T		U		V		W	
		Non-Residential Efficiency Levels								
	Measure	Average Size (Tons/BTUs)	Baseline Efficient	%	High Efficient	%	Premium Efficient	%	Advanced Efficient	%
1	DX Unit (direct expansion – unitary)		10.3 EER		11 EER		11.5 EER		12 EER	
2	Air Source Heat Pumps		10.1 EER & 3.2 COP		EER=11.0, COP=3.5		EER=11.5, COP=3.8		12 EER & 4.0 COP or greater	
3	Chiller (air-cooled)		1.13 kW/TON		1.04 kW/TON		0.95 kW/TON			
4	Chiller (water-cooled)		0.72 kW/TON		0.57 kW/TON		0.54 kW/TON		0.49 kW/TON	
5	Open Loop Ground Source (geothermal) Heat Pumps		EER = 16.2, COP = 3.6		EER = 17, COP = 4.0					
6	Closed Loop Ground Source (geothermal) Heat Pumps		EER = 13.4, COP = 3.1		EER = 14.1, COP = 3.3		EER = 16.2, COP = 4.1			

A.5 – Premium Efficiency Motors Survey

The Cadmus Group

AIU – Premium Efficiency Motors Survey

A. Respondent's Contact Information (Complete before interview)

Company Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. Introduction

Hello, my name is _____ and I work for a research firm called the Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities**.

We are conducting a study with manufacturers, distributors and installers of **[MEASURE]**. If you have a few minutes, I'd like to ask you some questions about the products you distribute or install.

This research effort will take approximately 20 minutes to complete.

1. Do you want to proceed by phone now? [IF YES PROCEED ON TO NEXT PAGE, IF NO GO TO BELOW]

2. Schedule another time? [If yes, write in scheduled date and time]
   _____

C. Awareness of / Participation in AIU Programs

1. Are you familiar with AIU's energy efficiency programs for business customers called "ActOnEnergy?"
   1) Yes ➔ Continue
   2) No ➔ Skip to 2
   -99) Don't Know ➔ Skip to 2

2. To the best of your knowledge, has your company received an incentive for efficient motors from AIU in the past year either as a program participant, or on behalf of one of your customers?
   1) Yes
   2) No
   -99) Don't Know

3. In the past five years, have you sold any NEMA Premium® motors?
   1) Yes
   2) No
   -99) Don't Know

4. In the past five years, have you sold any advanced motor controls such as VFDs and ASDs?
   1) Yes
   2) No
   -99) Don't Know

D. Awareness of and Demand for Energy Efficiency

5. How would you say that your customer's awareness of, and familiarity with NEMA Premium® motors changed over the past five years? Has it… **[Read List]**
   1) Decreased significantly
   2) Decreased somewhat
   3) Stayed the same
   4) Increased somewhat
   5) Increased significantly
   -99) Don't Know

6. How would you say that your customer's awareness of, and familiarity with advanced motor controls (ASDs, VFDs…) has changed over the past five years? Has it… **[Read List]**
   1) Decreased significantly
   2) Decreased somewhat
   3) Stayed the same
   4) Increased somewhat
   5) Increased significantly
   -99) Don't Know

7. Thinking back over the past five years, would you say market demand for NEMA Premium® motors has . . . ?
   1) Decreased significantly
   2) Decreased somewhat
   3) Stayed the same
   4) Increased somewhat
   5) Increased significantly
   -99) Don't Know

8. Thinking back over the past five years, would you say market demand for advanced motor controls (ASDs, VFDs…) has . . . ?
   1) Decreased significantly
   2) Decreased somewhat
   3) Stayed the same
   4) Increased somewhat
   5) Increased significantly
   -99) Don't Know

9. **[IF ANY QUESTION 5-8 ≠ 3 or -99]** To what do you attribute these trends in demand, sales and competition? **[After attributions provided, clarify if type of influence is positive or negative and then rate the strength of impact]** How would you rate the impact of these factors, using a scale of 0 to 10, where 10 = very large impact and 0 = very small impact?

Factor (Do Not Prompt - Check all that Apply)	**Direction of Influence** (+ = Increased Sales…; - = Decreased)	**Rate** [Rate after all factors are recorded] (10 = very large impact; 0 = very small impact)
a) Energy prices	a1) + / -	a2) _____
b) Environmental awareness/concerns	b1) + / -	b2) _____
c) Overall Economic conditions	c1) + / -	c2) _____
d) Customer demand	d1) + / -	d2) _____
e) Manufacturer rebates	e1) + / -	e2) _____
f) AIU	f1) + / -	f2) _____
g) Other Gov't programs [Specify] :_____	g1) + / -	g2) _____
h) Other 1 [Specify]_____	h1) + / -	h2) _____
i) Other 2 [Specify]_____	i1) + / -	i2) _____
Enter Total Number of Factors to Right → →	→ → → →	j2) _____

10. **[IF FAMILIAR WITH AIU (Q1=1)]** In your opinion, has AIU or the **Motors** program had any impact on these trends in market demand, sales, competition, and/or motor price differentials?

_____
_____
_____
_____

F. Market Share

Questions 122-15

11. Approximately how many electric motors did your organization sell during the past 12 months in Illinois?

Record number _____ (Don't know/Refused = -99) **[IF Refused, Probe for range or share of IL market (Less LI) and Note Below]**

NOTE: _____

[ASK PARTS a-c ONLY IF Q3=1 (Sold NEMA Premium Motors in Past 5 Years)]

a. What percent of your **Total** replacement motor sales for {APPLICATION} are NEMA Premium®?
_____% **[Insert numerical response into table below]**

b. What percent of your replacement motor sales for {APPLICATION} are **Eligible** to be NEMA Premium®? **[IF NEEDED]** By eligible, I mean would result in lifecycle cost savings (saving when operating costs are factored in).
_____% **[Insert numerical response into table below]**

c. **[IF FAMILIAR WITH AIU (Q1=1)]** In your opinion, what percent of your organization's total motor sales for {APPLICATION} would have been NEMA Premium® if AIU/Motors had NOT been operating any programs in Illinois?
_____% **[Insert numerical response into table below]**

[ASK PARTS d - 0 ONLY IF Q4=1 (Sold Advanced Motor Controls in Past 5 Years)]

d. What percent of your replacement motor sales for {APPLICATION} include advanced motor controls such as VFDs or ASDs?
_____% **[Insert numerical response into table below]**

e. What percent of your replacement motor sales for {APPLICATION} are **Eligible** to include advanced motor controls such as VFDs or ASDs?
_____% **[Insert numerical response into table below]**

f. Over the past five years, has the percent of your total replacement motor sales for {APPLICATION} that included advanced motor controls such as VFDs or ASDs increased, decreased, or stayed the same? **[IF INCREASED OR DECREASED]** significantly or just somewhat?
   1) Decreased significantly
   2) Decreased somewhat
   3) Stayed the same
   4) Increased somewhat
   5) Increased significantly
   -99) Don't Know

   [Insert coded response into table below]

Responses for Questions 12-15

{APPLICATION}	a % of Sales NPEM	b % Eligible to be NPEMs	c % NPEM w/o AIU incentive	d % of Sales Include Controls	e % Eligible to Incorp. Controls	f Incr. /Decr. 1-5 / -99
12. any use						
13. use in HVAC equipment						
14. use in compressors						
15. use in horizontal						

pumps						

16. **[IF any Q122-15 PARTS c or f = 1, 2, 4, or 5]** In your opinion, what are the most important factors contributing to the change in sales of NEMA Premium® motors and advanced motor controls by your organization?

Factor (Do Not Prompt - Check all that Apply)	Direction of Impact (+ = Increases NEMA Sales; - = Decreases)	Rate Strength of Impact (10 = very large impact; 0 = very small impact)
a. Higher energy costs	a1) + / -	a2) _____
b. Reduced price differential between EPAct and NEMA Premium® motors	b1) + / -	b2) _____
c. Greater awareness of NEMA Premium® motors among customers	c1) + / -	c2) _____
d. Greater availability of NEMA Premium® models	d1) + / -	d2) _____
e. Fuller product line for NEMA Premium® motors	e1) + / -	e2) _____
f. Promotion by manufacturers	f1) + / -	f2) _____
g. Programs/promotion by AIU	g1) + / -	g2) _____
h. AIU vendor incentives (currently education and sales support)	h1) + / -	h2) _____
i. AIU end user incentives (financial, education, motor inventories)	i1) + / -	i2) _____
j. Other 1 (specify) _____	j1) + / -	j2) _____
k. Other 2 (specify) _____	k1) + / -	k2) _____
l. Other 3 (specify) _____	l1) + / -	l2) _____
m. Other 4 (specify) _____	m1) + / -	m2) _____
Enter Total Number of Factors to Right → → →	→ → → →	n2) _____

17. Looking ahead to the coming year, do you expect that the percentage of NEMA Premium® motors sold by your organization will increase, decrease, or stay the same?
    1) Decrease significantly
    2) Decrease somewhat
    3) Stay the same
    4) Increase somewhat
    5) Increase significantly
    -99) Don't Know

18. **[IF FAMILIAR WITH AIU (Q1=1)]** How would you expect the percentage of NEMA Premium® motors sold by your organization would change next year if AIU/ **Motors** programs were discontinued?
    1) Decrease significantly
    2) Decrease Somewhat
    3) Stay the same
    4) Increase somewhat
    5) Increase significantly
    -99) Don't Know

19. **[IF Q3=1 (Sold NEMA Premium Motors in Past 5 Years)]** What percent of your current motor inventory is NEMA Premium®?
    _____%

20. **[IF Q3=1 (Sold NEMA Premium Motors in Past 5 Years)]** What percent of NEMA Premium® eligible applications receive EPAct motors instead of NEMA Premium® because the NEMA Premium® motors are not available in an acceptable timeframe?
    _____%

21. **[IF Q3=1 (Sold NEMA Premium Motors in Past 5 Years)]** Over the past five years, has the percent of these NEMA Premium® eligible applications that end up receiving EPAct motors increased, decreased, or stayed the same? **[IF INCREASED OR DECREASED]** significantly or just somewhat?
    1) Decrease significantly
    2) Decrease somewhat
    3) Stay the same
    4) Increase somewhat
    5) Increase significantly
    -99) Don't Know

Z. Firmographic Information

I just have a few additional questions about your organization…

22. How many locations does your organization have in Illinois?
    1) One
    2) 2 to 5
    3) 6 to 10
    4) 11 to 20
    5) More than 20
    -99) Don't Know

23. Approximately how many full time employees or full time equivalents does your organization have at this facility?
    1) Fewer than 5
    2) 5 to 9
    3) 10 to 19
    4) 20 to 49
    5) 50 to 99
    6) 100 to 249
    7) 250 or More
    -99) Don't Know

This concludes the questions I have for you. Thank you very much for your time.

A.6 – Non-Residential Builders and A&E Firms Survey

The Cadmus Group
AIU – Non-Residential
Builders and A&E Firms

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Respondent Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

Respondent is with an ❑ **A: Architecture/Engineering Firm** or is a ❑ **B: Builder** (Check One)

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with {IF **A** → architecture and engineering firms, IF **B** → builders} regarding the marketability of energy efficient products and ways the Utilities might help increase sales of the most efficient equipment. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes ➔ Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, GO TO B3.

_____

B3. As another option, we can e-mail or FAX the survey for you to fill out over the next week. Would you like to complete the survey this way instead?

IF NO, THANK AND TERMINATE.

IF E-MAIL IS DESIRED, WRITE RESPONDENT'S E-MAIL ADDRESS:
_____ OR

IF FAX IS DESIRED, WRITE RESPONDENT'S FAX #_____

THANK AND TERMINATE.

C. INTRODUCTORY QUESTIONS

C1. In the past 12 months, have you participated in any program for which you or a customer received an incentive or rebate from a utility? *[Clarify nongovernment if needed.]*

1 Yes
2 No
-99 Don't Know

The following questions are specific to equipment used or installed within Ameren Illinois service territory. Ameren service territory covers the southern part of Illinois from Peoria to the southern border.

D. MARKET SHARE – GAS WATER HEATERS

D1-10A

Do you {IF **A** → design, IF **B** → build (*include remodel, retrofit, additions*)} {Sector}? [IF Description ≠ Ø] By {Sector} I mean {Description}.

1 Yes
RECORD ANSWER IN APPROPRIATE CELL OF COLUMN A OF TABLE 1 AND PROCEED.

2 No
RECORD ANSWER IN APPROPRIATE CELL OF COLUMN A OF TABLE AND REPEAT QUESTION FOR NEXT MEASURE.

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF COLUMN A OF TABLE 1 AND REPEAT QUESTION FOR NEXT MEASURE.

D1-10B

In the past 5 years, approximately how many fully constructed square feet of {Sector} would you estimate that you have {IF **A** → designed, IF **B** → built}?

RECORD NUMBER IN APPROPRIATE CELL OF COLUMN B OF TABLE 1 AND PROCEED.

-99 Don't Know, Refused [*If unable to provide by sector, ask average sq. ft total]*

RECORD ANSWER IN APPROPRIATE CELL OF COLUMN B OF TABLE 1 AND REPEAT QUESTION FOR NEXT MEASURE.

D1-10C

How many buildings (projects) would you say that represents? [IF NEEDED: How many buildings combined to equal the {Read D1-8B Sq Ft response just given} square feet of {Sector}?]

RECORD NUMBER IN APPROPRIATE CELL OF COLUMN C OF TABLE 1 AND THEN AND RESTART AT D1-8A FOR NEXT MEASURE.
PROCEED TO NEXT QUESTION AFTER PARTS A, B, AND C HAVE BEEN ANSWERED FOR ALL MEASURES.

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF COLUMN C OF TABLE 1 AND THEN AND RESTART AT D1-11A FOR NEXT MEASURE.
PROCEED TO NEXT QUESTION AFTER PARTS A, B, AND C HAVE BEEN ANSWERED FOR ALL MEASURES.

E1A-E10O

Of the {D1-10, Sector} you said that you have {IF **A** → designed, IF **B** → built}, how many had {Measure}? *(Count what applied to the project—if addition, count only new part)*

1 ***RECORD NUMBER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.***

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.

E1P-E10R

Of the {D1-10, Sector} you said that you have {IF **A** → designed, IF **B** → built}, what was the average {Measure}?

1 ***RECORD NUMBER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.***

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.

E1-E10S

Of {Sector} you said that you have {IF **A** → designed, IF **B** → built}, what percent of the windows were {Measure}?

1 ***RECORD NUMBER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.***

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.

E1T-E10Z

Of the lighting installed in the {B1-10} square feet of {Sector} you said that you have {IF **A** → designed, IF **B** → built}, what percent would you estimate were illuminated with {Measure}?

1 ***RECORD NUMBER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.***

-99 Don't Know, Refused

RECORD ANSWER IN APPROPRIATE CELL OF TABLE 2 AND PROCEED.

F. CONCLUSION

That is all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1 Yes
2 No
-99 Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

Table 1: "D" Questions

	Sector	Description	A Yes (1), No (2), DK/Ref (-99)	B Sq Ft of Type in past 5 yrs	C Number of buildings/projects Sq Ft represents
1	Education	School Buildings, colleges & universities			
2	Food Store	Grocery, convenience store buildings			
3	Health Services	Hospitals, Healthcare clinic, nursing home			
4	Lodging	Hotels, motels			
5	Office				
6	Restaurants				
7	Retail				
8	Warehouses	Refrigerated or non-refrigerated			
9	Other:_____ (specify primary use); (specify- industrial ☐ or commercial ☐)	Buildings that don't fit into any of the previously mentioned categories			
-99	Don't Know				

Alternative: D10A. # of buildings per year _____ Total Square ft per year_____
D10B. # of buildings /year _____ Average Square ft of all buildings: _____

Table 1: "E" Questions

			1	2	3	4	5	6	7	8	9
	Measure	**Measure Descr**	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other: _____(specify primary use); (specify [_] industrial or [_] commercial)
A	ENERGY STAR Windows	EFF = 0.35 or less									
A2	Energy Efficient Non-Energy Star Windows	EFF = 0.35 or less									
B	Cool Roofs	Light color/white roof									
C	Green Roofs	Vegetation on roof									
D	Ducts in conditioned spaces *(within building envelope)*										
E	Insulated ducts										
F	Sealed ducts										
G	Occupancy Sensors	Lighting Only									
H	Daylighting controls										
I	Hot Water Pipe Insulation										
J	Point-of-Use Water Heaters										
K	Tankless Water Heaters										
L	Energy efficient chillers										
M	Energy efficient rooftop units										
N	Other energy efficient cooling equipment	Pumps, cooling towers, etc.									
O	HVAC controls	EMS, programmable thermostats									
P	Designed Air Changes per Hour										
Q	R-Value for wall insulation										

R	R-Value for ceiling insulation										
S	Operable windows	Natural ventilation									
T	T-12 lights										
U	T-8 lights										
V	T-5 HO lights	High Output T5									
W	Standard T-5 lights										
X	Incandescent lights										
Y	Pulse start electric ballast metal halide lights										
Z	CFLs	Compact Fluorescent Bulbs									

A.7 – Compressed Air Service Provider Survey

The Cadmus Group
AIU– Compressed Air Service Provider Survey

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Company Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with compressed air vendors and service providers regarding the marketability of energy efficient products and ways the Utilities might help increase the presence of energy efficient practices in the business. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry and the equipment's technical specifications?

1 Yes ➔ Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, THANK & TERMINATE.

_____

C. INTRODUCTORY QUESTIONS

C1. What is the type of your company?
- 1 Retailer
- 2 Distributor
- 3 Manufacturer
- 4 Contractor
- 5 Maintenance Company
- 6 Other ***(SPECIFY)*** _____
- -99 Don't Know

C2. What is your role in the company?
- 1 Owner
- 2 Project Manager
- 3 Project Engineer
- 4 Administrative Assistant
- 5 Other ***(SPECIFY)*** _____)

C3. What is the market area for your company?
- 1 Local
- 2 Regional
- 3 National
- 4 Global
- -99 Don't Know

These questions are specific to equipment used or installed within Ameren Illinois Service Territory. This includes the southern part of Illinois from Peoria to the southern border.

C4. How many employees are currently employed in Illinois:
- 1 ***RECORD NUMBER (OR RANGE):*** _____
- -99 Don't Know

C5. What are your Annual Sales (or range of sales) in Illinois:
- 1 ***RECORD NUMBER (OR RANGE):*** _____
- -99 Don't Know

(***IF NEEDED USE CATEGORIES: <500K; 501K-1 MILLION; 1M – 10M; 11M – 50M; >50M***)

C6. What percent of 2008 revenues accounted for by the following services?
IF UNSURE OF SHARE OF REVENUES, SIMPLY CHECK THOSE SERVICES THAT WERE PROVIDED.

Service	Percent of 2008 Revenues
Compressed air equipment sales	
Compressed air parts sales	
Compressed air equipment service	
Compressed air system design	
Compressed air efficiency services (leak detection, compressed air system audits, system optimization, controls)	
Other compressed air related services (Specify _____)	

C7. What are the industries or building types that account for most of your customers (list a maximum of five) and the number (or range) of customers for those industries / building types?

(INDUSTRY EXAMPLES: FOOD PROCESSING, LUMBER/WOOD PRODUCTS, TEXTILE MILL PRODUCTS, PAPER MFG, CHEMICAL MFG, PETROLEUM REFINING, STONE/CLAY/GLASS PRODUCTS, PRIMARY METAL MFG, FABRICATED METAL MFG, INDUSTRIAL MACHINERY, ELECTRONIC EQUIPMENT MFG, TRANSPORTATION EQUIPMENT MFG, MINING, IRRIGATION, MISCELLANEOUS MFG, WATER, WASTEWATER)

(BUILDING TYPES: LARGE OFFICE, SMALL OFFICE, LARGE RETAIL, SMALL RETAIL, LODGING, HEALTH, EDUCATION, RESTAURANT, GROCERY, CONVENIENCE STORE, WAREHOUSE, OTHER COMM)

Industry / Building Type	Number (or range) of Customers
1)	
2)	
3)	
4)	
5)	

C8. What percent of your work is performed for new construction (that is, not tied into an existing building or system)?

1 ***RECORD % OF WORK ON NEW CONSTRUCTION:*** _____

-99 Don't Know

D. EFFICIENCY SERVICES

D1-3.

1 Which of the efficiency services listed below do you offer?

2 In what year did you first offer the service?

3 Is the service offered as:

a. Part of a service contract (Serv)?

b. A freestanding engineering service (Eng)?

c. Part of equipment sales (Eqpt)?

-99 Don't Know ➔ Skip to D4

Table D1-3: (Indicate all that apply)

	1	2	3		
			Format of Service		
Service	Offered? (Enter 1 for Yes)	Year First Offered	Serv.	Eng.	Eqpt.
Example	1	2001	1	1	
A. Measurement of system flow and pressure					
B. Assessment of system efficiency					
C. Leak Management service					
D. Ultrasonic leak detection					
E. Provide a detailed inventory of all compressed air end uses					
F. Analysis of end-use reduction opportunities					
G. Other (specify _____)					

D4. Has the volume of efficiency services you sell increased, decreased or remained about the same over the past year?

1 Increased
2 Decreased
3 Remained about the same
-99 Don't Know

D5. How often do you conduct a compressed air needs assessment and/or estimate as part of a system sales order or bid response?

1 In all sales and bid situations
2 In most sales and bid situations
3 In some sales and bid situations
4 In relatively few sales and bid situations
5 Never
-99 Don't Know

D6. How often are you personally able to influence the energy efficiency level of the compressed air system?

1 Always
2 Almost Always
3 Sometimes
4 Almost Never
5 Never

E. CUSTOMERS CHARACTERISTICS

E1. Based on your experience, please provide estimates of the percentage of your customers who own each compressor type below and average number for compressors per customer.

Table E1:

Type of compressor	Percent of customers	Average number of units per customer
A. Screw		
B. Reciprocating		
C. Centrifugal		

E2 Based on your experience, please provide estimates of the percentage of your customers who own compressors in each size category and the average number for compressors in each category per customer.

Table E2:

Size of compressor	Percent of customers	Average number of units per customer
A. Small (<50 HP)		
B. Medium (50 – 150 HP)		
C. Large (>150 HP)		

E3. Please provide percentage estimates of the principle compressor-control strategy type for the compressed air system you service.

Table E3:

Compressor Control Strategy	Percent of customers
A. Start/Stop	
B. Load/Unload	
C. Modulating controls	
D. Multi-step controls	
E. Variable speed drives	
F. Variable Displacement	
G. Dual control system	
H. Other (Specify)	
I. Don't Know	

E4. Based on your experience, what percentage of your customers have a leak-prevention routine or program in place at their facility?

1 ***PERCENTAGE ESTIMATE*** _____

-99 Don't Know.

E5. Based on your experience, in the past 4 years what percent of your customers have contracted for a study of how to make their compressed air system as a whole more energy efficient?

1 ***PERCENTAGE ESTIMATE*** _____

-99 Don't Know.

F. CONCLUSION

F1. Those are all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1 Yes

2 No

-99 Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

A.8 – Non-Residential Lighting Wholesalers and Vendors Survey

The Cadmus Group
AIU Non-Residential
Lighting Wholesalers and Vendors

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Respondent Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I am calling on behalf of **Ameren Illinois Utilities**.

We are conducting a study with lighting systems wholesalers/vendors/contractors regarding the marketability of energy efficient products and ways the Utilities might help increase the presence of energy efficient equipment in the business. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes ➔ Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, GO TO B3.

_____

B3. As another option, we can e-mail or FAX the survey for you to fill out over the next week. Would you like to complete the survey this way instead? [If YES, write in fax or email information below.

IF NO, THANK AND TERMINATE.

IF E-MAIL IS DESIRED, WRITE RESPONDENT'S E-MAIL ADDRESS:

_____ ***OR***

IF FAX IS DESIRED, FAX #_____

Thank and terminate.

C. INTRODUCTORY QUESTIONS

C1. In the past 12 months, have you participated in any program for which you or a customer received an incentive or rebate from a utility?

1 Yes
2 No
-99 Don't Know

C2. What objections do you encounter most frequently when trying to sell energy efficient lighting equipment and controls? (check all that apply)

1 Customer thinks the equipment costs too much
2 Customer is skeptical about savings
3 Customer has aesthetic objections
4 Customer has technical/sizing constraints
5 Other (specify _____)
-99 Don't Know

C3. How important is your offering energy efficient lighting equipment and controls in establishing the competitive position of your company?

1 Not important
2 Somewhat important
3 Very important
-99 Don't Know

C4. Please specify the building types which make up the majority of your customers (list up to five) and list the number of your customers in each building type:

	Sector	Description	Number (range) of Customers
1	Education	School Buildings, colleges & universities	
2	Grocery	Grocery, convenience, food store buildings	
3	Health	Hospitals, Healthcare clinic, nursing home	
4	Lodging	Hotels, motels	
5	Office		
6	Restaurants		
7	Retail		
8	Warehouses	Refrigerated or non-refrigerated	
9	Other:_____ (specify primary use); (specify- industrial ☐ or commercial ☐)	Buildings that don't fit into any of the previously mentioned categories	
-99	Don't Know		

D. MARKET SHARE – LIGHTING EQUIPMENT

D1: Table 1 - Lighting Equipment Saturations

We are trying to estimate the percentage of customers with certain types of lighting equipment installed and are especially interested in the high efficiency lighting systems. The following questions are specific to lighting and equipment used or installed within Ameren Illinois Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border. Based on your industry experience, could you please estimate the percentage of commercial and industrial lighting currently supplied by the following equipment (after your project) (for the top two building types specified in C2)?

FOR EACH ROW A-O IN TABLE 1, GO THROUGH COLUMNS 1-8, RECORD THE ANSWER IN APPROPRIATE CELL, AND PROCEED.

D2: Table 2 - Lighting Efficiency Measures

We are also trying to estimate the installed base of energy efficient lighting controls. Based on your industry experience, could you please estimate the percentage of lighting systems with the following measures in place (after your project) (for the top two building types specified in C2)?

FOR EACH ROW A-F IN TABLE 2, GO THROUGH COLUMNS 1-8, RECORD THEANSWER IN APPROPRIATE CELL, AND PROCEED.

E. CONCLUSION

Those are all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1 Yes
2 No
-99 Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

Table 1: Lighting Equipment Saturations (% of installed systems)

		1	2	3	4	5	6	7	8	9
	Equipment	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other:_____ (specify primary use); (specify- industrial ☐ or commercial ☐)
A	Standard T12 Lighting									
B	Standard T8 Lighting (32 watts or more)									
C	Premium or High Performance T8 Lighting (28 watts or less)									
D	High Performance T5 Lighting									
E	High Bay Lighting w/ T5 or T8 lamps									
F	High Bay Lighting w/ CFLs									
G	Metal Halide w/ Magnetic Ballast									
H	Metal Halide w/ Electronic Ballast									

	Equipment	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other:_____ (specify primary use); (specify- industrial ☐ or commercial ☐)
I	High Pressure Sodium Lamps									
J	Incandescent Lamps									
K	Incandescent Exit Sign									
L	CFL Exit Sign									
M	LED Exit Sign									
N	LED Lighting									
O	Task Lighting									

Table 2: Lighting Efficiency Measures

		1	2	3	4	5	6	7	8	11
	Equipment	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other:_____ ____ (specify primary use); (specify- industrial ☐ or commercial ☐)
A	Dual-level Switches									
B	Day-lighting Controls									
C	Time Clocks									
D	Occupancy Sensors									
E	Digital Control Systems									

A.9 – Non-Residential Mechanical Contractors Survey

The Cadmus Group
AIU Non-Residential
Mechanical Contractors

A. RESPONDENT'S CONTACT INFORMATION (Complete before interview)

Respondent Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I am calling on behalf of **Ameren Illinois Utilities**.

We are conducting a study with mechanical systems contractors regarding the marketability of energy efficient products and ways the utilities might help increase the presence of energy efficient equipment in the business. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes ➔ Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, THANK & TERMINATE.

_____

C. INTRODUCTORY QUESTIONS

C1. What is the type of your company? (*example list will vary by survey topic*)

1 Retailer
2 Distributor
3 Manufacturer
4 Contractor
5 Maintenance Company
6 Other ***(SPECIFY)*** _____
-99 Don't Know

C2. In the past 12 months, have you participated in any program for which you or a customer received an incentive or rebate from a utility? (*clarify utility and not government agency if necessary*)

1 Yes
2 No
-99 Don't Know

C3. What objections do you encounter most frequently when trying to sell energy efficient equipment? ***(CHECK ALL THAT APPLY.)***

1 Customer thinks the equipment costs too much
2 Customer is skeptical about savings
3 Other ***(SPECIFY)***_____)
-99 Don't Know

C4. How important do you think your offering energy efficient equipment is in establishing the competitive position of your company?

1 Not important
2 Somewhat important
3 Very important
-99 Don't Know

C5. Please specify the building types which make up the majority of your customers (list up to five) and list the number of your customers in each building type:

	Sector	Description	Number (range) or customers
A	Education	School Buildings, colleges & universities	
B	Grocery	Grocery, convenience store buildings	
C	Health	Hospitals, Healthcare clinic, nursing home	
D	Lodging	Hotels, motels	
E	Office		
F	Restaurants		
G	Retail		
H	Warehouse		
I	Other:_____ (specify primary use); (specify [_] industrial or [_] commercial)	Buildings that don't fit into any of the previously mentioned categories	
-99.	Don't Know		

D. MARKET SHARE – HVAC EQUIPMENT

D1: Table 1

We are trying to estimate the percentage of customers with certain types of HVAC equipment installed. The following questions are specific to equipment used or installed within Ameren's Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border. Based on your experience in the industry, (for the top two building types specified in question C2) could you please estimate the percentage of customers with the following equipment installed?

FOR EACH ROW A-H IN TABLE 1, GO THROUGH COLUMNS 1-8 RECORD THE ANSWER IN APPROPRIATE CELL, AND PROCEED.

D2: Table 2

Within each equipment segment we are trying to determine the installed base of high efficiency units. Based on your experience in the industry, could you please estimate the percentage of units in each category that are higher efficiency units, or have higher efficiency equipment modifications?

FOR EACH ROW A-N IN TABLE 2, GO THROUGH THE LISTED MEASURE , RECORDTHE ANSWER IN APPROPRIATE CELL, AND PROCEED.

D3: Table 3

We're also trying to gauge how many commercial and industrial customers have advanced controls capabilities and strategies for optimizing their energy usage. Could you please estimate the percentage of customers with the following control (for the top two building types specified in C5)?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, GO TO E

_____

E. CONCLUSION

Those are all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1	Yes
2	No
-99	Don't Know

Unless you have any questions or comments for me, that is all. Thank you again for your time.

Table 1: HVAC Equipment Saturations

		1	2	3	4	5	6	7	8	11
	Equipment	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other:_____ ____ (specify primary use); (specify- industrial ☐ or commercial ☐)
A	Water-Cooled Chillers									
B	Air-Cooled Chillers									
C	Packaged Air-Conditioner									
D	Packaged Heat Pump									
E	Split System Air-Conditioner									
F	Split System Heat Pump									
G	Ground Source Heat Pump									
H	Gas Heating (% that have)									

Table 2: Efficient HVAC Equipment Penetration

	EQUIPMENT	DESCRIPTION	PERCENT OF INSTALLED BASE
	Water-Cooled Chillers		
A	High Efficiency Reciprocating Chiller	<= 0.63 kW/ton	
B	Premium Efficiency Reciprocating Chiller	<= 0.56 kW/ton	
C	High Efficiency Screw Chiller	<= 0.57 kW/ton	
D	Premium Efficiency Screw Chiller	<= 0.50 kW/ton	
E	High Efficiency Centrifugal Chiller **(1 to 300 Tons)**	<= 0.54 kW/ton	
F	Premium Efficiency Centrifugal Chiller **(1 to 300 Tons)**	<= 0.48 kW/ton	
G	High Efficiency Centrifugal Chiller **(≥ 300 Tons)**	<= 0.49 kW/ton	
H	Premium Efficiency Centrifugal Chiller **(≥ 300 Tons)**	<= 0.44 kW/ton	
	Air-Cooled Chillers		
I	High Efficiency Air-Cooled Chiller	<= 1.04 kW/ton	
J	Premium Efficiency Air-Cooled Chiller	<= 0.95 kW/ton	
	Air-Conditioning Equipment		
K	High Efficiency Packaged Air-Conditioner	>= 11.0 EER	
L	Premium Efficiency Packaged Air-Conditioner	>= 12.0 EER	
M	High Efficiency Heat Pump	>= 11.0 EER, 3.4 COP	
N	Premium Efficiency Heat Pump	>= 11.5 EER, 3.8 COP	

Table 3: Control Equipment Penetration

		1	2	3	4	5	6	7	8	11
	Equipment	Education	Grocery	Health	Lodging	Office	Restaurants	Retail	Warehouse	Other:_____ (specify primary use); (specify- industrial ☐ or commercial ☐)
A	Programmable Thermostats									
B	Centralized EMS									
C	Centralized EMS – optimized for energy performance									
D	Economizers									
E	Demand-controlled Ventilation									
F	Exhaust air heat recovery									
G	Advanced chilled water system strategies (e.g. optimized setpoints, cond and chilled water reset, fan and pump VFDs)									

A.10 – Plumber Trade Ally Survey

The Cadmus Group
AIU– Plumber Trade Ally Survey

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Dealer Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with plumbers regarding the marketability of energy efficient products and ways the Utilities might help increase sales of the most efficient equipment. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes → Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, THANK & TERMINATE.

_____

-99 Don't Know ➔ Go to B2

C. INTRODUCTORY QUESTIONS

C1. First, I'd just like to confirm that you sell and/or install electric water heaters, electric tankless water heaters, kitchen or bathroom fixtures to the residential market. Is this correct?

1 Yes ➔ Go to 3

2 No ➔ ***CONFIRM NON-RESIDENTIAL ONLY***

-99 Don't Know ➔ Go to 5

C2. Do you sell residential sized water heating systems to the non-residential market?

1 Yes
2 No
-99 Don't Know

C3. What is the type of your company?

1. Retailer
2. Distributor
3. Manufacturer
4. Contractor
5. Maintenance
6. Other

-99. Don't know

C4. In the past 12 months, have you sold any equipment for which you or your customer received an incentive or rebate from a utility?

1 Yes [Skip to C6]
2 No

-99 Don't Know.

C5. [*Skip if C4 = 1*] Why have you not promoted the rebates?

1 Not enough money/budget
2 Utility's job
3 Other [SPECIFY: _____]

-99 Don't Know.

C6. In the past 12 months, have you done any advertising to promote rebates that are available for high efficiency water heating or water saving devices?

ENTER ALL THAT APPLY.

1 Print ads
2 Radio ads
3 TV ads
4 Circulars/Direct mail
5 Other [SPECIFY: _____]
6 No (Did not promote incentives) [Skip to C5]
-99 Don't Know.

D. MARKET SHARE – GAS WATER HEATERS

For the next several questions, I am going to ask about the percent of units that you sell to each the existing home market, the new construction and the non-residential markets. The following questions are specific to equipment used or installed within Ameren Illinois Utilities Service Territory. This includes the southern part of Illinois from Peoria to the southern border.

- ***COMPLETE FOR ENTIRE COLUMN BEFORE PROCEEDING.***
- ***REPEAT FOR EACH MEASURE AND INDICATE RESPONSE IN COLUMN A OF TABLE ON PAGE 5.***
- ***IF MEASURE NOT SOLD/INSTALLED ENTER 0%.***
- ***IF RESPONDENT DOESN'T KNOW, ENTER = -99.***
- ***FOR EACH ITEM THAT HAS A NUMBER GREATER THAN 0% IN COLUMN A, ASK THE FOLLOWING FULL SERIES OF QUESTIONS BEFORE PROCEEDING TO THE NEXT MEASURE.***
- ***ENTER ALL RESPONSES IN TABLE BELOW.***
- ***IF RESPONDENT DOESN'T KNOW OR REFUSED, ENTER = -99.***

D1A – D7A What percent of all of the electric water heaters that you have installed and/or sold in the past year were {MEASURE}?

D#B. What percent of (the) {MEASURE} that you installed or sold were installed in newly constructed homes?

D#C. What percent of (the) {MEASURE} that you installed or sold were installed as replacement equipment or installed in existing homes?

D#D. What percent of (the) {MEASURE} that you installed or sold were installed in non-residential buildings?

D#E. Of the {MEASURE} that you installed or sold which were installed in newly constructed homes, what percent were rated with an efficiency rating of{EFFICIENCY}?

D#F. Of the {MEASURE} that you installed or sold which were installed as replacement equipment or installed in existing homes, what percent were rated with an efficiency rating of{EFFICIENCY}?

D#G. Of the {MEASURE} that you installed or sold which were installed in non-residential buildings, what percent were rated with an efficiency rating of {EFFICIENCY}?

D#H. In total, how many {MEASURE} would you estimate that you sold or installed in the past 12 months?

E. CONCLUSION

That is all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1	Yes
2	No
-99	Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

		A	B	C	D		E		F		G	H
			Percent of Water Heater Sales			Efficiency Level						
	Measure	Type (0% if not sold/ installed)	Residential New Construction	Residential Existing Homes	Non-Residential	Residential New Construction	% (or More Efficient)	Residential Existing Homes	% (or More Efficient)	Non-Residential	% (or More Efficient)	Unit Sales
1	Any Type of Water Heater (all combined)	100%										
2	Electric Tankless Water Heaters					EF = 0.98		EF = 0.98		EF = 0.98		
3	Gas Tankless Water Heaters					EF = 0.98		EF = 0.98		EF = 0.98		
4	Heat Pump Water Heaters					EF = 2.9		EF = 2.9		EF = 2.9		
5	Traditional Electric Storage Tank Water Heaters					EF = 0.95		EF = 0.95		EF = 0.95		
6	Gas water heaters					EF = 0.95		EF = 0.95		EF = 0.95		
7	Showerheads	100%				2.0 or less GPM		2.0 or less GPM		2.0 or less GPM		
8	Faucets	100%				2.0 or less GPM		2.0 or less GPM		2.0 or less GPM		

A.11 – Refrigeration Specialist Survey

The Cadmus Group
AIU – Refrigeration Specialist Survey

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Company Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with refrigeration specialists, vendors, and service providers regarding the marketability of energy efficient products and ways the Utilities might help increase the presence of energy efficient practices in the business. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?

1 Yes → Go to B2

2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

B2. Would you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, THANK & TERMINATE.

_____

C. INTRODUCTORY QUESTIONS

C1. What is the type of company?
What is the type of your company?

1 Retailer
2 Equipment Distributor
3 Manufacturer
4 Contractor
5 Maintenance
6 Other
-99 Don't know

C2. What is your job title?

1 Owner
2 Project Manager
3 Project Engineer
4 Administrative Assistant
5 Other (Specify _____)

C3. What is the market area for your company?

1 Local
2 Regional
3 National
4 Global
-99 Don't Know

These questions are specific to equipment used or installed within Ameren Illinois' Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border.

C4. How many employees are currently employed in Ameren's service territory: ***[IF THEY ARE NOT SURE, ASK IF THEY KNOW HOW MANY EMPLOYEES ARE IN ILLINOIS AND INDICATE STATEWIDE IN RESPONSE.]***

1 ***RECORD NUMBER (OR RANGE):*** _____
-99 Don't Know

C5. What are your Annual Sales (or range of sales) in Ameren's service territory: ***[IF THEY ARE NOT SURE, ASK IF THEY KNOW ANNUAL SALES FOR ILLINOIS AND INDICATE STATEWIDE IN RESPONSE.]***

1 ***RECORD NUMBER OF DOLLARS (OR RANGE)***: _____
-99 Don't Know

[***IF NEEDED, USE THE FOLLOWING CATEGORIES: <500K; 501K-1M; 1-10M; 11-50M; 51-100M; >100M***]

C6. What percent of your work is performed for new construction (i.e. not tied into an existing building or system)?

1 Record % work on new construction: _____

-99 Don't know

C7. Record percent of 2008 revenues accounted for by services listed below (if unsure of share of revenues, simply check those services that were provided)

Table C7:

Service	Percent of 2008 Revenues
A. Refrigeration equipment sales	
B. Refrigeration parts sales	
C. Refrigeration equipment service	
D. Refrigeration system design	
E. Refrigeration efficiency services (refrigeration system audits, system optimization, controls)	
F. Other refrigeration related services (Specify) _____	

C8. Specify the industries or building types that account for most of your customers (list a maximum of five) and the number (or range) of customers for those industries / building types.

(INDUSTRY EXAMPLES: FOOD PROCESSING, LUMBER/WOOD PRODUCTS, TEXTILE MILL PRODUCTS, PAPER MFG, CHEMICAL MFG, PETROLEUM REFINING, STONE/CLAY/GLASS PRODUCTS, PRIMARY METAL MFG, FABRICATED METAL MFG, INDUSTRIAL MACHINERY, ELECTRONIC EQUIPMENT MFG, TRANSPORTATION EQUIPMENT MFG, MINING, IRRIGATION, MISCELLANEOUS MFG, WATER, WASTEWATER)

(BUILDING TYPES: OFFICE, FOOD SERVICE (RESTAURANT), FOOD STORE (GROCERY), RETAIL, HEALTH SERVICES, EDUCATION, FABRICATED METALS, FOOD & KINDRED PRODUCTS, RUBBER & MISCELLANEOUS PLASTICS, OTHER (SPECIFY PRIMARY USE; SPECIFY INDUSTRIAL OR COMMERCIAL))

Industry / Building Type	Number (or range) of Customers
A)	
B)	
C)	
D)	
E)	

D. EFFICIENCY SERVICES

D1. Has the volume of efficiency services you sell increased, decreased, or remained about the same over the past year?

1 Increased
2 Decreased
3 Remained about the same
-99 Don't Know

D2. How often do you conduct a refrigeration system assessment and /or estimate as part of a system sales order or bid response?

1 In all sales and bid situations
2 In most sales and bid situations
3 In some sales and bid situations
4 In relatively few sales and bid situations
5 Never
-99 Don't Know

D3-4. Specify what kind of businesses appear to be most receptive to purchasing refrigeration efficiency services?

Table D3-4:

D3. Size of company (Large, medium, small)
A.
B.
D4. Size / complexity of refrigeration system (e.g. over 200 HP)
A.
B.
C.

D5. How often are you personally able to influence customers' decisions to install or upgrade to a higher energy-efficient refrigeration system?

1 Always
2 Almost Always
3 Sometimes
4 Almost Never
5 Never

E. CUSTOMERS CHARACTERISTICS

E1. Based on your experience, what percentage of your customers (in each of your top three industries or building types from Table C8) have installed the following energy efficiency measures to make their refrigeration system as a whole more energy efficient?

Table E1: (estimate percentage of customers)

	Energy Efficiency Measure	Industry or Building Type #1 Specify: _____	Industry or Building Type #2 Specify: _____	Industry or Building Type #3 Specify: _____
A	Floating Head Pressure Control (set/reset minimum head pressure)			
B	VSD on Compressor			
C	VSD on Evaporator Fans			
D	VSD on Condenser Fans			
E	Refrigeration System Optimization (compressor sequencing/controls, suction pressure opt, cond selection, etc.)			
F	Digital Controls			
G	Advanced/ improved defrost controls			
H	Heat Recovery for Water Heating or other end-use			
I	Strip Curtains for Walk-ins			
J	Pulse Modulating Anti-Sweat Controller			
K	Night Covers for Display Cases			
L	Load Management / Reduction			
M	Sub-cooling (ambient or			
N	Premium efficiency motors			
O	New high-efficiency refrigerated case installation			
P	High-efficiency lighting for display cases or reach-ins			
Q	Other : _____			

E2. Based on your experience, in the past 4 years what percentage of your customers have contracted for a study/in-depth investigation of how to make their refrigeration system as a whole more energy efficient?

1 ***PERCENTAGE ESTIMATE*** _____

-99 Don't Know.

F. CONCLUSION

F1. Those are all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1 Yes
2 No
-99 Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

A.12 – Residential New Home Builders Survey

The Cadmus Group
AIU – Residential Builders

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Company Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with home builders regarding the marketability of energy efficient products and ways the Utilities might help increase sales of the most efficient equipment. If you have a few minutes, I'd like to ask you some questions about your experience in the industry.

B1. Are you the person most familiar with the efficiency levels of equipment and the amount of insulation installed in the houses built by your company?

1 Yes

2 No ➔ Is there someone else at your company with whom I could speak regarding these types of questions?

RECORD NAME: _____

RECORD PHONE (____)-_____ ext._____

-99 Don't Know.

B2. Do you have a few minutes to speak now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, GO TO B3.

_____

B3. As another option, we can e-mail or FAX the survey for you to fill out over the next week. Would you like to complete the survey this way instead?

IF NO, THANK AND TERMINATE.

IF E-MAIL IS DESIRED, WRITE RESPONDENT'S E-MAIL ADDRESS:
_____ OR

IF FAX IS DESIRED, WRITE RESPONDENT'S FAX #_____

THANK AND TERMINATE.

These questions are specific to equipment used or installed within Ameren's Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border.

C. INTRODUCTORY QUESTIONS

C1. In the past 12 months, has your company participated in any program for which you or a customer received an incentive or rebate from a utility?

1 Yes
2 No
-99 Don't Know

C2. In the past 12 months, how many new homes (whole single-family, multi-family, attached, detached buildings) has your company built? **[Buildings, NOT Units]**

1 RECORD NUMBER _____
IF HESITANT OR REFUSED, ASK FOR RANGE OR CLOSEST 10 OR 50.

-99 Don't Know

C3. In the past 12 months, how many Retrofits, reconstruction or additions has your company built?

1 RECORD NUMBER _____
IF HESITANT OR REFUSED, ASK FOR RANGE OR CLOSEST 10 OR 50.

-99 Don't Know

C4. What percent of the homes that your company built in the past 12 months were **single family,** buildings?

[INCLUDE SF DETATCHED AND ATTACHED; MAX=2 UNITS]

1 ***RECORD PERCENT*** _____%
-99 Don't Know

C5. What percent of the homes that you built in the past 12 months were **multi-family** buildings?

[MULTIFAMILY= 3 OR MORE ATTACHED UNITS]

1 ***RECORD PERCENT*** _____%

[NOTE: RESPONSES TO C4-C5 SHOULD TOTAL 100%. IF NOT, PROBE]

-99 Don't Know

For the rest of my questions I am going to be focusing on the home type you have built the most often over the past 12 months, {Read building type from greatest of C4 – C5}.

C10. What is the average size of the {Read building type from greatest of C4 – C8} that you have built in the past 12 months (in square feet)?

1 ***RECORD NUMBER:*** _____ ***IF HESITANT OR REFUSED, ASK FOR RANGE OR CLOSEST 500 SQ FT AS A BEST GUESS.***

-99 Don't Know/Refused

D. MARKET SHARES

D1. In the past 12 months, what is the percentage of heating equipment have you typically had installed in the homes that you built?

1. READ LIST.

2. NOTE THAT THE NUMBERS IN "{ }" ARE CODES USED IN QUESTIONS D2 AND D3. THUS, DO NOT READ THESE NUMBERS.

1 Electric Baseboard *{EFF LEVEL = **N/A**}*_____%
2 Electric central forced air furnace *{EFF LEVEL = **N/A**}*_____%
3 Air-source Heat pump (ELEC) *{EFF LEVEL = **7.7 HSPF**}*_____%
4 Ground-source heat pump (ELEC) *{EFF LEVEL = **N/A**}*_____%
5 Portable or unit heaters (ELEC) *{EFF LEVEL = **N/A**}*_____%
6 Natural gas space heating _____%
7 Oil space heating _____%
8 Solar space heating (solar hydronic heating) *{ EFF LEVEL = **N/A**}*_____%
9 Other space heating (propane, butane, kerosene, wood, etc.) _____%
10 None (No heating system) _____%
-99 Don't Know/Refused

D2. In the past 12 months, what has been the average efficiency for these heating units installed in the homes you built?

1 ***RECORD EFFICIENCY:*** _____
-99 Don't Know/Refused

D3. [IF D2 < EFF LEVEL for measure] What percent have had an efficiency greater than or equal to [EFF LEVEL for measure]?

1 ***RECORD PERCENT:*** _____%
-99 Don't Know/Refused

D4. [IF D1 = 1,7,8,9,11 or 14] What percent of the ducts for the {Response to D1} in the homes you build are located in conditioned spaces (within the interior envelope of the building)?

1 ***RECORD PERCENT:*** _____%
-99 Don't Know/Refused

D5. In the past 12 months, what percentage of cooling equipment have you typically had installed in the homes that you built?

1. READ LIST.

2. NOTE THAT THE NUMBERS IN "{ }" ARE CODES USED IN QUESTIONS D6 AND D7. THUS, DO NOT READ THESE NUMBERS.

1 Central air conditioner *{EFF LEVEL = **13 SEER**}*_____%
2 Air-source heat pump *{EFF LEVEL = **13 SEER** }*_____%
3 Ground-source heat pump *{EFF LEVEL = **13 SEER** }*_____%
4 Room air conditioners *{EFF LEVEL = **9.7 EER** }*_____%
5 Ductless mini-split air conditioner *{EFF LEVEL = **13 SEER** }*_____%
6 Ceiling fans *{ EFF LEVEL = **N/A** }*_____%
7 Whole-house fan *{EFF LEVEL = **N/A** }*_____%
8 Something else [SPECIFY]: _____ _____%
-99 Don't Know/Refused

D6. In the past 12 months, what has been the average efficiency for these cooling units installed in the new homes you built?
1 ***RECORD EFFICIENCY:*** _____
-99 Don't Know/Refused

D7. [IF D6 < EFF LEVEL for measure selected in D5] What percent have had an efficiency greater than or equal to [EFF LEVEL for measure]?
1 ***[RECORD PERCENT]*** _____%
-99 Don't Know/Refused

D8. IF D5 = 1 AND D4 NOT ANSWERED, ASK, What percent of the ducts for the central air conditioners in the homes you build are located in conditioned spaces? ***[CONDITIONED SPACES ARE WITHIN THE BUILDING ENVELOP—HEATED OR COOLED SPACES]***
1 ***[RECORD PERCENT]*** _____%
-99 Don't Know/Refused

D9. In the past 12 months, what percentage of water heating equipment have you typically had installed in the homes that you built? ***READ LIST.***
1 Electric storage water heater _____%
➔ ***[RECORD AVERAGE SIZE IN GALLONS]***: _____
2 Electric demand or instantaneous water heater_____%
3 Heat pump water heater_____%
4 Gas water heater (storage or tankless) _____%
5 Indirect water heater that uses the home's boiler as the heat source or an integrated water heater that is also used to heat the home. _____%
6 Solar water heater _____%

7	Something else ***[SPECIFY]***: _____	_____%
-99	Don't Know/Refused	

D10. In the past 12 months, what has been the average efficiency for these water heating units installed in the new homes you built?

1 ***[RECORD EFFICIENCY]:*** _____

-99 Don't Know/Refused

D11. What percent of the following types of windows do you install in the homes you build?

1 ENERGY STAR (by ENERGY STAR, I mean Low-E Argon U=0.35 or less) ➔ _____%

2 Other Low-E ➔ _____%

3 Standard 2-pane ➔ _____%

4 Other (Specify):_____ ➔ _____%

-99 Don't Know/Refused

D12. What percent of the lights installed in the new homes that you built over the past 12 months were…

1 Compact Fluorescent Bulbs (CFLs)? [Record Percent]: _____%

2 Other Fluorescent Bulbs? [Record Percent]: _____%

3 Incandescent Bulbs? [Record Percent]: _____%

4 Halogen Bulbs [Record Percent]: _____%

5 Other Bulbs? [Record Percent]: _____%

[NOTE: SHOULD TOTAL 100%]

D13. What percent of your homes you built over the past 12 months had …

1 2x6 wood framing _____% in roof _____% in walls

2 2x4 wood framing _____% in roof _____% in walls

3 2x4 metal framing _____% in roof _____% in walls

4 2x6 metal framing _____% in roof _____% in walls

5 Other (Specify): _____ _____%

-99 Don't Know/Refused

D14. On average, how much insulation did you have installed in the ceilings of the new homes built over the past 12 months?

1 ***RECORD R-VALUE:*** _____

-99 Don't Know/Refused

D15. On average, how much insulation did you have installed in the walls of the new homes built over the past 12 months?

1 ***RECORD R-VALUE:*** _____

-99 Don't Know/Refused

D16. What percent of the homes that you built over the past 12 months had conditioned basements?

1 ***RECORD PERCENT:*** _____%

-99 Don't Know/Refused

D17. What percent of the homes that you built over the past 12 months had un-conditioned basements?

1 ***RECORD PERCENT:*** _____%

-99 Don't Know/Refused

D18. What percent of the homes that you built over the past 12 months had swimming pools installed?

1 ***RECORD PERCENT:*** _____%
-99 Don't Know/Refused

D19. [***SKIP IF D18=0, OR DK***] What percent of homes with pools installed had electric heat pumps?

1. ***RECORD PERCENT:*** _____%
-99 Don't Know/Refused

D20. [***SKIP IF C2=0; DID NOT BUILD NEW HOMES***] Is your company involved directly with installing larger kitchen appliances? (Prompt if needed: refrigerators, ovens, cooking range, stand alone freezers)

1. yes (any involvement)
2. No [***SKIP TO E1]***
-99 Don't Know/Refused

D21. [Skip if D20=2 or -99] What percent of homes you have built in the past 12 months have energy efficient (Energy Star) kitchen appliances installed?

1. ***RECORD PERCENT:*** _____%
-99 Don't Know/Refused

E. CONCLUSION

E1. That is all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1 Yes
2 No
99 Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time.

A.13 – Retailer Survey

The Cadmus Group
AIU - Retailer Survey

A. RESPONDENT'S CONTACT INFORMATION (COMPLETE BEFORE INTERVIEW)

Retailer Name: _____ Survey Date: _____

Contact Name:_____ Interviewer Initials: _____

Contact Phone Number: _____ Contact Title: _____

National ENERGY STAR Partner: ☐ Yes ☐ No

Retailer Segment

☐ Department or discount department store (e.g., Dollar, Target, Wal-Mart, Costco)
☐ Drug store (e.g., CVS, Walgreens)
☐ Electronics (Radio Shack, Best Buy, Ultimate Electronics)
☐ Furniture or home furnishing store (e.g., Bed Bath & Beyond, Ikea)
☐ Grocery store (e.g., Jewel, Dominicks…)
☐ Hardware store (e.g., Ace, True Value)
☐ Home improvement store (e.g., Home Depot, Lowe's)
☐ Lighting specialty store
☐ Other (e.g., online retailers): _____

B. INTRODUCTION

Hello, my name is _____ and I work for The Cadmus Group. I'm calling on behalf of **Ameren Illinois Utilities.**

We are conducting a study with retailers about energy efficient products. If you have a few minutes, I'd like to ask you some questions about your store and the products you carry.

B1. Are you the person who is most familiar with the product lines you carry, and the products for which there are energy efficient or ENERGY STAR models available?
1 Yes ➔ Go to B2
2 ***IF NO, ASK,*** Can you provide me with a contact name and phone number for a person at your store who might be more familiar with the energy efficient products you carry? ***[WRITE NAME AND NUMBER IN SPACE BELOW.]***

Name: _____

Phone: (____)_____ext._____

[THANK AND REPEAT WITH NEW CONTACT]

The information we'll be discussing will be used to determine the opportunity for the Utilities in Illinois to improve their energy efficiency programs, and help consumers save more on their bills. As an independent research firm, we do not intend to report your responses in any way that would reveal your identity or the identity of your company.

B2. This research effort will take approximately 15 minutes to complete. Do you have a few minutes so that we can proceed over the phone now?

1 Yes ➔ Go to C1

2 No ➔ Can I schedule a time to call back?

IF YES, WRITE IN SCHEDULED DATE AND TIME. IF NO, GO TO B3.

_____

B3. As another option, we can e-mail or FAX the survey for you to fill out over the next week. Would you like to complete the survey this way instead?

IF NO, THANK AND TERMINATE.

IF E-MAIL IS DESIRED, WRITE RESPONDENT'S E-MAIL ADDRESS:
_____ ***OR***

IF FAX IS DESIRED, WRITE RESPONDENT'S FAX #_____

THANK AND TERMINATE.

C. INTRODUCTORY QUESTIONS

C1. Of all the products you sell for which energy-efficient models are available, which one or two do you believe customers are the least aware of, and would benefit the most from increased education, advertising, or other promotions?

_____
_____
_____

C2. Of all the products you sell for which energy efficient models are available, which one or two do you believe customers are the most aware of or most likely to purchase without any additional incentive, advertising or other promotions?

_____
_____
_____

C3. Are you aware of energy efficient models on the market that your store does not currently offer to customers?

1. Yes
2. No

-99 Don't know/Refused

C4. [***SKIP IF C3 = 2 OR -99***] Why are these models not currently offered to customers in your store?

_____

_____

C5. How often do you recommend higher energy efficient options to customers?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

C6. What types of incentives are most effective for increasing energy efficiency sales in your store? (Offer examples if needed: customer rebates, incentives to the retailer, national level Energy Star promotions)

_____

_____

C7. What types of programs or incentives do you think Ameren should implement in order to make energy efficient appliances or equipment more attractive to your customers?

_____

_____

_____

D. RETAILER AWARENESS AND KNOWLEDGE

I am going to ask you a series of questions about which products you sell, who buys them and when customers do purchase that item, how likely they are to purchase the more efficient versions of the product. These questions are specific to equipment used or installed within Ameren Illinois Service Territory. Ameren's service territory covers the southern part of Illinois from Peoria to the southern border.

D1A – D26A. Which of he following items do you sell?

- ***READ MEASURES AND INDICATE RESPONSE IN COLUMN A OF TABLE BELOW.***
- ***FOR EACH ITEM MARKED AS "1" IN COLUMN A, ASK THE FOLLOWING FULL SERIES OF QUESTIONS BEFORE PROCEEDING TO THE NEXT MEASURE.***
- ***ENTER ALL RESPONSES IN TABLE BELOW.***
- ***USE -99 IF RESPONDENT DOESN'T KNOW OR REFUSES.***

D#B. What percent of your {MEASURE} sales are for residential use?

D#C. Of the {MEASURE} that you sell for residential use, what percent are {EFFICIENCY LEVEL} or better?

D#D. What percent of your {MEASURE} sales are for non-residential use?
SHOULD TOTAL 100% - COLUMN B. IF NOT, PROBE.

D#E. Of the {MEASURE} that you sell for non-residential use, what percent are {EFFICIENCY LEVEL} or better?

D#F. In the past 12 months, how many {MEASURE} would you estimate that your store sold?
[IF REFUSED, ATTEMPT TO GET A RANGE TO NEAREST 50 OR 100.]

E. CONCLUSION

That is all of the questions I have for you; however I would like to ask one favor: if I have a quick follow-up question at a later date would it be alright if I was to call back at that time?

1	Yes
2	No
-99	Don't Know

Unless you have any questions or comments for me, I think that is all. Thank you again for your time

	Measure	A	B		C	D		E	F
		Sell Item N (0), Y (1), DK (-99)	Percent sold for residential use	Percent Meeting Efficiency		Percent sold for non-residential use	Percent Meeting Efficiency		Unit Sales
				Efficiency Level	%		Efficiency Level	%	
1	Programmable Thermostats			ENERGY STAR			ENERGY STAR		
2	Water Heaters - Electric			EF = 0.95			EF = 0.95		
3	Tankless Water Heaters - Electric			EF = 0.98			EF = 0.98		
4	Water Heaters - Gas								
5	Tankless Water Heaters - Gas								
6	Clothes Washers			ENERGY STAR – MEF = 1.72			ENERGY STAR – MEF = 1.72		
7	Clothes Dryers - Electric			High Eff w/ Moisture Sensor			High Eff w/ Moisture Sensor		
8	Clothes Dryers - Gas								
9	Refrigerators			ENERGY STAR			ENERGY STAR		
10	Freezers			ENERGY STAR			ENERGY STAR		
11	Dishwashers			ENERGY STAR			ENERGY STAR		
12	CFL bulbs			ENERGY STAR			ENERGY STAR		
13	CFL lighting fixtures			ENERGY STAR			ENERGY STAR		
14	LED bulbs			Any			Any		
15	Dehumidifiers			ENERGY STAR			ENERGY STAR		
16	Room ACs			ENERGY STAR			ENERGY STAR		
17	Ceiling fans			ENERGY STAR			ENERGY STAR		
18	Attic Fans			Any			Any		
19	Televisions			ENERGY STAR			ENERGY STAR		
20	HDTVs			ENERGY STAR			ENERGY STAR		
21	DVD Players			ENERGY STAR			ENERGY STAR		
22	Set-Top Receivers			ENERGY STAR			ENERGY STAR		
23	Monitors			ENERGY STAR			ENERGY STAR		
24	Printers			ENERGY STAR			ENERGY STAR		
25	Faucet Aerators			2.0 GPM			2.0 GPM		
26	Showerheads			2.0 GPM			2.0 GPM		
27	Windows			U = 0.35			U = 0.35		

28	Doors			U = 0.35 or R5			U = 0.35 or R5		

Appendix B: Summary of Findings from Primary Data Collection

B.1 – Residential Appliance Saturation Survey (RASS) Telephone Survey 1

B.2 – Residential On-Site Survey..... 144

B.3 – Commercial On-Site Survey 270

B.1 – Residential Appliance Saturation Survey (RASS) – Telephone Survey

Table B.1.1

bName	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Multi_Family	32	8.10	32	8.10
Single_Family	363	91.90	395	100.00

Table B.1.2

	bName					
	Multi_Family		Single_Family			
2.1 Which of the following best describes how the residence is occupied? (Q2_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Year-round, full-time	31	97%	360	99%	391	99%
(2) Seasonal or part-time use	1	3%	2	1%	3	1%
	32	*100%*	*362*	*100%*	*394*	*100%*

Table B.1.3

	bName					
	Multi_Family		Single_Family			
2.2 Within the past year, what have you done to reduce energy use in your home? (Q2_2) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Turn off lights when not in use	22	25%	243	28%	265	28%
(2) Replace light bulbs with Compact Fluorescent Light (CFL) bulbs	18	20%	215	25%	233	24%
(3) Adjust thermostat setting at night	7	8%	49	6%	56	6%
(4) Adjust thermostat setting when not at home	7	8%	38	4%	45	5%
(5) Reduce thermostat setting in the winter	8	9%	33	4%	41	4%
(6) Increase thermostat setting in the summer	9	10%	28	3%	37	4%
(7) Installed programmable thermostat	3	3%	31	4%	34	4%
(8) Unplug adapters and charging devices when not in use	2	2%	14	2%	16	2%
(9) Unplug electronic devices with "instant on" feature	3	3%	8	1%	11	1%
(10) Purchase energy efficient appliances/equipment	.	.	36	4%	36	4%
(11) Take shorter showers	3	3%	11	1%	14	1%
(12) Increase level of insulation	.	.	31	4%	31	3%
(13) Reduce air infiltration or leaks (by caulking, adding storm windows, etc.)	1	1%	56	6%	57	6%
(14) I don't do anything to reduce energy in my home	2	2%	16	2%	18	2%
(15) Continue to question 2.3 below	.	.	1	0%	1	0%
(16) Other (specify)	3	3%	64	7%	67	7%
	88	*100%*	*874*	*100%*	*962*	*100%*

Table B.1.4

	bName					
	Multi_Family		Single_Family			
2.2-Specify Within the past year, what have you done to reduce energy use in your home? (Q2_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Ajustable Thermostat	.	.	1	1%	1	1%
All Appliances Are Energy Star	.	.	1	1%	1	1%
Bought Three New Appliances, Insulation	.	.	1	1%	1	1%
Change Filters	.	.	1	1%	1	1%
Cok Windows And Doors	.	.	1	1%	1	1%
Don't Use Washer, Dryer, Window Ac	.	.	1	1%	1	1%
Dryer	.	.	1	1%	1	1%
Energy Star Roof, Instillation, Corn Burner	.	.	1	1%	1	1%
Furnace	.	.	1	1%	1	1%
Furnace, Windows	.	.	1	1%	1	1%
Furnace,windows, Storm Doors And Caulking The Windows	.	.	1	1%	1	1%
Gas Fireplace	.	.	1	1%	1	1%
Gone To Geothermal, And Preparing To Put In More Insulation,	.	.	1	1%	1	1%
Hung Up Draperies	.	.	1	1%	1	1%
Installed Geo Thermal Furnace	.	.	1	1%	1	1%
Installed New Furnace And Air	.	.	1	1%	1	1%
Insulating, Roof And New Furnace	.	.	1	1%	1	1%
Insulation	.	.	1	1%	1	1%
Keep Temperture Low	.	.	1	1%	1	1%
New Ac/Windows	.	.	1	1%	1	1%
New Air And Furnace	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.2-Specify Within the past year, what have you done to reduce energy use in your home? (Q2_2_Specify)	Frequency	Percent	Frequency	Percent	Frequency	Percent
New Air Conditioner	.	.	1	1%	1	1%
New Doors	.	.	1	1%	1	1%
New Doors, Insul	.	.	1	1%	1	1%
New Doors/Windows	.	.	1	1%	1	1%
New Furnace	.	.	1	1%	1	1%
New Furnace, A/C	.	.	1	1%	1	1%
New Furnace, New A/C	.	.	1	1%	1	1%
New Heating, Hang Dry Clothes	.	.	1	1%	1	1%
New Insulation	.	.	1	1%	1	1%
New Meter	.	.	1	1%	1	1%
New Roof	.	.	4	6%	4	6%
New Windows, And Put Plastic On Windows.	.	.	1	1%	1	1%
Open Windows	.	.	1	1%	1	1%
Plastic Over Windows In The Winter	.	.	1	1%	1	1%
Programmable Thermostat	.	.	1	1%	1	1%
Repl Furn, A/C, And Ceiling Fan	.	.	1	1%	1	1%
Repl Roof With Lighter Color	.	.	1	1%	1	1%
Replace Ac	.	.	1	1%	1	1%
Replaced Boiler	.	.	1	1%	1	1%
Replaced Furnace And Windows	.	.	1	1%	1	1%
Roof Insulation, Replaced Water Heater	.	.	1	1%	1	1%
Sealed Wondows And Doors	.	.	1	1%	1	1%
Siding, Insulation	.	.	1	1%	1	1%
Solid Doors	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.2-Specify Within the past year, what have you done to reduce energy use in your home? (Q2_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Stand Up Fans	1	25%	.	.	1	1%
Stated He Already Did All This 5 Years Ago	.	.	1	1%	1	1%
Storm Windows, Sealed Doors	.	.	1	1%	1	1%
Sun Tubes	.	.	1	1%	1	1%
Thermostat	.	.	1	1%	1	1%
Turn Thermostat Down In The Summer	.	.	1	1%	1	1%
Unplug Tv	1	25%	.	.	1	1%
Use Fan Instead Of Ac,	1	25%	.	.	1	1%
Vinyl Curtains	1	25%	.	.	1	1%
Water Heater	.	.	1	1%	1	1%
Water Heater Blanket	.	.	1	1%	1	1%
We Put In New Windows	.	.	1	1%	1	1%
When They Run Washer, And Careful About Air Filters, And How High The Thermastat Is.	.	.	1	1%	1	1%
Widnow, Roof, Insulation	.	.	1	1%	1	1%
Window Repair	.	.	1	1%	1	1%
Windows	.	.	7	10%	7	10%
Windows, Furnace	.	.	1	1%	1	1%
Wood Stove	.	.	1	1%	1	1%
	4	*100%*	*68*	*100%*	*72*	*100%*

Table B.1.5

	bName					
	Multi_Family		Single_Family			
2.3 What is your primary motive to reduce energy use in your home? (Q2_3) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) To save energy	14	29%	115	24%	129	24%
(2) To save money on utility bill	27	56%	319	65%	346	64%
(3) Reduce pollution/carbon footprint	5	10%	48	10%	53	10%
(4) Other (specify)	2	4%	7	1%	9	2%
	48	*100%*	*489*	*100%*	*537*	*100%*

Table B.1.6

	bName					
	Multi_Family		Single_Family			
2.3-Specify What is your primary motive to reduce energy use in your home? (Q2_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
All	.	.	4	36%	4	33%
All Of The Above	.	.	1	9%	1	8%
And 2	.	.	1	9%	1	8%
Being Comfortable	.	.	1	9%	1	8%
Can't Do Anything	.	.	1	9%	1	8%
Money	.	.	1	9%	1	8%
Money And Energy	.	.	1	9%	1	8%

	bName					
	Multi_Family		Single_Family			
2.3-Specify What is your primary motive to reduce energy use in your home? (Q2_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Na	.	.	1	9%	1	8%
Social Security	1	100%	.	.	1	8%
	1	*100%*	*11*	*100%*	*12*	*100%*

Table B.1.7

	bName					
	Multi_Family		Single_Family			
2.4 Which of the following high-efficiency equipment (e.g., ENERGY STAR) have you installed in your home in the past five years? Please check all that apply. (Q2_4) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Compact Fluorescent Light Bulb(s) (CFL)	19	48%	215	30%	234	31%
(2) Central air conditioner	4	10%	81	11%	85	11%
(3) Window/through-the-wall air conditioner	.	.	12	2%	12	2%
(4) Heat-pump	.	.	6	1%	6	1%
(5) Water heater	.	.	69	10%	69	9%
(6) Refrigerator	1	3%	95	13%	96	13%
(7) Dishwasher	1	3%	64	9%	65	9%
(8) Clothes washer	2	5%	64	9%	66	9%
(9) Other (specify)	4	10%	61	8%	65	9%

	bName					
	Multi_Family		Single_Family			
2.4 Which of the following high-efficiency equipment (e.g., ENERGY STAR) have you installed in your home in the past five years? Please check all that apply. (Q2_4) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(10) Have not installed any energy efficient equipment in my home	9	23%	52	7%	61	8%
	40	*100%*	*719*	*100%*	*759*	*100%*

Table B.1.8

	bName					
	Multi_Family		Single_Family			
2.4-Specify Which of the following high-efficiency equipment (e.g., ENERGY STAR) have you installed in your home in the past five years? Please check all that apply. (Q2_4_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Air Conditioner	.	.	1	1%	1	1%
All (New Home)	.	.	1	1%	1	1%
Ceiling Fan, A/C, Furn	.	.	1	1%	1	1%
Clothed Dryer	.	.	1	1%	1	1%
Clothes Dryer	.	.	1	1%	1	1%
Dishwasher And Microwave	.	.	1	1%	1	1%
Dryer	.	.	8	11%	8	11%
Dryer And Microwave	1	25%	.	.	1	1%
Dryer, Stove	.	.	1	1%	1	1%
Dryer, Stove, Microwave	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.4-Specify Which of the following high-efficiency equipment (e.g., ENERGY STAR) have you installed in your home in the past five years? Please check all that apply. (Q2_4_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Dryer`	.	.	1	1%	1	1%
Electric Stove, Dryer, Tvs	.	.	1	1%	1	1%
Energy Efficient Spaceheather	.	.	1	1%	1	1%
Everything Is	.	.	1	1%	1	1%
Fans	.	.	1	1%	1	1%
Fireplace	.	.	1	1%	1	1%
Freezer	.	.	2	3%	2	3%
Furn And Water Heater	.	.	1	1%	1	1%
Furnace	.	.	19	27%	19	26%
Furnace, Dehumidifier	.	.	1	1%	1	1%
Furnace, Stove	.	.	1	1%	1	1%
Gas Stove	.	.	1	1%	1	1%
Greener Laptop	1	25%	.	.	1	1%
Hot Water Heater	.	.	1	1%	1	1%
Na	.	.	1	1%	1	1%
New Deep Freeze	.	.	1	1%	1	1%
None	1	25%	.	.	1	1%
Oven	1	25%	.	.	1	1%
Repl Furn	.	.	1	1%	1	1%
Replaced Door	.	.	1	1%	1	1%
Roof	.	.	1	1%	1	1%
Roof, Computer & Printer, Tv, Dishwasher	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.4-Specify Which of the following high-efficiency equipment (e.g., ENERGY STAR) have you installed in your home in the past five years? Please check all that apply. (Q2_4_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Stove	.	.	4	6%	4	5%
Stove, Tv	.	.	1	1%	1	1%
Stove, Water Softener, Microwave, Washer, Dryer, Freezer	.	.	1	1%	1	1%
Stove/Frrezer/ Microwave Doors	.	.	1	1%	1	1%
Thermostat	.	.	1	1%	1	1%
Tv, Computer, Monitors	.	.	1	1%	1	1%
Vents	.	.	1	1%	1	1%
Washing Machine	.	.	2	3%	2	3%
Window, Stone	.	.	1	1%	1	1%
Windows	.	.	2	3%	2	3%
Windows, Doors And Furnace	.	.	1	1%	1	1%
	4	*100%*	*70*	*100%*	*74*	*100%*

Table B.1.9

	bName					
	Multi_Family		Single_Family			
2.5A. On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to pay for an on-site energy audit of your home if the final cost to you was: $200 (Q2_5A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	23	72%	282	79%	305	79%
(2) 2	2	6%	19	5%	21	5%
(3) 3	1	3%	22	6%	23	6%
(4) 4	1	3%	14	4%	15	4%
(5) 5 - Very likely	5	16%	18	5%	23	6%
	32	*100%*	*355*	*100%*	*387*	*100%*

Table B.1.10

	bName					
	Multi_Family		Single_Family			
2.5B. On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to pay for an on-site energy audit of your home if the final cost to you was: $250 (Q2_5B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	24	75%	295	83%	319	83%
(2) 2	1	3%	17	5%	18	5%
(3) 3	2	6%	23	6%	25	6%
(4) 4	3	9%	8	2%	11	3%

	bName					
	Multi_Family		Single_Family			
2.5B. On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to pay for an on-site energy audit of your home if the final cost to you was: $250 (Q2_5B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	2	6%	11	3%	13	3%
	32	*100%*	*354*	*100%*	*386*	*100%*

Table B.1.11

	bName					
	Multi_Family		Single_Family			
2.5C. On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to pay for an on-site energy audit of your home if the final cost to you was: $300 (Q2_5C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	24	75%	307	87%	331	86%
(2) 2	1	3%	12	3%	13	3%
(3) 3	5	16%	21	6%	26	7%
(4) 4	.	.	4	1%	4	1%
(5) 5 - Very likely	2	6%	10	3%	12	3%
	32	*100%*	*354*	*100%*	*386*	*100%*

Table B.1.12

	bName					
	Multi_Family		Single_Family			
2.5D. On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to recycle an old appliance if you were paid to recycle an old appliance (Q2_5D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	12	40%	97	27%	109	28%
(2) 2	.	.	14	4%	14	4%
(3) 3	3	10%	41	12%	44	11%
(4) 4	2	7%	51	14%	53	14%
(5) 5 - Very likely	13	43%	151	43%	164	43%
	30	*100%*	*354*	*100%*	*384*	*100%*

Table B.1.13

	bName					
	Multi_Family		Single_Family			
2.6A On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Lighting without a utility incentive rebate? (Q2_6A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	12	38%	82	23%	94	24%
(2) 2	1	3%	24	7%	25	6%
(3) 3	3	9%	39	11%	42	11%
(4) 4	1	3%	38	11%	39	10%

	bName					
	Multi_Family		Single_Family			
2.6A On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Lighting without a utility incentive rebate? (Q2_6A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	15	47%	178	49%	193	49%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.14

	bName					
	Multi_Family		Single_Family			
2.6B On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Air Conditioning without a utility incentive rebate? (Q2_6B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	16	50%	134	37%	150	38%
(2) 2	1	3%	27	8%	28	7%
(3) 3	3	9%	57	16%	60	15%
(4) 4	3	9%	25	7%	28	7%
(5) 5 - Very likely	9	28%	117	33%	126	32%
	32	*100%*	*360*	*100%*	*392*	*100%*

Table B.1.15

	bName					
	Multi_Family		Single_Family			
2.6C On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Space Heating (gas furnace) without a utility incentive rebate? (Q2_6C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	17	55%	149	42%	166	43%
(2) 2	1	3%	24	7%	25	6%
(3) 3	4	13%	51	14%	55	14%
(4) 4	3	10%	30	8%	33	8%
(5) 5 - Very likely	6	19%	104	29%	110	28%
	31	*100%*	*358*	*100%*	*389*	*100%*

Table B.1.16

	bName					
	Multi_Family		Single_Family			
2.6D On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Appliances (refrigerator) without a utility incentive rebate? (Q2_6D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	15	47%	120	33%	135	34%
(2) 2	.	.	32	9%	32	8%
(3) 3	4	13%	61	17%	65	17%
(4) 4	5	16%	38	11%	43	11%

	bName					
	Multi_Family		Single_Family			
2.6D On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Appliances (refrigerator) without a utility incentive rebate? (Q2_6D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	8	25%	110	30%	118	30%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.17

	bName					
	Multi_Family		Single_Family			
2.6E On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Electronics (TV, Computer) without a utility incentive rebate? (Q2_6E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	13	41%	129	36%	142	36%
(2) 2	1	3%	36	10%	37	9%
(3) 3	4	13%	66	18%	70	18%
(4) 4	4	13%	37	10%	41	10%
(5) 5 - Very likely	10	31%	93	26%	103	26%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.18

	bName					
	Multi_Family		Single_Family			
2.6F On a scale of 1 to 5, where 1 is Very Unlikely and 5 is Very Likely, how likely would you be to install energy efficient Weatherization (energy efficient insulation) without a utility incentive rebate? (Q2_6F)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	17	55%	128	35%	145	37%
(2) 2	.	.	34	9%	34	9%
(3) 3	5	16%	42	12%	47	12%
(4) 4	4	13%	36	10%	40	10%
(5) 5 - Very likely	5	16%	121	34%	126	32%
	31	*100%*	*361*	*100%*	*392*	*100%*

Table B.1.19

	bName					
	Multi_Family		Single_Family			
2.7A What if Ameren paid 50% of the cost to upgrade to the energy efficient: Lighting (Q2_7A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	6	19%	34	11%	40	12%
(2) 2	1	3%	16	5%	17	5%
(3) 3	3	10%	39	13%	42	13%
(4) 4	3	10%	53	17%	56	17%
(5) 5 - Very likely	18	58%	163	53%	181	54%
	31	*100%*	*305*	*100%*	*336*	*100%*

Table B.1.20

	bName					
	Multi_Family		Single_Family			
2.7B What if Ameren paid 50% of the cost to upgrade to the energy efficient: Air Conditioning (Q2_7B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	10	32%	59	19%	69	20%
(2) 2	1	3%	21	7%	22	6%
(3) 3	5	16%	44	14%	49	14%
(4) 4	.	.	55	18%	55	16%
(5) 5 - Very likely	15	48%	131	42%	146	43%
	31	*100%*	*310*	*100%*	*341*	*100%*

Table B.1.21

	bName					
	Multi_Family		Single_Family			
2.7C What if Ameren paid 50% of the cost to upgrade to the energy efficient: Space Heating (gas furnace) (Q2_7C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	11	38%	70	23%	81	24%
(2) 2	1	3%	21	7%	22	7%
(3) 3	3	10%	45	15%	48	14%
(4) 4	2	7%	50	16%	52	15%

	bName					
	Multi_Family		Single_Family			
2.7C What if Ameren paid 50% of the cost to upgrade to the energy efficient: Space Heating (gas furnace) (Q2_7C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	12	41%	122	40%	134	40%
	29	*100%*	*308*	*100%*	*337*	*100%*

Table B.1.22

	bName					
	Multi_Family		Single_Family			
2.7D What if Ameren paid 50% of the cost to upgrade to the energy efficient: Appliances (refrigerator) (Q2_7D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	9	29%	53	17%	62	18%
(2) 2	1	3%	17	5%	18	5%
(3) 3	3	10%	45	14%	48	14%
(4) 4	2	6%	64	21%	66	19%
(5) 5 - Very likely	16	52%	132	42%	148	43%
	31	*100%*	*311*	*100%*	*342*	*100%*

Table B.1.23

	bName					
	Multi_Family		Single_Family			
2.7E What if Ameren paid 50% of the cost to upgrade to the energy efficient: Electronics (TV, Computer) (Q2_7E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	8	26%	54	17%	62	18%
(2) 2	1	3%	17	6%	18	5%
(3) 3	3	10%	46	15%	49	14%
(4) 4	3	10%	66	21%	69	20%
(5) 5 - Very likely	16	52%	126	41%	142	42%
	31	*100%*	*309*	*100%*	*340*	*100%*

Table B.1.24

	bName					
	Multi_Family		Single_Family			
2.7F What if Ameren paid 50% of the cost to upgrade to the energy efficient: Weatherization (energy efficient insulation) (Q2_7F)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	10	33%	57	19%	67	20%
(2) 2	2	7%	21	7%	23	7%
(3) 3	3	10%	39	13%	42	13%
(4) 4	1	3%	49	16%	50	15%
(5) 5 - Very likely	14	47%	139	46%	153	46%
	30	*100%*	*305*	*100%*	*335*	*100%*

Table B.1.25

	bName					
	Multi_Family		Single_Family			
2.8A How about if the incentive were 75% of the cost to upgrade the: Lighting (Q2_8A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	6	20%	32	12%	38	13%
(2) 2	1	3%	8	3%	9	3%
(3) 3	1	3%	22	8%	23	8%
(4) 4	2	7%	30	11%	32	11%
(5) 5 - Very likely	20	67%	181	66%	201	66%
	30	*100%*	*273*	*100%*	*303*	*100%*

Table B.1.26

	bName					
	Multi_Family		Single_Family			
2.8B How about if the incentive were 75% of the cost to upgrade the: Air Conditioning (Q2_8B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	10	33%	53	19%	63	21%
(2) 2	1	3%	13	5%	14	5%
(3) 3	3	10%	21	8%	24	8%
(4) 4	1	3%	29	11%	30	10%

	bName					
	Multi_Family		Single_Family			
2.8B How about if the incentive were 75% of the cost to upgrade the: Air Conditioning (Q2_8B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	15	50%	158	58%	173	57%
	30	*100%*	*274*	*100%*	*304*	*100%*

Table B.1.27

	bName					
	Multi_Family		Single_Family			
2.8C How about if the incentive were 75% of the cost to upgrade the: Space Heating (gas furnace) (Q2_8C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	11	38%	58	21%	69	23%
(2) 2	1	3%	11	4%	12	4%
(3) 3	2	7%	26	10%	28	9%
(4) 4	3	10%	28	10%	31	10%
(5) 5 - Very likely	12	41%	149	55%	161	53%
	29	*100%*	*272*	*100%*	*301*	*100%*

Table B.1.28

	bName					
	Multi_Family		Single_Family			
2.8D How about if the incentive were 75% of the cost to upgrade the: Appliances (refrigerator) (Q2_8D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	9	30%	44	16%	53	17%
(2) 2	1	3%	8	3%	9	3%
(3) 3	2	7%	31	11%	33	11%
(4) 4	2	7%	33	12%	35	12%
(5) 5 - Very likely	16	53%	157	58%	173	57%
	30	*100%*	*273*	*100%*	*303*	*100%*

Table B.1.29

	bName					
	Multi_Family		Single_Family			
2.8E How about if the incentive were 75% of the cost to upgrade the: Electronics (TV, Computer) (Q2_8E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	7	23%	45	16%	52	17%
(2) 2	1	3%	9	3%	10	3%
(3) 3	3	10%	30	11%	33	11%
(4) 4	3	10%	30	11%	33	11%
(5) 5 - Very likely	16	53%	160	58%	176	58%
	30	*100%*	*274*	*100%*	*304*	*100%*

Table B.1.30

	bName					
	Multi_Family		Single_Family			
2.8F How about if the incentive were 75% of the cost to upgrade the: Weatherization (energy efficient insulation) (Q2_8F)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	9	32%	51	19%	60	20%
(2) 2	2	7%	10	4%	12	4%
(3) 3	2	7%	24	9%	26	9%
(4) 4	2	7%	29	11%	31	10%
(5) 5 - Very likely	13	46%	157	58%	170	57%
	28	*100%*	*271*	*100%*	*299*	*100%*

Table B.1.31

	bName					
	Multi_Family		Single_Family			
2.9A On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected the value of your home. (Q2_9A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	11	37%	74	20%	85	22%
(2) 2	.	.	18	5%	18	5%
(3) 3	7	23%	81	22%	88	23%
(4) 4	4	13%	79	22%	83	21%

	bName					
	Multi_Family		Single_Family			
2.9A On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected the value of your home. (Q2_9A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) 5 - Very likely	8	27%	109	30%	117	30%
	30	*100%*	*361*	*100%*	*391*	*100%*

Table B.1.32

	bName					
	Multi_Family		Single_Family			
2.9B On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Impacted the environment (Q2_9B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	7	23%	58	16%	65	17%
(2) 2	1	3%	27	7%	28	7%
(3) 3	5	16%	86	24%	91	23%
(4) 4	8	26%	84	23%	92	23%
(5) 5 - Very likely	10	32%	106	29%	116	30%
	31	*100%*	*361*	*100%*	*392*	*100%*

Table B.1.33

	bName					
	Multi_Family		Single_Family			
2.9C On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected your monthly electric bill (Q2_9C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	5	16%	35	10%	40	10%
(2) 2	.	.	17	5%	17	4%
(3) 3	5	16%	55	15%	60	15%
(4) 4	6	19%	73	20%	79	20%
(5) 5 - Very likely	15	48%	181	50%	196	50%
	31	*100%*	*361*	*100%*	*392*	*100%*

Table B.1.34

	bName					
	Multi_Family		Single_Family			
2.9D On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected the cost for new high-efficiency electric equipment appliances (Q2_9D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	9	29%	50	14%	59	15%
(2) 2	2	6%	29	8%	31	8%

	bName					
	Multi_Family		Single_Family			
2.9D On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected the cost for new high-efficiency electric equipment appliances (Q2_9D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) 3	6	19%	82	23%	88	23%
(4) 4	6	19%	83	23%	89	23%
(5) 5 - Very likely	8	26%	116	32%	124	32%
	31	*100%*	*360*	*100%*	*391*	*100%*

Table B.1.35

	bName					
	Multi_Family		Single_Family			
2.9E On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected your level of comfort (Q2_9E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	7	23%	42	12%	49	13%
(2) 2	2	6%	24	7%	26	7%
(3) 3	4	13%	79	22%	83	21%
(4) 4	7	23%	84	23%	91	23%
(5) 5 - Very likely	11	35%	132	37%	143	36%
	31	*100%*	*361*	*100%*	*392*	*100%*

Table B.1.36

	bName					
	Multi_Family		Single_Family			
2.9F On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Affected the payback period from new high-efficiency equipment (Q2_9F)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	9	29%	60	17%	69	18%
(2) 2	.	.	25	7%	25	6%
(3) 3	9	29%	77	21%	86	22%
(4) 4	5	16%	75	21%	80	20%
(5) 5 - Very likely	8	26%	123	34%	131	34%
	31	*100%*	*360*	*100%*	*391*	*100%*

Table B.1.37

	bName					
	Multi_Family		Single_Family			
2.9G On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Impacted your lifestyle convenience (Q2_9G)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Very unlikely	8	26%	53	15%	61	16%
(2) 2	1	3%	31	9%	32	8%

	bName					
	Multi_Family		Single_Family			
2.9G On a scale of 1 to 5, where 1 is not likely and 5 is Very likely, rate the following based on whether you would participate in an Ameren energy efficiency program if it: Impacted your lifestyle convenience (Q2_9G)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) 3	5	16%	78	22%	83	21%
(4) 4	5	16%	82	23%	87	22%
(5) 5 - Very likely	12	39%	116	32%	128	33%
	31	*100%*	*360*	*100%*	*391*	*100%*

Table B.1.38

	bName					
	Multi_Family		Single_Family			
2.10A Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: High-efficiency measures are generally too expensive for me (Cost) (Q2_10A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Completely disagree	5	16%	69	19%	74	19%
(2) 2	3	9%	37	10%	40	10%
(3) 3	7	22%	83	23%	90	23%
(4) 4	4	13%	48	13%	52	13%
(5) 5 - Completely agree	13	41%	124	34%	137	35%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.39

	bName					
	Multi_Family		Single_Family			
2.10B Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: : I don't know enough about high-efficiency measures (Information) (Q2_10B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Completely disagree	8	25%	86	24%	94	24%
(2) 2	3	9%	61	17%	64	16%
(3) 3	4	13%	86	24%	90	23%
(4) 4	3	9%	46	13%	49	12%
(5) 5 - Completely agree	14	44%	83	23%	97	25%
	32	*100%*	*362*	*100%*	*394*	*100%*

Table B.1.40

	bName					
	Multi_Family		Single_Family			
2.10C Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: : I am not responsible for purchasing these items in my household (Not Decision Maker) (Q2_10C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Completely disagree	14	44%	248	69%	262	66%

	bName					
	Multi_Family		Single_Family			
2.10C Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: : I am not responsible for purchasing these items in my household (Not Decision Maker) (Q2_10C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) 2	1	3%	27	7%	28	7%
(3) 3	4	13%	28	8%	32	8%
(4) 4	1	3%	7	2%	8	2%
(5) 5 - Completely agree	12	38%	52	14%	64	16%
	32	*100%*	*362*	*100%*	*394*	*100%*

Table B.1.41

	bName					
	Multi_Family		Single_Family			
2.10D Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: : I do not know enough about my home's current energy usage (Knowledge) (Q2_10D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Completely disagree	11	34%	151	42%	162	41%
(2) 2	4	13%	49	14%	53	13%
(3) 3	4	13%	69	19%	73	19%
(4) 4	3	9%	33	9%	36	9%
(5) 5 - Completely agree	10	31%	60	17%	70	18%
	32	*100%*	*362*	*100%*	*394*	*100%*

Table B.1.42

	bName					
	Multi_Family		Single_Family			
2.10E Where 1 is Completely Disagree and 5 is Completely Agree, please indicate your level of agreement with the following statement: : Energy prices are not high enough to motivate me to take action (Status quo) (Q2_10E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 1 - Completely disagree	15	47%	190	53%	205	52%
(2) 2	4	13%	51	14%	55	14%
(3) 3	4	13%	56	16%	60	15%
(4) 4	2	6%	27	7%	29	7%
(5) 5 - Completely agree	7	22%	37	10%	44	11%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.43

	bName					
	Multi_Family		Single_Family			
2.11 What other barriers often prevent you from becoming more energy efficient in your home? (Q2_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Specify	9	32%	96	34%	105	33%

	bName					
	Multi_Family		Single_Family			
2.11 What other barriers often prevent you from becoming more energy efficient in your home? (Q2_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) No other barriers exist	19	68%	190	66%	209	67%
	28	*100%*	*286*	*100%*	*314*	*100%*

Table B.1.44

	bName					
	Multi_Family		Single_Family			
2.11-Specify What other barriers often prevent you from becoming more energy efficient in your home? (Q2_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Age Of Home	.	.	1	1%	1	1%
Alergies Requires Her To Use Her Air All The Time.	.	.	1	1%	1	1%
Apt Living/	1	11%	.	.	1	1%
Availability Of Vendors / Cost	.	.	1	1%	1	1%
Being Disorganized	.	.	1	1%	1	1%
Cash	.	.	1	1%	1	1%
Convenience, Cost	.	.	1	1%	1	1%
Convinence, Someone To Help	.	.	1	1%	1	1%
Cost	1	11%	25	24%	26	23%
Cost Limited Income	.	.	1	1%	1	1%
Cost Too Much	.	.	1	1%	1	1%
Cost, Knowing Good Suppliers	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.11-Specify What other barriers often prevent you from becoming more energy efficient in your home? (Q2_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Cost/Economy	.	.	1	1%	1	1%
Doesn't Own The Home	.	.	1	1%	1	1%
Economy	.	.	1	1%	1	1%
Elderly	.	.	1	1%	1	1%
Expense	.	.	2	2%	2	2%
Finances	.	.	1	1%	1	1%
Fixed Income	.	.	1	1%	1	1%
Funds	.	.	1	1%	1	1%
Income	1	11%	2	2%	3	3%
Knowledge	1	11%	1	1%	2	2%
Lack Of Knowledge Of New Products And Durability	.	.	1	1%	1	1%
Manufacture Flawws	.	.	1	1%	1	1%
Money	2	22%	36	35%	38	34%
Money, Elderly	.	.	1	1%	1	1%
Na	.	.	1	1%	1	1%
New Home, Cost	.	.	1	1%	1	1%
No Money	.	.	1	1%	1	1%
No Need	.	.	1	1%	1	1%
None	.	.	1	1%	1	1%
Not Enough Pay Back	.	.	1	1%	1	1%
Not Home Owner	.	.	1	1%	1	1%
Not Staying In Home	.	.	1	1%	1	1%
Old Home	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
2.11-Specify What other barriers often prevent you from becoming more energy efficient in your home? (Q2_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Older Home, Turns Into Monster Project	.	.	1	1%	1	1%
Rent	1	11%	1	1%	2	2%
Rent, Friends	.	.	1	1%	1	1%
Rent, Keeping Your Lightbulbs	1	11%	.	.	1	1%
Rental Property	.	.	1	1%	1	1%
Renter	1	11%	.	.	1	1%
Single W/Child	.	.	1	1%	1	1%
The Economy	.	.	1	1%	1	1%
Time	.	.	1	1%	1	1%
Unemployed	.	.	1	1%	1	1%
	9	*100%*	*103*	*100%*	*112*	*100%*

Table B.1.45

	bName					
	Multi_Family		Single_Family			
3.1 Which of the following best describes your home? (Q3_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Single family detached house (on a separate lot) not connected to other living units	.	.	326	90%	326	83%
(2) Single family attached, such as a duplex, condominium, row or townhouse	.	.	21	6%	21	5%

	bName					
	Multi_Family		Single_Family			
3.1 Which of the following best describes your home? (Q3_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) A unit in a multifamily apartment, condominium, row or townhouse building that has 3 or more units	32	100%	.	.	32	8%
(4) Manufactured home or house trailer	.	.	16	4%	16	4%
	32	*100%*	*363*	*100%*	*395*	*100%*

Table B.1.46

	bName					
	Multi_Family		Single_Family			
3.1-Specify Which of the following best describes your home? (Q3_1_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Duplex	.	.	2	5%	2	4%
Four- Plex	.	.	1	2%	1	2%
Home, Changed Into Apartments	1	25%	.	.	1	2%
Mobile Home	.	.	2	5%	2	4%
Multi-Family Apartment	3	75%	.	.	3	6%
Na	.	.	1	2%	1	2%
Single Family	.	.	1	2%	1	2%
Single Family Condo	.	.	1	2%	1	2%
Single Family- Detached	.	.	35	80%	35	73%
Town House	.	.	1	2%	1	2%
	4	*100%*	*44*	*100%*	*48*	*100%*

Table B.1.47

	bName					
	Multi_Family		Single_Family			
3.2 How many living units or apartments are in the building where this residence is located? (Q3_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Don't know (probe for general size)	5	17%	14	58%	19	36%
(2) 3 - 10 units	7	24%	5	21%	12	23%
(3) 11 - 50 units	6	21%	3	13%	9	17%
(4) 51 - 100 units	5	17%	2	8%	7	13%
(5) More than 100 units	3	10%	.	.	3	6%
(6) Don't know	3	10%	.	.	3	6%
	29	*100%*	*24*	*100%*	*53*	*100%*

Table B.1.48

	bName			
	Multi_Family			
3.2-Specify How many living units or apartments are in the building where this residence is located? (Q3_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Three	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.1.49

	bName					
	Multi_Family		Single_Family			
3.3 How many levels or stories are there in this residence? (Q3_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) One story	9	33%	194	59%	203	57%
(2) One and a half stories	.	.	20	6%	20	6%
(3) Split level or two stories	10	37%	74	23%	84	24%
(4) Two and a half stories	1	4%	19	6%	20	6%
(5) Tri-level or three stories	3	11%	16	5%	19	5%
(6) More than three stories	1	4%	4	1%	5	1%
(7) Other (specify)	1	4%	1	0%	2	1%
(8) Don't know	2	7%	.	.	2	1%
	27	*100%*	*328*	*100%*	*355*	*100%*

Table B.1.50

	bName					
	Multi_Family		Single_Family			
3.3-Specify How many levels or stories are there in this residence? (Q3_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	2	4%	2	4%
1 Story	.	.	20	43%	20	39%
1 Story w/ basement	.	.	3	7%	3	6%
1 and a half stories	.	.	2	4%	2	4%

	bName					
	Multi_Family		Single_Family			
3.3-Specify How many levels or stories are there in this residence? (Q3_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1 story	.	.	1	2%	1	2%
2 Stories w/ basement	.	.	2	4%	2	4%
2 Stories, w/ half finished basement	.	.	1	2%	1	2%
2 Story	3	60%	10	22%	13	25%
2+ basement	.	.	1	2%	1	2%
3 Stories	.	.	1	2%	1	2%
4 Storys	.	.	1	2%	1	2%
6	1	20%	.	.	1	2%
MOBILE HOME	1	20%	.	.	1	2%
RANCH	.	.	1	2%	1	2%
Two and a Half Stories	.	.	1	2%	1	2%
	5	*100%*	*46*	*100%*	*51*	*100%*

Table B.1.51

	bName					
	Multi_Family		Single_Family			
4.1 What is the approximate age of your home? (Q4_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 2 Years	10	33%	30	8%	40	10%
2-10 Years	4	13%	33	9%	37	10%
10-20 Years	3	10%	41	11%	44	11%
20-30 Years	8	27%	40	11%	48	12%

	bName					
	Multi_Family		Single_Family			
4.1 What is the approximate age of your home? (Q4_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
30-40 Years	2	7%	37	10%	39	10%
40-50 Years	1	3%	48	13%	49	13%
More than 50 Years	2	7%	130	36%	132	34%
	30	*100%*	*359*	*100%*	*389*	*100%*

Table B.1.52

	bName					
	Multi_Family		Single_Family			
4.2 If different portions of your house have different configurations, please answer based on the largest portion of your home's footprint. Is your home: (Q4_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Above a finished basement	6	22%	89	26%	95	25%
(2) Above an unfinished basement	1	4%	115	33%	116	31%
(3) On top of a foundation meaning on a concrete slab with no basement	7	26%	54	16%	61	16%
(4) Above a crawl space	.	.	79	23%	79	21%
(5) Don't know	13	48%	9	3%	22	6%
	27	*100%*	*346*	*100%*	*373*	*100%*

Table B.1.53

	bName					
	Multi_Family		Single_Family			
4.3 Approximately what percentage of this residence's windows are double or triple-pane? (Q4_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
None	10	33%	38	10%	48	12%
Less than 10%	1	3%	6	2%	7	2%
10-20%	.	.	4	1%	4	1%
20-30%	.	.	6	2%	6	2%
30-40%	.	.	4	1%	4	1%
40-50%	1	3%	16	4%	17	4%
50-60%	.	.	7	2%	7	2%
60-70%	.	.	4	1%	4	1%
70-80%	.	.	10	3%	10	3%
80-90%	1	3%	11	3%	12	3%
90-100%	13	43%	240	66%	253	64%
Don't know	4	13%	17	5%	21	5%
	30	*100%*	*363*	*100%*	*393*	*100%*

Table B.1.54

	bName					
	Multi_Family		Single_Family			
4.4 Approximately what percentage of your home's windows are equipped with storm windows? (Q4_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
None	17	55%	125	38%	142	39%
Less than 10%	.	.	5	2%	5	1%
10-20%	.	.	8	2%	8	2%
20-30%	.	.	4	1%	4	1%
30-40%	.	.	2	1%	2	1%
40-50%	1	3%	17	5%	18	5%
50-60%	.	.	3	1%	3	1%
60-70%	.	.	3	1%	3	1%
70-80%	.	.	11	3%	11	3%
80-90%	1	3%	4	1%	5	1%
90-100%	9	29%	138	42%	147	40%
Don't know	3	10%	12	4%	15	4%
	31	*100%*	*332*	*100%*	*363*	*100%*

Table B.1.55

	bName					
	Multi_Family		Single_Family			
4.5 What is the approximate square footage of the heated or cooled living space in this residence? (Q4_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 4.5-Specify	9	32%	219	64%	228	61%
(3) Don't know	19	68%	125	36%	144	39%
	28	*100%*	*344*	*100%*	*372*	*100%*

Table B.1.56

	bName					
	Multi_Family		Single_Family			
4.5-Specify What is the approximate square footage of the heated or cooled living space in this residence? (Q4_5_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 500 square feet	1	11%	1	0%	2	1%
500 to 1000 square feet	7	78%	26	12%	33	14%
1000 to 1500 square feet	1	11%	64	29%	65	29%
1500 to 2000 square feet	.	.	64	29%	64	28%
2000 to 2500 square feet	.	.	31	14%	31	14%
2500 to 3000 square feet	.	.	17	8%	17	7%
3000 to 3500 square feet	.	.	7	3%	7	3%
3500 to 4000 square feet	.	.	5	2%	5	2%
4000 to 4500 square feet	.	.	1	0%	1	0%

	bName					
	Multi_Family		Single_Family			
4.5-Specify What is the approximate square footage of the heated or cooled living space in this residence? (Q4_5_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
4500 to 5000 square feet	.	.	2	1%	2	1%
More than 5000 square feet	.	.	1	0%	1	0%
	9	*100%*	*219*	*100%*	*228*	*100%*

Table B.1.57

	bName					
	Multi_Family		Single_Family			
4.6 Although you aren't sure about the actual heated or cooled living space, can you estimate the square footage of your home using the following categories? (Q4_6)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Under 1,000 square feet	4	21%	15	11%	19	12%
(2) 1,000 – 1,500 square feet	3	16%	27	20%	30	19%
(3) 1,501 – 2,000 square feet	1	5%	21	16%	22	14%
(4) 2,001 – 2,500 square feet	.	.	7	5%	7	5%
(5) 2,501 – 3,000 square feet	.	.	4	3%	4	3%
(6) More than 3,000 square feet (Specify) _____ square feet	.	.	4	3%	4	3%
(7) Don't know	11	58%	57	42%	68	44%
	19	*100%*	*135*	*100%*	*154*	*100%*

Table B.1.58

	bName					
	Multi_Family		Single_Family			
4.7 How many heated rooms are in this residence? (Q4_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 4.7-Specify	32	100%	355	99%	387	99%
(2) Don't know	.	.	2	1%	2	1%
	32	*100%*	*357*	*100%*	*389*	*100%*

Table B.1.59

	bName					
	Multi_Family		Single_Family			
4.7-Specify How many heated rooms are in this residence? (Q4_7_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	.	.	1	0%	1	0%
(1) One	.	.	1	0%	1	0%
(2) Two	3	9%	3	1%	6	2%
(3) Three	11	34%	14	4%	25	6%
(4) Four	15	47%	36	10%	51	13%
(5) Five	1	3%	89	25%	90	23%
(6) Six	1	3%	60	17%	61	16%
(7+) Seven or more	1	3%	157	43%	158	40%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.60

	bName					
	Multi_Family		Single_Family			
4.8 How many bathrooms are in this home? (Q4_8)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 4.8-Specify	30	94%	344	96%	374	95%
(2) Don't know	2	6%	15	4%	17	4%
3	.	.	1	0%	1	0%
	32	*100%*	*360*	*100%*	*392*	*100%*

Table B.1.61

	bName					
	Multi_Family		Single_Family			
4.8-Specify How many bathrooms are in this home? (Q4_8_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	27	90%	124	36%	151	41%
1.25	.	.	1	0%	1	0%
1.5	1	3%	19	6%	20	5%
1.75	.	.	1	0%	1	0%
2	2	7%	128	37%	130	35%
2 full and 2 half	.	.	2	1%	2	1%
2.5	.	.	19	6%	19	5%

	bName					
	Multi_Family		Single_Family			
4.8-Specify How many bathrooms are in this home? (Q4_8_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
3	.	.	34	10%	34	9%
3.5	.	.	8	2%	8	2%
4	.	.	5	1%	5	1%
5	.	.	1	0%	1	0%
	30	*100%*	*342*	*100%*	*372*	*100%*

Table B.1.62

	bName					
	Multi_Family		Single_Family			
5.1 What type of heating system do you have? Is it …? (Q5_1) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Natural gas heating	7	23%	273	75%	280	71%
(2) Electric heating	21	68%	69	19%	90	23%
(3) Other (specify) _____ (i.e., wood, propane)	.	.	18	5%	18	5%
(4) No heating	.	.	1	0%	1	0%
(5) Combination of types (Specify)_____	.	.	1	0%	1	0%
(6) Don't know	3	10%	3	1%	6	2%
(7) Don't have one (Skip to section 6)	.	.	1	0%	1	0%
	31	*100%*	*366*	*100%*	*397*	*100%*

Table B.1.63

	bName					
	Multi_Family		Single_Family			
5.1-Specify What type of heating system do you have? Is it …? (Q5_1_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	2%	1	1%
Baseboard	.	.	1	2%	1	1%
Boiler	.	.	1	2%	1	1%
Electric	3	75%	12	19%	15	22%
Forced Air And Radiant Floor Heating	.	.	1	2%	1	1%
Gas Fireplace	.	.	1	2%	1	1%
Geothermal	.	.	3	5%	3	4%
Heating Oil	.	.	1	2%	1	1%
Liquid Patroleum	.	.	1	2%	1	1%
Na	.	.	1	2%	1	1%
Natural Gas	1	25%	29	46%	30	45%
Natural Gas, Space Heater	.	.	1	2%	1	1%
Propane	.	.	9	14%	9	13%
Space Heaters	.	.	1	2%	1	1%
	4	*100%*	*63*	*100%*	*67*	*100%*

Table B.1.64

	bName					
	Multi_Family		Single_Family			
5.2 What is the approximate age of your heating system? (Q5_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 0-2 years	2	6%	60	17%	62	16%
(2) 3-9 years	4	13%	107	30%	111	28%
(3) 10-19 years	2	6%	92	26%	94	24%
(4) 20 or more years	4	13%	63	18%	67	17%
(5) Don't know	19	61%	38	11%	57	15%
	31	*100%*	*360*	*100%*	*391*	*100%*

Table B.1.65

	bName					
	Multi_Family		Single_Family			
5.3 Do you have a service contract for regular maintenance on your heating unit? (Q5_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	10	34%	101	29%	111	29%
(2) No	6	21%	240	68%	246	64%
(3) Don't know	13	45%	13	4%	26	7%
	29	*100%*	*354*	*100%*	*383*	*100%*

Table B.1.66

	bName					
	Multi_Family		Single_Family			
5.4-Month When was the last time maintenance was performed on your heating unit? (Q5_4_Month)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) January	1	6%	15	6%	16	6%
(2) February	.	.	7	3%	7	3%
(3) March	.	.	10	4%	10	4%
(4) April	1	6%	17	6%	18	6%
(5) May	.	.	13	5%	13	5%
(6) June	.	.	14	5%	14	5%
(7) July	.	.	11	4%	11	4%
(8) August	4	24%	47	18%	51	18%
(9) September	1	6%	30	11%	31	11%
(10) October	.	.	23	9%	23	8%
(11) November	.	.	9	3%	9	3%
(12) December	1	6%	25	10%	26	9%
(98) Don't know	9	53%	42	16%	51	18%
	17	*100%*	*263*	*100%*	*280*	*100%*

Table B.1.67

	bName					
	Multi_Family		Single_Family			
5.4-Year How many years ago was the last maintenance performed on your heating unit? (Q5_4_Year)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	.	.	2	1%	2	1%
(1) One	.	.	1	0%	1	0%
(3) Three	.	.	2	1%	2	1%
(4) Four	.	.	2	1%	2	1%
(5) Five	.	.	1	0%	1	0%
(6) Six	.	.	7	2%	7	2%
(7+) Seven or more	8	53%	230	81%	238	80%
(98) Don't Know	7	47%	39	14%	46	15%
	15	*100%*	*284*	*100%*	*299*	*100%*

Table B.1.68

	bName					
	Multi_Family		Single_Family			
5.5 NOTE: Skip if question 5.2 above was "1" or "4." Does the main heating system serve only this residence or does it serve more than one residence? (Q5_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Only this residence	21	68%	311	97%	332	95%
(2) More than one residence	8	26%	3	1%	11	3%

	bName					
	Multi_Family		Single_Family			
5.5 NOTE: Skip if question 5.2 above was "1" or "4." Does the main heating system serve only this residence or does it serve more than one residence? (Q5_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Don't know	2	6%	5	2%	7	2%
	31	*100%*	*319*	*100%*	*350*	*100%*

Table B.1.69

	bName					
	Multi_Family		Single_Family			
5.6 What is the type of system that is used to heat the majority of your home? (Q5_6) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Natural gas central forced air furnace	8	27%	275	75%	283	71%
(2) Natural gas hot water boiler (with radiators or baseboards) gas hydronic heating	.	.	4	1%	4	1%
(3) Natural gas steam boiler (with radiators)	1	3%	1	0%	2	1%
(4) Natural gas radiant floor heating	.	.	2	1%	2	1%
(5) Natural gas fireplace	.	.	1	0%	1	0%
(6) Electric baseboard	7	23%	10	3%	17	4%
(7) Electric central forced air furnace	9	30%	29	8%	38	10%
(8) Air-Source Heat pump	.	.	2	1%	2	1%
(9) Ground-source heat pump	.	.	4	1%	4	1%
(10) Portable heaters	.	.	6	2%	6	2%

	bName					
	Multi_Family		Single_Family			
5.6 What is the type of system that is used to heat the majority of your home? (Q5_6) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(11) Oil central forced air furnace	.	.	1	0%	1	0%
(12) Oil hot water boiler (with radiators or baseboards)	.	.	1	0%	1	0%
(13) Oil steam boiler (with radiators)	.	.	1	0%	1	0%
(14) Bottled gas central forced air (propane, butane or kerosene)	.	.	7	2%	7	2%
(15) Bottled gas portable heaters (propane, butane, or kerosene)	.	.	1	0%	1	0%
(16) Wood stove	.	.	1	0%	1	0%
(17) Wood fireplace	.	.	2	1%	2	1%
(18) Solar	.	.	1	0%	1	0%
(19) Other System & Fuel (specify_____)	.	.	3	1%	3	1%
(21) Don't know	5	17%	14	4%	19	5%
	30	*100%*	*366*	*100%*	*396*	*100%*

Table B.1.70

	bName					
	Multi_Family		Single_Family			
5.6-Specify What is the type of system that is used to heat the majority of your home? (Q5_6_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
14	.	.	1	2%	1	2%
2-radiant heat	.	.	1	2%	1	2%
ELEC WALL UNITS	.	.	1	2%	1	2%
ELECTRIC CEILING	.	.	1	2%	1	2%
Electric Baseboard	1	25%	1	2%	2	3%
Electric Central forced air	2	50%	9	15%	11	17%
Electric forced air	.	.	1	2%	1	2%
Forced Gas Air	.	.	1	2%	1	2%
GEOTHERMAL	.	.	1	2%	1	2%
Geo Thermal	.	.	1	2%	1	2%
Geothermal	.	.	2	3%	2	3%
NA	.	.	1	2%	1	2%
Nat gas forced air	.	.	5	8%	5	8%
PROPANE	.	.	2	3%	2	3%
PROPANE HEATED RADIANT FLOOR	.	.	1	2%	1	2%
Steam Boiler	.	.	1	2%	1	2%
air duct	.	.	1	2%	1	2%
heat pump	.	.	1	2%	1	2%
nat gas forced air	1	25%	22	37%	23	37%
nat gas, hot water boiler	.	.	1	2%	1	2%
natural gas forced air	.	.	1	2%	1	2%

	bName					
	Multi_Family		Single_Family			
5.6-Specify What is the type of system that is used to heat the majority of your home? (Q5_6_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
propane	.	.	3	5%	3	5%
	4	*100%*	*59*	*100%*	*63*	*100%*

Table B.1.71

	bName					
	Multi_Family		Single_Family			
5.7 What type of temperature control is on the main heating system? (Q5_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Regular thermostat(s) with temperature settings	18	60%	174	49%	192	49%
(2) Clock or programmable thermostat(s)	3	10%	157	44%	160	41%
(3) Dial control without temperature settings	3	10%	16	4%	19	5%
(4) Simple on/off switch or no temperature control	4	13%	5	1%	9	2%
(5) Something else (specify) _____	1	3%	2	1%	3	1%
(6) Don't know	1	3%	4	1%	5	1%
	30	*100%*	*358*	*100%*	*388*	*100%*

Table B.1.72

	bName					
	Multi_Family		Single_Family			
5.7-Specify What type of temperature control is on the main heating system? (Q5_7_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	17%	.	.	1	2%
Dial Control	1	17%	6	14%	7	14%
Digital, regular thermostat	.	.	2	5%	2	4%
NA	.	.	1	2%	1	2%
Regular Thermostat	3	50%	9	20%	12	24%
WOOD	.	.	1	2%	1	2%
no switch	1	17%	.	.	1	2%
programmable thermostat	.	.	25	57%	25	50%
	6	*100%*	*44*	*100%*	*50*	*100%*

Table B.1.73

	bName					
	Multi_Family		Single_Family			
5.8 I will read some ways that heating systems are used. Please indicate which ones describe how you use the main heating system in your home. Indicate all that apply. (Q5_8) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) The thermostat(s) is kept at a constant setting or temperature	15	33%	216	40%	231	40%
(2) The thermostat is adjusted when occupants are sleeping	7	16%	140	26%	147	25%

	bName					
	Multi_Family		Single_Family			
5.8 I will read some ways that heating systems are used. Please indicate which ones describe how you use the main heating system in your home. Indicate all that apply. (Q5_8) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) The thermostat is adjusted when occupants leave the house	12	27%	127	24%	139	24%
(4) The heater is adjusted only when someone is cold	8	18%	50	9%	58	10%
(5) Other (specify) _____	2	4%	3	1%	5	1%
(6) Don't know	1	2%	1	0%	2	0%
	45	*100%*	*537*	*100%*	*582*	*100%*

Table B.1.74

	bName					
	Multi_Family		Single_Family			
5.8-Specify I will read some ways that heating systems are used. Please indicate which ones describe how you use the main heating system in your home. Indicate all that apply. (Q5_8_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
ONLY ON WHEN COLD	1	33%	.	.	1	13%
adjusted when someone is cold	.	.	1	20%	1	13%
constant	1	33%	4	80%	5	63%
n/a	1	33%	.	.	1	13%
	3	*100%*	*5*	*100%*	*8*	*100%*

Table B.1.75

	bName					
	Multi_Family		Single_Family			
5.9 When you are heating your house, at what temperature do you normally keep your thermostat? (Q5_9)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.9-Specify	22	85%	315	98%	337	97%
(2) Don't know	4	15%	6	2%	10	3%
	26	*100%*	*321*	*100%*	*347*	*100%*

Table B.1.76

	bName					
	Multi_Family		Single_Family			
5.9-Specify When you are heating your house, at what temperature do you normally keep your thermostat? (Q5_9_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
50	.	.	1	0%	1	0%
55	.	.	1	0%	1	0%
60	.	.	6	2%	6	2%
62	.	.	3	1%	3	1%
64	.	.	1	0%	1	0%
65	2	8%	15	4%	17	5%
65-70	.	.	1	0%	1	0%
66	1	4%	7	2%	8	2%
67	.	.	10	3%	10	3%

	bName					
	Multi_Family		Single_Family			
5.9-Specify When you are heating your house, at what temperature do you normally keep your thermostat? (Q5_9_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
68	2	8%	84	24%	86	23%
68-70	.	.	1	0%	1	0%
69	1	4%	16	5%	17	5%
70	8	33%	56	16%	64	17%
71	1	4%	8	2%	9	2%
72	.	.	60	17%	60	16%
73	.	.	9	3%	9	2%
74	.	.	16	5%	16	4%
75	4	17%	21	6%	25	7%
76	.	.	10	3%	10	3%
77	.	.	4	1%	4	1%
78	3	13%	11	3%	14	4%
79	.	.	1	0%	1	0%
80	1	4%	4	1%	5	1%
81	.	.	1	0%	1	0%
84	1	4%	.	.	1	0%
90	.	.	2	1%	2	1%
	24	*100%*	*349*	*100%*	*373*	*100%*

Table B.1.77

	bName					
	Multi_Family		Single_Family			
5.10 When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When one or more people in your household are at home and everyone is awake? (Q5_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.10-Specify	23	85%	305	98%	328	97%
(2) Don't know	4	15%	6	2%	10	3%
	27	*100%*	*311*	*100%*	*338*	*100%*

Table B.1.78

	bName					
	Multi_Family		Single_Family			
5.10-Specify When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When one or more people in your household are at home and everyone is awake? (Q5_10_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	.	.	8	2%	8	2%
60-65F	3	13%	19	6%	22	6%
65-70F	10	42%	171	50%	181	49%
70-75F	6	25%	112	33%	118	32%

	bName					
	Multi_Family		Single_Family			
5.10-Specify When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When one or more people in your household are at home and everyone is awake? (Q5_10_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
75-80F	4	17%	29	8%	33	9%
More than 80F	1	4%	3	1%	4	1%
	24	*100%*	*342*	*100%*	*366*	*100%*

Table B.1.79

	bName					
	Multi_Family		Single_Family			
5.11 When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When one or more people in your household are at home and everyone is asleep? (Q5_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.11-Specify	23	85%	304	98%	327	97%
(2) Don't know	4	15%	7	2%	11	3%
	27	*100%*	*311*	*100%*	*338*	*100%*

Table B.1.80

	bName					
	Multi_Family		Single_Family			
5.11-Specify When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When one or more people in your household are at home and everyone is asleep? (Q5_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	.	.	25	7%	25	7%
60-65F	3	13%	63	18%	66	18%
65-70F	10	42%	140	41%	150	41%
70-75F	7	29%	83	24%	90	25%
75-80F	3	13%	24	7%	27	7%
More than 80F	1	4%	6	2%	7	2%
	24	*100%*	*341*	*100%*	*365*	*100%*

Table B.1.81

	bName					
	Multi_Family		Single_Family			
5.12 When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When no one is at home? (Q5_12)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.12-Specify	23	85%	298	97%	321	96%

	bName					
	Multi_Family		Single_Family			
5.12 When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When no one is at home? (Q5_12)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Don't know	4	15%	10	3%	14	4%
	27	*100%*	*308*	*100%*	*335*	*100%*

Table B.1.82

	bName					
	Multi_Family		Single_Family			
5.12-Specify When you are heating your house, at what temperature do you normally keep your thermostat set during the following different situations: When no one is at home? (Q5_12_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	1	4%	44	13%	45	13%
60-65F	2	8%	66	20%	68	19%
65-70F	7	29%	122	37%	129	36%
70-75F	6	25%	76	23%	82	23%
75-80F	5	21%	20	6%	25	7%
More than 80F	3	13%	5	1%	8	2%
998	.	.	1	0%	1	0%
	24	*100%*	*334*	*100%*	*358*	*100%*

Table B.1.83

	bName					
	Multi_Family		Single_Family			
5.13-Specify And, on a typical weekday, for about how many hours is there no one at home? (Q5_13_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	7	26%	136	41%	143	40%
1	1	4%	13	4%	14	4%
2	3	11%	24	7%	27	8%
3	1	4%	16	5%	17	5%
4	1	4%	30	9%	31	9%
5	1	4%	10	3%	11	3%
6	.	.	12	4%	12	3%
7	1	4%	4	1%	5	1%
8	5	19%	35	11%	40	11%
9	1	4%	10	3%	11	3%
10	4	15%	18	5%	22	6%
11	.	.	3	1%	3	1%
12	1	4%	5	2%	6	2%
13	.	.	2	1%	2	1%
14	.	.	1	0%	1	0%
15	.	.	3	1%	3	1%
16	.	.	1	0%	1	0%
18	.	.	1	0%	1	0%
20	.	.	1	0%	1	0%
23	.	.	2	1%	2	1%
24	.	.	1	0%	1	0%

	bName					
	Multi_Family		Single_Family			
5.13-Specify And, on a typical weekday, for about how many hours is there no one at home? (Q5_13_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
40	.	.	1	0%	1	0%
45	.	.	1	0%	1	0%
98	1	4%	.	.	1	0%
	27	*100%*	*330*	*100%*	*357*	*100%*

Table B.1.84

	bName					
	Multi_Family		Single_Family			
5.14 On a typical weekend day, for about how many hours is there no one at home? (Q5_14)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.14-Specify	22	88%	237	88%	259	88%
(2) Don't know	3	12%	33	12%	36	12%
	25	*100%*	*270*	*100%*	*295*	*100%*

Table B.1.85

	bName					
	Multi_Family		Single_Family			
5.14-Specify On a typical weekend day, for about how many hours is there no one at home? (Q5_14_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	8	31%	160	51%	168	49%
1	.	.	9	3%	9	3%
2	3	12%	29	9%	32	9%
3	2	8%	23	7%	25	7%
4	2	8%	25	8%	27	8%
5	3	12%	17	5%	20	6%
6	3	12%	12	4%	15	4%
7	.	.	1	0%	1	0%
8	1	4%	13	4%	14	4%
9	1	4%	1	0%	2	1%
10	1	4%	8	3%	9	3%
12	1	4%	2	1%	3	1%
13	1	4%	1	0%	2	1%
14	.	.	1	0%	1	0%
15	.	.	3	1%	3	1%
16	.	.	2	1%	2	1%
20	.	.	3	1%	3	1%
22	.	.	1	0%	1	0%
24	.	.	2	1%	2	1%
48	.	.	1	0%	1	0%
	26	*100%*	*314*	*100%*	*340*	*100%*

Table B.1.86

	bName					
	Multi_Family		Single_Family			
5.15 Do you have any other heating systems or space heaters in your home? (Q5_15) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes, secondary system	1	3%	12	3%	13	3%
(2) Yes, space heater	6	19%	75	21%	81	21%
(3) Yes, other: (Specify) _____	.	.	24	7%	24	6%
(4) No (Proceed to section 6 below)	23	74%	244	69%	267	69%
(5) Don't know (Proceed to section 6 below)	1	3%	1	0%	2	1%
	31	*100%*	*356*	*100%*	*387*	*100%*

Table B.1.87

	bName					
	Multi_Family		Single_Family			
5.15-Specify Do you have any other heating systems or space heaters in your home? (Q5_15_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	3%	1	3%
4	.	.	1	3%	1	3%
Electric Fireplace	.	.	1	3%	1	3%
Fire Places	.	.	1	3%	1	3%
Fireplace	.	.	5	17%	5	17%

	bName					
	Multi_Family		Single_Family			
5.15-Specify Do you have any other heating systems or space heaters in your home? (Q5_15_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Furnace	.	.	1	3%	1	3%
Furnace In Garage	.	.	1	3%	1	3%
Gas Fireplace	.	.	3	10%	3	10%
Gas Furnace	.	.	1	3%	1	3%
Gas Heater	.	.	1	3%	1	3%
Infared Heater	.	.	1	3%	1	3%
Kerosene	.	.	1	3%	1	3%
Na	.	.	1	3%	1	3%
Natural Gas Fireplace	.	.	2	7%	2	7%
Propane 3 Units	.	.	1	3%	1	3%
Radiator System	1	100%	.	.	1	3%
Secondary Furnace And 2 Fireplaces	.	.	1	3%	1	3%
Space Hear	.	.	1	3%	1	3%
Wall Gas Heater	.	.	1	3%	1	3%
Wall Unit In Sun Room	.	.	1	3%	1	3%
Wood Buring Fireplace	.	.	1	3%	1	3%
Wood Burning Fireplace	.	.	1	3%	1	3%
Wood Burning Stove	.	.	1	3%	1	3%
	1	*100%*	*29*	*100%*	*30*	*100%*

Table B.1.88

	bName					
	Multi_Family		Single_Family			
5.16 How many space heaters do you have? (Q5_16)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) See 5.16-Specify	10	100%	113	98%	123	98%
(2) Don't know	.	.	2	2%	2	2%
	10	*100%*	*115*	*100%*	*125*	*100%*

Table B.1.89

	bName					
	Multi_Family		Single_Family			
5.16-Specify How many space heaters do you have? (Q5_16_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	6	60%	31	30%	37	32%
(1) One	2	20%	54	52%	56	49%
(2) Two	2	20%	11	11%	13	11%
(3) Three	.	.	7	7%	7	6%
(4) Four	.	.	1	1%	1	1%
	10	*100%*	*104*	*100%*	*114*	*100%*

Table B.1.90

	bName					
	Multi_Family		Single_Family			
5.17A1 Let's talk about the space heaters that you use most often. Record room: (Q5_17A1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Attic	.	.	1	1%	1	1%
Basement	.	.	6	9%	6	9%
Basement Bedroom	.	.	1	1%	1	1%
Basement Shower	.	.	1	1%	1	1%
Bathroom	1	33%	14	21%	15	21%
Bathroom Bsmt	.	.	1	1%	1	1%
Bedroom	2	67%	8	12%	10	14%
Comp Room	.	.	1	1%	1	1%
Dining Room	.	.	1	1%	1	1%
Don't Know	.	.	1	1%	1	1%
Don't Use Them Often Enough	.	.	1	1%	1	1%
Family	.	.	1	1%	1	1%
Family Room	.	.	2	3%	2	3%
Front Room	.	.	1	1%	1	1%
Garage	.	.	2	3%	2	3%
High	.	.	2	3%	2	3%
Living	.	.	1	1%	1	1%
Living Room	.	.	8	12%	8	11%
Livingroom	.	.	1	1%	1	1%
Low	.	.	4	6%	4	6%
Medium	.	.	3	4%	3	4%

	bName					
	Multi_Family		Single_Family			
5.17A1 Let's talk about the space heaters that you use most often. Record room: (Q5_17A1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Sewing	.	.	1	1%	1	1%
Sewing Room	.	.	2	3%	2	3%
Sun Room	.	.	1	1%	1	1%
Up Hall	.	.	1	1%	1	1%
Utility	.	.	1	1%	1	1%
	3	*100%*	*67*	*100%*	*70*	*100%*

Table B.1.91

	bName					
	Multi_Family		Single_Family			
5.17A2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17A2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	2	3%	2	3%
2	1	50%	5	7%	6	8%
3	.	.	11	15%	11	15%
4	.	.	7	10%	7	9%
5	.	.	5	7%	5	7%
6	.	.	2	3%	2	3%
7	.	.	11	15%	11	15%
10	.	.	4	5%	4	5%

	bName					
	Multi_Family		Single_Family			
5.17A2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17A2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
14	.	.	1	1%	1	1%
15	.	.	1	1%	1	1%
16	.	.	2	3%	2	3%
30	.	.	5	7%	5	7%
35	.	.	1	1%	1	1%
40	1	50%	1	1%	2	3%
45	.	.	1	1%	1	1%
60	.	.	3	4%	3	4%
72	.	.	1	1%	1	1%
90	.	.	6	8%	6	8%
250	.	.	1	1%	1	1%
300	.	.	1	1%	1	1%
365	.	.	2	3%	2	3%
	2	*100%*	*73*	*100%*	*75*	*100%*

Table B.1.92

	bName			
	Single_Family			
5.17B1 Let's talk about the space heaters that you use most often. Record room: (Q5_17B1)	**Frequency**	**Percent**	**Frequency**	**Percent**
Bathroom	1	10%	1	10%

	bName			
	Single_Family			
5.17B1 Let's talk about the space heaters that you use most often. Record room: (Q5_17B1)	**Frequency**	**Percent**	**Frequency**	**Percent**
Bedroom	3	30%	3	30%
Down Living	1	10%	1	10%
Family Room In Basement	1	10%	1	10%
Glass Room	1	10%	1	10%
Kitchen	1	10%	1	10%
Living Room	1	10%	1	10%
Low	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.1.93

	bName			
	Single_Family			
5.17B2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17B2)	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	10%	1	10%
2	2	20%	2	20%
3	2	20%	2	20%
4	1	10%	1	10%
7	1	10%	1	10%
30	1	10%	1	10%
90	1	10%	1	10%

	bName			
	Single_Family			
5.17B2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17B2)	**Frequency**	**Percent**	**Frequency**	**Percent**
250	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.1.94

	bName			
	Single_Family			
5.17C1 Let's talk about the space heaters that you use most often. Record room: (Q5_17C1)	**Frequency**	**Percent**	**Frequency**	**Percent**
Basement	1	33%	1	33%
Bedroom	1	33%	1	33%
Low	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.1.95

	bName			
	Single_Family			
5.17C2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17C2)	**Frequency**	**Percent**	**Frequency**	**Percent**
3	1	33%	1	33%
4	1	33%	1	33%

	bName			
	Single_Family			
5.17C2 Let's talk about the space heaters that you use most often. Record # of days use: (Q5_17C2)	**Frequency**	**Percent**	**Frequency**	**Percent**
90	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.1.96

	bName					
	Multi_Family		Single_Family			
6.0 Now, moving on to your home's cooling system. Do you have any cooling system or equipment? (Q6_0)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	30	97%	347	97%	377	97%
(2) No	1	3%	12	3%	13	3%
	31	*100%*	*359*	*100%*	*390*	*100%*

Table B.1.97

	bName					
	Multi_Family		Single_Family			
6.1A How many of each of the following do you have? Central air conditioning (Q6_1A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	2	8%	22	7%	24	7%
(1) One	22	92%	277	90%	299	90%

	bName					
	Multi_Family		Single_Family			
6.1A How many of each of the following do you have? Central air conditioning (Q6_1A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Two	.	.	6	2%	6	2%
(3) Three	.	.	1	0%	1	0%
(4) Four	.	.	1	0%	1	0%
	24	*100%*	*307*	*100%*	*331*	*100%*

Table B.1.98

	bName					
	Multi_Family		Single_Family			
6.1B How many of each of the following do you have? Air-source heat pump (Q6_1B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	9	100%	126	98%	135	98%
(1) One	.	.	2	2%	2	1%
(2) Two	.	.	1	1%	1	1%
	9	*100%*	*129*	*100%*	*138*	*100%*

Table B.1.99

	bName					
	Multi_Family		Single_Family			
6.1C How many of each of the following do you have? Ground-source (geothermal) heat pump (Q6_1C)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	9	100%	124	96%	133	96%
(1) One	.	.	4	3%	4	3%
(3) Three	.	.	1	1%	1	1%
	9	*100%*	*129*	*100%*	*138*	*100%*

Table B.1.100

	bName					
	Multi_Family		Single_Family			
6.1D How many of each of the following do you have? Room air conditioners (Q6_1D)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	7	47%	109	66%	116	64%
(1) One	6	40%	35	21%	41	23%
(2) Two	2	13%	14	8%	16	9%
(3) Three	.	.	5	3%	5	3%
(4) Four	.	.	2	1%	2	1%
(5) Five	.	.	1	1%	1	1%
	15	*100%*	*166*	*100%*	*181*	*100%*

Table B.1.101

	bName					
	Multi_Family		Single_Family			
6.1E How many of each of the following do you have? Ductless mini-split air conditioner (Q6_1E)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	9	100%	117	91%	126	92%
(1) One	.	.	7	5%	7	5%
(2) Two	.	.	3	2%	3	2%
(3) Three	.	.	1	1%	1	1%
	9	*100%*	*128*	*100%*	*137*	*100%*

Table B.1.102

	bName					
	Multi_Family		Single_Family			
6.1F How many of each of the following do you have? Portable fans (Q6_1F)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	4	22%	75	36%	79	35%
(1) One	7	39%	49	24%	56	25%
(2) Two	3	17%	49	24%	52	23%
(3) Three	2	11%	22	11%	24	11%
(4) Four	2	11%	10	5%	12	5%
(5) Five	.	.	3	1%	3	1%
	18	*100%*	*208*	*100%*	*226*	*100%*

Table B.1.103

	bName					
	Multi_Family		Single_Family			
6.1G How many of each of the following do you have? Whole-house fans (Q6_1G)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	8	89%	118	88%	126	88%
(1) One	1	11%	8	6%	9	6%
(2) Two	.	.	1	1%	1	1%
(3) Three	.	.	2	1%	2	1%
(4) Four	.	.	2	1%	2	1%
(5) Five	.	.	1	1%	1	1%
(7+) Seven or more	.	.	2	1%	2	1%
	9	*100%*	*134*	*100%*	*143*	*100%*

Table B.1.104

	bName					
	Multi_Family		Single_Family			
6.1H How many of each of the following do you have? Ceiling fans (Q6_1H)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	5	33%	29	10%	34	12%
(1) One	7	47%	31	11%	38	13%
(2) Two	2	13%	54	19%	56	19%

	bName					
	Multi_Family		Single_Family			
6.1H How many of each of the following do you have? Ceiling fans (Q6_1H)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Three	1	7%	43	15%	44	15%
(4) Four	.	.	44	16%	44	15%
(5) Five	.	.	38	14%	38	13%
(6) Six	.	.	20	7%	20	7%
(7+) Seven or more	.	.	19	7%	19	6%
	15	*100%*	*278*	*100%*	*293*	*100%*

Table B.1.105

	bName					
	Multi_Family		Single_Family			
6.1I How many of each of the following do you have? Something else (specify) (Q6_1I)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	9	28%	118	33%	127	32%
(1) One	23	72%	245	67%	268	68%
	32	*100%*	*363*	*100%*	*395*	*100%*

Table B.1.106

	bName					
	Multi_Family		Single_Family			
6.1A How many of each of the following do you have? No cooling system or equipment (Q6_1J)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	9	100%	101	99%	110	99%
(1) One	.	.	1	1%	1	1%
	9	*100%*	*102*	*100%*	*111*	*100%*

Table B.1.107

	bName					
	Multi_Family		Single_Family			
6.1-Specify How many of each of the following do you have? (Q6_1_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1 Ceiling Exhaust Fan	.	.	1	25%	1	17%
Attic Fan	.	.	1	25%	1	17%
Cooling Unit Built In With Geo Thermal	.	.	1	25%	1	17%
Stand Up Fans	1	50%	.	.	1	17%
Window Aire	.	.	1	25%	1	17%
Window Fan	1	50%	.	.	1	17%
	2	*100%*	*4*	*100%*	*6*	*100%*

Table B.1.108

	bName					
	Multi_Family		Single_Family			
6.2 Which one would you say is your primary or main cooling system (the system that gets used most often)? Is it the …. (Q6_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Central air conditioner	22	73%	279	80%	301	79%
(2) Air-source heat pump	.	.	4	1%	4	1%
(3) Ground-source (geothermal) heat pump	.	.	6	2%	6	2%
(4) Room air conditioners	8	27%	44	13%	52	14%
(5) Ductless mini-split air conditioner	.	.	7	2%	7	2%
(7) Don't know	.	.	1	0%	1	0%
(8) Don't have a cooling system (skip to section 7 below)	.	.	8	2%	8	2%
	30	*100%*	*349*	*100%*	*379*	*100%*

Table B.1.109

	bName					
	Multi_Family		Single_Family			
6.3 If 6.1 above is "1" (Q6_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Approximately how old is this _____?	12	46%	250	85%	262	82%
(2) Approximately how old are these ____ on average?	.	.	3	1%	3	1%

	bName					
	Multi_Family		Single_Family			
6.3 If 6.1 above is "1" (Q6_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Don't know	14	54%	42	14%	56	17%
	26	*100%*	*295*	*100%*	*321*	*100%*

Table B.1.110

	bName					
	Multi_Family		Single_Family			
6.3-Specify If 6.1 above is "1" (Q6_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	5	2%	5	2%
Less than 2 Years	7	50%	52	19%	59	20%
2-10 Years	4	29%	146	53%	150	52%
10-20 Years	2	14%	59	22%	61	21%
20-30 Years	.	.	9	3%	9	3%
30-40 Years	1	7%	3	1%	4	1%
	14	*100%*	*274*	*100%*	*288*	*100%*

Table B.1.111

	bName					
	Multi_Family		Single_Family			
6.4 Does this equipment cool any other units (i.e., apartments) at your location? (Q6_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	10	32%	89	27%	99	28%
(2) No	19	61%	231	71%	250	70%
(3) Refused	2	6%	4	1%	6	2%
	31	*100%*	*324*	*100%*	*355*	*100%*

Table B.1.112

	bName					
	Multi_Family		Single_Family			
6.5 Do you have a service contract for regular maintenance on your main (primary) cooling unit? (Q6_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	8	29%	98	29%	106	29%
(2) No	13	46%	226	68%	239	66%
(3) Refused	7	25%	10	3%	17	5%
	28	*100%*	*334*	*100%*	*362*	*100%*

Table B.1.113

	bName					
	Multi_Family		Single_Family			
6.6-Month When was maintenance last done on your main (primary) cooling unit? (Q6_6_Month)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	27%	28	12%	32	13%
(1) January	.	.	10	4%	10	4%
(2) February	.	.	1	0%	1	0%
(3) March	.	.	12	5%	12	5%
(4) April	1	7%	31	13%	32	13%
(5) May	1	7%	37	15%	38	15%
(6) June	.	.	33	14%	33	13%
(7) July	.	.	15	6%	15	6%
(8) August	3	20%	28	12%	31	12%
(9) September	1	7%	16	7%	17	7%
(10) October	.	.	6	3%	6	2%
(12) December	1	7%	10	4%	11	4%
(98) Don't know	4	27%	12	5%	16	6%
	15	*100%*	*239*	*100%*	*254*	*100%*

Table B.1.114

	bName					
	Multi_Family		Single_Family			
6.6-Year When was maintenance last done on your main (primary) cooling unit? (Q6_6_Year)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	4	29%	28	11%	32	12%
(4) Four	.	.	4	2%	4	1%
(5) Five	.	.	1	0%	1	0%
(6) Six	.	.	5	2%	5	2%
(7+) Seven or more	7	50%	208	82%	215	80%
(98) Don't Know	3	21%	8	3%	11	4%
	14	*100%*	*254*	*100%*	*268*	*100%*

Table B.1.115

	bName					
	Multi_Family		Single_Family			
6.7 What type of temperature control is on the main (primary) cooling system? (Q6_7) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Regular thermostat(s) with temperature settings	19	63%	143	41%	162	43%
(2) Clock or programmable thermostat(s)	4	13%	154	45%	158	42%
(3) Dial control without temperature settings	4	13%	17	5%	21	6%
(4) Simple on/off switch or no temperature control	3	10%	28	8%	31	8%

	bName					
	Multi_Family		Single_Family			
6.7 What type of temperature control is on the main (primary) cooling system? (Q6_7) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) Other (specify) _____	.	.	2	1%	2	1%
(6) Don't know	.	.	2	1%	2	1%
	30	*100%*	*346*	*100%*	*376*	*100%*

Table B.1.116

	bName					
	Multi_Family		Single_Family			
6.7-Specify What type of temperature control is on the main (primary) cooling system? (Q6_7_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	2%	1	2%
2	.	.	1	2%	1	2%
Dial Control	1	25%	4	9%	5	10%
Digital, Regular Thermostat	.	.	2	4%	2	4%
Na	.	.	1	2%	1	2%
Only On If Above 90	.	.	1	2%	1	2%
Programmable Thermostat	.	.	26	55%	26	51%
Regular Thermostat	3	75%	8	17%	11	22%
Simple On/Off Switch	.	.	2	4%	2	4%
Use Windows	.	.	1	2%	1	2%
	4	*100%*	*47*	*100%*	*51*	*100%*

Table B.1.117

	bName					
	Multi_Family		Single_Family			
6.8 I will read some ways that cooling systems are used. Please indicate which ones describe how you use your main cooling system. Indicate all that apply. (Q6_8) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) The thermostat(s) is kept at a constant setting or temperature	19	40%	203	41%	222	41%
(2) The thermostat is adjusted when occupants are sleeping	10	21%	99	20%	109	20%
(3) The thermostat is adjusted when occupants leave the house	10	21%	105	21%	115	21%
(4) The cooling system is turned on only when someone is warm	6	13%	55	11%	61	11%
(5) We rarely use this cooling system	3	6%	28	6%	31	6%
(6) Don't know	.	.	2	0%	2	0%
	48	*100%*	*492*	*100%*	*540*	*100%*

Table B.1.118

	bName					
	Multi_Family		Single_Family			
6.9 When you are cooling your house, at what temperature do you normally keep your thermostat? (Q6_9)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	0%	1	0%
(1) Temperature: _____	19	83%	205	94%	224	93%

	bName					
	Multi_Family		Single_Family			
6.9 When you are cooling your house, at what temperature do you normally keep your thermostat? (Q6_9)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Don't know	4	17%	13	6%	17	7%
	23	*100%*	*219*	*100%*	*242*	*100%*

Table B.1.119

	bName					
	Multi_Family		Single_Family			
6.9-Specify When you are cooling your house, at what temperature do you normally keep your thermostat? (Q6_9_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	4	15%	4	1%	8	2%
60-65F	.	.	6	2%	6	2%
65-70F	3	12%	66	20%	69	20%
70-75F	13	50%	141	44%	154	44%
75-80F	6	23%	101	31%	107	31%
More than 80F	.	.	4	1%	4	1%
	26	*100%*	*322*	*100%*	*348*	*100%*

Table B.1.120

	bName					
	Multi_Family		Single_Family			
6.10 When one or more people in your household are at home and everyone is awake? (Q6_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	0%	1	0%
(1) Temperature: _____	18	82%	204	94%	222	93%
(2) Don't know	4	18%	13	6%	17	7%
	22	*100%*	*218*	*100%*	*240*	*100%*

Table B.1.121

	bName					
	Multi_Family		Single_Family			
6.10-Specify When one or more people in your household are at home and everyone is awake? (Q6_10_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	4	15%	4	1%	8	2%
60-65F	.	.	5	2%	5	1%
65-70F	3	12%	62	20%	65	19%
70-75F	15	58%	135	44%	150	45%
75-80F	4	15%	101	33%	105	31%
More than 80F	.	.	2	1%	2	1%
	26	*100%*	*309*	*100%*	*335*	*100%*

Table B.1.122

	bName					
	Multi_Family		Single_Family			
6.11 When one or more people in your household are at home and everyone is asleep? (Q6_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	0%	1	0%
(1) Temperature: _____	18	90%	203	95%	221	94%
(2) Don't know	2	10%	10	5%	12	5%
	20	*100%*	*214*	*100%*	*234*	*100%*

Table B.1.123

	bName					
	Multi_Family		Single_Family			
6.11-Specify When one or more people in your household are at home and everyone is asleep? (Q6_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	3	13%	4	1%	7	2%
60-65F	1	4%	7	2%	8	3%
65-70F	2	8%	61	21%	63	20%
70-75F	14	58%	116	41%	130	42%
75-80F	4	17%	93	33%	97	31%
More than 80F	.	.	4	1%	4	1%
	24	*100%*	*285*	*100%*	*309*	*100%*

Table B.1.124

	bName					
	Multi_Family		Single_Family			
6.12 When no one is at home? (Q6_12)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	0%	1	0%
(1) Temperature: _____	18	86%	199	93%	217	92%
(2) Don't know	3	14%	15	7%	18	8%
	21	*100%*	*215*	*100%*	*236*	*100%*

Table B.1.125

	bName					
	Multi_Family		Single_Family			
6.12-Specify When no one is at home? (Q6_12_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	3	13%	7	3%	10	3%
60-65F	.	.	5	2%	5	2%
65-70F	2	9%	53	20%	55	19%
70-75F	12	52%	100	38%	112	39%
75-80F	6	26%	87	33%	93	32%
More than 80F	.	.	14	5%	14	5%
	23	*100%*	*266*	*100%*	*289*	*100%*

Table B.1.126

	bName					
	Multi_Family		Single_Family			
7.1 Does the water heater, or the source of the hot water, serve only this residence or does it serve more than one residence? (Q7_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Only this residence	23	74%	358	99%	381	97%
(2) More than one residence	6	19%	.	.	6	2%
(3) This residence has no hot water (proceed to section 8 below)	.	.	1	0%	1	0%
(4) Don't know	2	6%	1	0%	3	1%
	31	*100%*	*360*	*100%*	*391*	*100%*

Table B.1.127

	bName					
	Multi_Family		Single_Family			
7.2 How many water heaters are at this residence? (Q7_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) One	25	81%	358	99%	383	98%
(2) Two	6	19%	3	1%	9	2%
	31	*100%*	*361*	*100%*	*392*	*100%*

Table B.1.128

	bName					
	Multi_Family		Single_Family			
7.2-Specify How many water heaters are at this residence? (Q7_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Water heaters _____	22	96%	296	96%	318	96%
(2) Don't know	.	.	10	3%	10	3%
3	1	4%	2	1%	3	1%
	23	*100%*	*308*	*100%*	*331*	*100%*

Table B.1.129

	bName					
	Multi_Family		Single_Family			
7.3 What is the approximate age of this water heater? (Q7_3) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 0-2 years	6	17%	94	22%	100	22%
(2) 3-9 years	4	11%	145	35%	149	33%
(3) 10-19 years	3	9%	108	26%	111	25%
(4) 20 or more years	2	6%	26	6%	28	6%
(5) Don’t know	20	57%	45	11%	65	14%
	35	*100%*	*418*	*100%*	*453*	*100%*

Table B.1.130

	bName					
	Multi_Family		Single_Family			
7.4A What type of fuel or energy does this water heater use? (Q7_4A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	17	57%	106	30%	123	32%
(2) Natural gas	7	23%	232	65%	239	62%
(3) Propane or bottled gas (LP, propane, butane)	1	3%	10	3%	11	3%
(4) Solar	.	.	3	1%	3	1%
(6) Don't know	5	17%	7	2%	12	3%
	30	*100%*	*358*	*100%*	*388*	*100%*

Table B.1.131

	bName					
	Multi_Family		Single_Family			
7.4A-Specify What type of fuel or energy does this water heater use? (Q7_4A_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Electric	1	25%	7	17%	8	17%
Lp	.	.	1	2%	1	2%
Natural Gas	2	50%	31	74%	33	72%
Not Sure	1	25%	1	2%	2	4%
Propane	.	.	2	5%	2	4%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.1.132

	bName					
	Multi_Family		Single_Family			
7.4B What type of fuel or energy does this water heater use? (Q7_4B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	2	100%	12	75%	14	78%
(2) Natural gas	.	.	3	19%	3	17%
(6) Don't know	.	.	1	6%	1	6%
	2	*100%*	*16*	*100%*	*18*	*100%*

Table B.1.133

	bName					
	Multi_Family		Single_Family			
7.5 What type of water heater is this? (Q7_5) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Tank-type storage water heater. This is the most common type of water heater.	27	84%	368	95%	395	94%
(2) Heat pump water heater	.	.	1	0%	1	0%
(5) Tankless hot water heater, also called Demand or instantaneous water heaters	.	.	7	2%	7	2%
(6) Don't know	5	16%	10	3%	15	4%
	32	*100%*	*386*	*100%*	*418*	*100%*

Table B.1.134

	bName					
	Multi_Family		Single_Family			
7.6 NOTE: Ask only if the answer to question 7.5 above is "4." What type of system is used in conjunction with your solar water heater? (Q7_6) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Tank-type water heater (this is the "standard" type, with a water storage tank)	14	70%	150	96%	164	93%
(2) Tankless hot water heater, also called Demand or Instantaneous water heaters	.	.	2	1%	2	1%
(3) Don't know	6	30%	5	3%	11	6%
	20	*100%*	*157*	*100%*	*177*	*100%*

Table B.1.135

	bName					
	Multi_Family		Single_Family			
7.7A What is the secondary or back-up type of fuel you use to heat water at this residence? (Q7_7A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	5	31%	26	16%	31	18%
(2) Natural gas	1	6%	30	19%	31	18%
(3) Propane or bottled gas (LP, propane, butane)	.	.	3	2%	3	2%
(4) Something else (specify) _____	2	13%	46	29%	48	27%

	bName					
	Multi_Family		Single_Family			
7.7A What is the secondary or back-up type of fuel you use to heat water at this residence? (Q7_7A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) Don't know	8	50%	56	35%	64	36%
	16	*100%*	*161*	*100%*	*177*	*100%*

Table B.1.136

	bName			
	Single_Family			
7.7A-Specify What is the secondary or back-up type of fuel you use to heat water at this residence? (Q7_7A_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
Electric	1	33%	1	33%
Geo thermal	1	33%	1	33%
N/A	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.1.137

	bName			
	Single_Family			
7.7B What is the secondary or back-up type of fuel you use to heat water at this residence? (Q7_7B)	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	2	50%	2	50%

	bName			
	Single_Family			
7.7B What is the secondary or back-up type of fuel you use to heat water at this residence? (Q7_7B)	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Natural gas	1	25%	1	25%
(5) Don't know	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.1.138

	bName					
	Multi_Family		Single_Family			
7.8A At what specific temperature is this water heater thermostat set? (Q7_8A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Temperature: _____	1	4%	50	18%	51	17%
(2) Don't know	24	96%	233	82%	257	83%
	25	*100%*	*283*	*100%*	*308*	*100%*

Table B.1.139

	bName					
	Multi_Family		Single_Family			
7.8A-Specify At what specific temperature is this water heater thermostat set? (Q7_8A_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Less than 60F	.	.	5	7%	5	7%
65-70F	.	.	1	1%	1	1%
70-75F	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
7.8A-Specify At what specific temperature is this water heater thermostat set? (Q7_8A_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
80-100F	.	.	1	1%	1	1%
100	.	.	4	6%	4	6%
100-120F	1	100%	41	59%	42	59%
120-140F	.	.	11	16%	11	15%
140-160F	.	.	3	4%	3	4%
160-180F	.	.	1	1%	1	1%
More than 180F	.	.	2	3%	2	3%
	1	*100%*	*70*	*100%*	*71*	*100%*

Table B.1.140

	bName					
	Multi_Family		Single_Family			
7.8B At what specific temperature is this water heater thermostat set? (Q7_8B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Temperature: _____	.	.	4	25%	4	24%
(2) Don't know	1	100%	12	75%	13	76%
	1	*100%*	*16*	*100%*	*17*	*100%*

Table B.1.141

	bName					
	Multi_Family		Single_Family			
7.9 NOTE: Ask only if question 7.8 = 99 or 'doesn't apply' or 'no temperature setting available' Then which of these statements best describes where your water heater thermostat is set? (Q7_9) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) On the "low" setting	1	4%	16	6%	17	6%
(2) Between the "low" and "medium" settings	2	8%	19	8%	21	8%
(3) On the "medium" setting	3	13%	106	43%	109	40%
(4) Between the "medium" and "high" settings	7	29%	45	18%	52	19%
(5) On the "high" setting	3	13%	27	11%	30	11%
(6) Don't know	8	33%	36	14%	44	16%
	24	*100%*	*249*	*100%*	*273*	*100%*

Table B.1.142

	bName					
	Multi_Family		Single_Family			
7.10 Which of the following items do you have for your main water heater? Do you have: Either a water heater tank wrap or insulation blanket? (Q7_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	4	14%	84	24%	88	23%
(2) No	16	55%	252	71%	268	69%

	bName					
	Multi_Family		Single_Family			
7.10 Which of the following items do you have for your main water heater? Do you have: Either a water heater tank wrap or insulation blanket? (Q7_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Don't know	9	31%	21	6%	30	8%
	29	*100%*	*357*	*100%*	*386*	*100%*

Table B.1.143

	bName					
	Multi_Family		Single_Family			
7.11 Which of the following items do you have for your main water heater? Do you have: Pipe insulation? (Q7_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	9	32%	136	38%	145	38%
(2) No	9	32%	191	54%	200	52%
(3) Don't know	10	36%	30	8%	40	10%
	28	*100%*	*357*	*100%*	*385*	*100%*

Table B.1.144

	bName					
	Multi_Family		Single_Family			
7.12 Which of the following items do you have for your main water heater? Do you have: A water heater timer? (Q7_12)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	3	11%	21	6%	24	6%
(2) No	10	36%	299	84%	309	80%
(3) Don't know	15	54%	37	10%	52	14%
	28	*100%*	*357*	*100%*	*385*	*100%*

Table B.1.145

	bName					
	Multi_Family		Single_Family			
8.1 How many refrigerators are in your home? These can be anywhere in your home, but please only count the ones that are used regularly. (Q8_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Refrigerators: _____	32	100%	347	96%	379	96%
(2) Don't know	.	.	12	3%	12	3%
3	.	.	2	1%	2	1%
	32	*100%*	*361*	*100%*	*393*	*100%*

Table B.1.146

	bName					
	Multi_Family		Single_Family			
8.1-Specify How many refrigerators are in your home? These can be anywhere in your home, but please only count the ones that are used regularly. (Q8_1_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) One	31	97%	260	75%	291	77%
(2) Two	1	3%	82	24%	83	22%
(3) Three	.	.	6	2%	6	2%
	32	*100%*	*348*	*100%*	*380*	*100%*

Table B.1.147

	bName					
	Multi_Family		Single_Family			
8.2A If question 8.1 is greater than 3: Let's talk about the 2 refrigerators that you use most often. What is the approximate age of your primary refrigerator? (Q8_2A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	2	1%	2	1%
Less than 2 Years	10	63%	75	40%	85	42%
2-10 Years	4	25%	79	42%	83	41%
10-20 Years	.	.	23	12%	23	11%
20-30 Years	.	.	4	2%	4	2%

	bName					
	Multi_Family		Single_Family			
8.2A If question 8.1 is greater than 3: Let's talk about the 2 refrigerators that you use most often. What is the approximate age of your primary refrigerator? (Q8_2A)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
More than 50 Years	2	13%	4	2%	6	3%
	16	*100%*	*187*	*100%*	*203*	*100%*

Table B.1.148

	bName					
	Multi_Family		Single_Family			
8.2B If question 8.1 is greater than 3: Let's talk about the 2 refrigerators that you use most often. What is the approximate age of your secondary refrigerator? (Q8_2B)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	2	3%	2	3%
Less than 2 Years	.	.	10	13%	10	13%
2-10 Years	1	100%	29	38%	30	39%
10-20 Years	.	.	29	38%	29	38%
20-30 Years	.	.	3	4%	3	4%
30-40 Years	.	.	1	1%	1	1%
More than 50 Years	.	.	2	3%	2	3%
	1	*100%*	*76*	*100%*	*77*	*100%*

Table B.1.149

	bName					
	Multi_Family		Single_Family			
8.3 If question 8.2 greater than 1, is it: (Q8_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) 6 or less years old	8	50%	68	52%	76	52%
(2) 7 to 14 years old	2	13%	41	32%	43	29%
(3) 15 or more years old	.	.	16	12%	16	11%
(4) Don't know	6	38%	5	4%	11	8%
	16	*100%*	*130*	*100%*	*146*	*100%*

Table B.1.150

	bName					
	Multi_Family		Single_Family			
8.4 How many stand-alone freezers are in your home? (Q8_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Freezers: _____	29	100%	330	94%	359	94%
(2) Don't know	.	.	21	6%	21	6%
	29	*100%*	*351*	*100%*	*380*	*100%*

Table B.1.151

	bName					
	Multi_Family		Single_Family			
8.4-Specify How many stand-alone freezers are in your home? (Q8_4_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	26	90%	145	47%	171	50%
(1) One	3	10%	148	48%	151	45%
(2) Two	.	.	13	4%	13	4%
(3) Three	.	.	4	1%	4	1%
	29	*100%*	*310*	*100%*	*339*	*100%*

Table B.1.152

	bName					
	Multi_Family		Single_Family			
8.6 How many dishwashers are in your home? (Q8_6)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Dishwashers: _____	24	83%	337	95%	361	94%
(2) Don't know	5	17%	17	5%	22	6%
	29	*100%*	*354*	*100%*	*383*	*100%*

Table B.1.153

	bName					
	Multi_Family		Single_Family			
8.6-Specify How many dishwashers are in your home? (Q8_6_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	16	67%	119	39%	135	41%
(1) One	8	33%	190	61%	198	59%
	24	*100%*	*309*	*100%*	*333*	*100%*

Table B.1.154

	bName					
	Multi_Family		Single_Family			
8.7 Please describe your washing machine. Is it… (Q8_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Used only by the people in your household?	13	43%	331	98%	344	93%
(2) Shared among other units in the residence? If yes skip to question 8.10 below	8	27%	3	1%	11	3%
(3) Exclusively off-site—either a laundry service, drycleaner, or Laundromat?	9	30%	4	1%	13	4%
	30	*100%*	*338*	*100%*	*368*	*100%*

Table B.1.155

	bName					
	Multi_Family		Single_Family			
8.8 Which of the following best describes the type of clothes washer(s) in your residence? (Q8_8)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Front Load Washing Machine	1	5%	65	18%	66	18%
(2) Top Load Washing Machine	18	86%	285	80%	303	81%
(3) Other (specify) _____	1	5%	1	0%	2	1%
(4) Don't know	1	5%	4	1%	5	1%
	21	*100%*	*355*	*100%*	*376*	*100%*

Table B.1.156

	bName					
	Multi_Family		Single_Family			
8.8-Specify Which of the following best describes the type of clothes washer(s) in your residence? (Q8_8_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	2%	1	2%
2	.	.	1	2%	1	2%
4	.	.	1	2%	1	2%
BOTH	1	20%	.	.	1	2%
Front Load	1	20%	7	15%	8	15%
NA	.	.	1	2%	1	2%

	bName					
	Multi_Family		Single_Family			
8.8-Specify Which of the following best describes the type of clothes washer(s) in your residence? (Q8_8_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
NONE	.	.	1	2%	1	2%
Top Load	3	60%	20	42%	23	43%
Top load	.	.	15	31%	15	28%
none	.	.	1	2%	1	2%
	5	*100%*	*48*	*100%*	*53*	*100%*

Table B.1.157

	bName					
	Multi_Family		Single_Family			
8.9 In an average week, how many loads of laundry does your household wash? (Q8_9)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Loads: _____	20	91%	341	97%	361	97%
(2) Don't know	2	9%	10	3%	12	3%
	22	*100%*	*351*	*100%*	*373*	*100%*

Table B.1.158

	bName					
	Multi_Family		Single_Family			
8.9-Specify In an average week, how many loads of laundry does your household wash? (Q8_9_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	.	.	2	1%	2	1%
(1) One	2	11%	26	8%	28	8%
(2) Two	4	22%	40	12%	44	12%
(3) Three	7	39%	56	16%	63	17%
(4) Four	3	17%	51	15%	54	15%
(5) Five	1	6%	43	13%	44	12%
(6) Six	1	6%	28	8%	29	8%
(7+) Seven or more	.	.	97	28%	97	27%
	18	*100%*	*343*	*100%*	*361*	*100%*

Table B.1.159

	bName					
	Multi_Family		Single_Family			
8.10 Please describe your clothes dryer. (Q8_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Used only by the people in your household?	9	29%	341	97%	350	91%
(2) Shared among other units in the residence? If yes skip to question 8.11 below	12	39%	3	1%	15	4%
(3) Exclusively off-site—either a laundry service, drycleaner, or Laundromat?	10	32%	5	1%	15	4%

	bName					
	Multi_Family		Single_Family			
8.10 Please describe your clothes dryer. (Q8_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(4) Don't know	.	.	3	1%	3	1%
	31	*100%*	*352*	*100%*	*383*	*100%*

Table B.1.160

	bName					
	Multi_Family		Single_Family			
8.11 What fuel or energy source do you use for your clothes dryer(s)? (Q8_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	18	82%	251	71%	269	71%
(2) Natural gas	2	9%	93	26%	95	25%
(3) Propane or bottled gas (LP, propane, butane)	.	.	6	2%	6	2%
(5) Don't know	2	9%	6	2%	8	2%
	22	*100%*	*356*	*100%*	*378*	*100%*

Table B.1.161

	bName					
	Multi_Family		Single_Family			
8.11-Specify What fuel or energy source do you use for your clothes dryer(s)? (Q8_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	2%	1	2%
2	.	.	1	2%	1	2%
Electric	3	75%	29	63%	32	64%
LAUNDROMAT	.	.	1	2%	1	2%
LP	.	.	1	2%	1	2%
Natural Gas	1	25%	11	24%	12	24%
OFF SITE	.	.	1	2%	1	2%
Propane	.	.	1	2%	1	2%
	4	*100%*	*46*	*100%*	*50*	*100%*

Table B.1.162

	bName					
	Multi_Family		Single_Family			
8.12 Do you use a dehumidifier? (Q8_12)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	3	10%	95	26%	98	25%
(2) No	27	90%	263	73%	290	75%
(3) Don’t know	.	.	1	0%	1	0%
	30	*100%*	*359*	*100%*	*389*	*100%*

Table B.1.163

	bName					
	Multi_Family		Single_Family			
8.13 Does your residence have a swimming pool? (Q8_13)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	3	10%	32	10%	35	10%
(2) No	27	90%	295	90%	322	90%
	30	*100%*	*327*	*100%*	*357*	*100%*

Table B.1.164

	bName					
	Multi_Family		Single_Family			
8.14 Is the pool...? (Q8_14)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Your own private outdoor pool	.	.	27	77%	27	69%
(2) Your own private indoor pool	1	25%	6	17%	7	18%
(3) Shared outdoor pool	3	75%	2	6%	5	13%
	4	*100%*	*35*	*100%*	*39*	*100%*

Table B.1.165

	bName			
	Single_Family			
8.14-Specify Is the pool...? (Q8_14_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
NA	1	25%	1	25%
Outdoor Shared Pool	1	25%	1	25%
Private Outdoor	1	25%	1	25%
Private outdoor	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.1.166

	bName					
	Multi_Family		Single_Family			
8.15 NOTE: Skip if question 8.14 = 3 or 4. What fuel or energy source is used to heat your swimming pool? (Q8_15)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	.	.	7	25%	7	24%
(2) Natural gas	.	.	2	7%	2	7%
(3) Solar	.	.	2	7%	2	7%
(5) Not heated	.	.	17	61%	17	59%
(7) Don’t know	1	100%	.	.	1	3%
	1	*100%*	*28*	*100%*	*29*	*100%*

Table B.1.167

	bName			
	Single_Family			
8.15-Specify NOTE: Skip if question 8.14 = 3 or 4. What fuel or energy source is used to heat your swimming pool? (Q8_15_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
Not Heated	1	33%	1	33%
Not heated	1	33%	1	33%
solar blanket	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.1.168

	bName					
	Multi_Family		Single_Family			
8.16 NOTE: Skip if question 8.14 = 3 or 4. When do you operate your pool pump and filtration system? (Q8_16)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) All day and all night	.	.	9	36%	9	35%
(2) Turned off at night	.	.	6	24%	6	23%
(3) Something else (specify) _____	.	.	7	28%	7	27%
(4) Don't know	1	100%	3	12%	4	15%
	1	*100%*	*25*	*100%*	*26*	*100%*

Table B.1.169

	bName			
	Single_Family			
8.16-Specify NOTE: Skip if question 8.14 = 3 or 4. When do you operate your pool pump and filtration system? (Q8_16_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
2 hours per day	1	13%	1	13%
5 hours/day	1	13%	1	13%
8 HRS A DAY	1	13%	1	13%
8HRS/DAY	1	13%	1	13%
TIMER	2	25%	2	25%
Turned off at night	1	13%	1	13%
timer	1	13%	1	13%
	8	*100%*	*8*	*100%*

Table B.1.170

	bName					
	Multi_Family		Single_Family			
8.17 NOTE: Skip if question 8.14 = 3 or 4. Do you use an insulating cover for your pool? (Q8_17)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	.	.	13	50%	13	48%
(2) No	.	.	13	50%	13	48%

	bName					
	Multi_Family		Single_Family			
8.17 NOTE: Skip if question 8.14 = 3 or 4. Do you use an insulating cover for your pool? (Q8_17)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(3) Don't know	1	100%	.	.	1	4%
	1	*100%*	*26*	*100%*	*27*	*100%*

Table B.1.171

	bName					
	Multi_Family		Single_Family			
8.18 Do you have a hot tub or spa at your residence? (Q8_18)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	.	.	14	4%	14	4%
(2) No	24	100%	307	96%	331	96%
	24	*100%*	*321*	*100%*	*345*	*100%*

Table B.1.172

	bName					
	Multi_Family		Single_Family			
8.19 What fuel or energy source is used to heat your hot tub or spa? (Q8_19)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	1	50%	18	64%	19	63%
(2) Natural gas	1	50%	9	32%	10	33%

	bName					
	Multi_Family		Single_Family			
8.19 What fuel or energy source is used to heat your hot tub or spa? (Q8_19)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) Don't know	.	.	1	4%	1	3%
	2	*100%*	*28*	*100%*	*30*	*100%*

Table B.1.173

	bName			
	Single_Family			
8.19-Specify What fuel or energy source is used to heat your hot tub or spa? (Q8_19_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	40%	2	40%
Electric	3	60%	3	60%
	5	*100%*	*5*	*100%*

Table B.1.174

	bName					
	Multi_Family		Single_Family			
8.20-Specify What fuel or energy source do you use for your cook-top(s)? (Q8_20_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	4	8%	4	8%
2	.	.	2	4%	2	4%

	bName					
	Multi_Family		Single_Family			
8.20-Specify What fuel or energy source do you use for your cook-top(s)? (Q8_20_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Electric	3	75%	16	33%	19	36%
LP	.	.	1	2%	1	2%
NA	.	.	1	2%	1	2%
Natural Gas	1	25%	23	47%	24	45%
Propane	.	.	2	4%	2	4%
	4	*100%*	*49*	*100%*	*53*	*100%*

Table B.1.175

	bName					
	Multi_Family		Single_Family			
8.21 How many cook-top units do you have? (Q8_21)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Cook-top units: _____	31	100%	353	99%	384	99%
(2) Don't know	.	.	5	1%	5	1%
	31	*100%*	*358*	*100%*	*389*	*100%*

Table B.1.176

	bName					
	Multi_Family		Single_Family			
8.21-Specify How many cook-top units do you have? (Q8_21_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) One	21	78%	203	70%	224	71%
(2) Two	.	.	10	3%	10	3%
(3) Three	.	.	2	1%	2	1%
(4) Four	6	22%	68	24%	74	23%
(5) Five	.	.	4	1%	4	1%
(7+) Seven or more	.	.	1	0%	1	0%
	27	*100%*	*288*	*100%*	*315*	*100%*

Table B.1.177

	bName					
	Multi_Family		Single_Family			
8.22 What fuel or energy source do you use for your oven(s)? (Q8_22) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Electricity	27	75%	200	51%	227	53%
(2) Natural gas	9	25%	179	45%	188	44%
(3) Propane or bottled gas (LP, propane, butane)	.	.	15	4%	15	3%
	36	*100%*	*394*	*100%*	*430*	*100%*

Table B.1.178

	bName					
	Multi_Family		Single_Family			
8.22-Specify What fuel or energy source do you use for your oven(s)? (Q8_22_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	24	96%	283	96%	307	96%
2	.	.	5	2%	5	2%
4	.	.	1	0%	1	0%
Electric	1	4%	3	1%	4	1%
Natural Gas	.	.	3	1%	3	1%
	25	*100%*	*295*	*100%*	*320*	*100%*

Table B.1.179

	bName					
	Multi_Family		Single_Family			
8.23 How many ovens do you have? (Q8_23)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Ovens: _____	28	100%	293	95%	321	95%
(2) Don't know	.	.	16	5%	16	5%
	28	*100%*	*309*	*100%*	*337*	*100%*

Table B.1.180

	bName					
	Multi_Family		Single_Family			
8.23-Specify How many ovens do you have? (Q8_23_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	.	.	1	0%	1	0%
(1) One	30	100%	345	97%	375	98%
(2) Two	.	.	8	2%	8	2%
	30	*100%*	*354*	*100%*	*384*	*100%*

Table B.1.181

	bName					
	Multi_Family		Single_Family			
8.24 How many microwave ovens do you have? (Q8_24)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Microwave Ovens: _____	27	100%	300	97%	327	97%
(2) Don't know	.	.	10	3%	10	3%
	27	*100%*	*310*	*100%*	*337*	*100%*

Table B.1.182

	bName					
	Multi_Family		Single_Family			
8.24-Specify How many microwave ovens do you have? (Q8_24_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	1	3%	3	1%	4	1%
(1) One	30	97%	334	94%	364	94%
(2) Two	.	.	15	4%	15	4%
(3) Three	.	.	3	1%	3	1%
	31	*100%*	*355*	*100%*	*386*	*100%*

Table B.1.183

	bName					
	Multi_Family		Single_Family			
8.25 Before today, were you familiar with CFLs? (Q8_25)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	24	75%	313	90%	337	88%
(2) No	8	25%	33	9%	41	11%
(3) Don’t know	.	.	3	1%	3	1%
	32	*100%*	*349*	*100%*	*381*	*100%*

Table B.1.184

	bName					
	Multi_Family		Single_Family			
8.26 Do you have any CFLs installed either inside or outside of your home? (Q8_26)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	26	93%	308	93%	334	93%
(2) No	2	7%	22	7%	24	7%
(3) Don't know	.	.	1	0%	1	0%
	28	*100%*	*331*	*100%*	*359*	*100%*

Table B.1.185

	bName					
	Multi_Family		Single_Family			
8.27 Approximately how many CFLs would you estimate are installed in your home? (Q8_27)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) CFLs: _____	26	90%	315	92%	341	91%
(2) Don't know	3	10%	29	8%	32	9%
	29	*100%*	*344*	*100%*	*373*	*100%*

Table B.1.186

	bName					
	Multi_Family		Single_Family			
8.27-Specify Approximately how many CFLs would you estimate are installed in your home? (Q8_27_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	2	7%	10	3%	12	3%
(1) One	3	11%	19	6%	22	6%
(2) Two	7	26%	29	9%	36	10%
(3) Three	2	7%	15	5%	17	5%
(4) Four	1	4%	19	6%	20	6%
(5) Five	2	7%	13	4%	15	4%
(6) Six	2	7%	22	7%	24	7%
(7+) Seven or more	8	30%	193	60%	201	58%
	27	*100%*	*320*	*100%*	*347*	*100%*

Table B.1.187

	bName					
	Multi_Family		Single_Family			
8.28 Do you have any hard wired, non-solar outdoor security lighting? (Q8_28)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	10	59%	189	83%	199	81%
(2) No	6	35%	38	17%	44	18%
(3) Don’t know	1	6%	1	0%	2	1%
	17	*100%*	*228*	*100%*	*245*	*100%*

Table B.1.188

	bName					
	Multi_Family		Single_Family			
8.29 Approximately how many outdoor security lights do you have? (Q8_29)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Outdoor Security Lights: _____	6	86%	88	87%	94	87%
(2) Don't know	1	14%	13	13%	14	13%
	7	*100%*	*101*	*100%*	*108*	*100%*

Table B.1.189

	bName					
	Multi_Family		Single_Family			
8.29-Specify Approximately how many outdoor security lights do you have? (Q8_29_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	1	11%	19	12%	20	12%
(1) One	5	56%	59	38%	64	39%
(2) Two	2	22%	25	16%	27	17%
(3) Three	.	.	14	9%	14	9%
(4) Four	.	.	14	9%	14	9%
(5) Five	.	.	8	5%	8	5%
(6) Six	.	.	4	3%	4	2%

	bName					
	Multi_Family		Single_Family			
8.29-Specify Approximately how many outdoor security lights do you have? (Q8_29_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(7+) Seven or more	1	11%	11	7%	12	7%
	9	*100%*	*154*	*100%*	*163*	*100%*

Table B.1.190

	bName					
	Multi_Family		Single_Family			
8.30 NOTE: Ask only if question 8.28 = 1 or more. Are these outdoor security lights: (Q8_30) (Multiple responses possible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Operated by a manual switch	6	50%	72	37%	78	37%
(2) On a timer	1	8%	15	8%	16	8%
(3) On a photo sensor which means they automatically activate when it gets dark	2	17%	43	22%	45	22%
(4) Motion activated	2	17%	51	26%	53	25%
(5) A combination of motion and photo sensor activated which means they automatically activate when it senses motion after dark	.	.	10	5%	10	5%
(6) Other (specify) _____	.	.	2	1%	2	1%
(7) Don't know	1	8%	4	2%	5	2%
	12	*100%*	*197*	*100%*	*209*	*100%*

Table B.1.191

	bName					
	Multi_Family		Single_Family			
8.30-Specify NOTE: Ask only if question 8.28 = 1 or more. Are these outdoor security lights: (Q8_30_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	2	8%	2	7%
4	.	.	1	4%	1	4%
ALWAYS ON	.	.	1	4%	1	4%
Manual Switc	.	.	11	42%	11	39%
Motion Activ	1	50%	4	15%	5	18%
Motioned Act	.	.	1	4%	1	4%
Photo Sensor	.	.	3	12%	3	11%
Timer	1	50%	1	4%	2	7%
Timer and Mo	.	.	1	4%	1	4%
solar	.	.	1	4%	1	4%
	2	*100%*	*26*	*100%*	*28*	*100%*

Table B.1.192

	bName					
	Multi_Family		Single_Family			
9.1 Televisions, of all types (Q9_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	2	6%	3	1%	5	1%
(1) One	11	34%	58	16%	69	18%

	bName					
	Multi_Family		Single_Family			
9.1 Televisions, of all types (Q9_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Two	16	50%	130	36%	146	37%
(3) Three	2	6%	86	24%	88	22%
(4) Four	.	.	47	13%	47	12%
(5) Five	1	3%	20	6%	21	5%
(6) Six	.	.	13	4%	13	3%
(7+) Seven or more	.	.	3	1%	3	1%
	32	*100%*	*360*	*100%*	*392*	*100%*

Table B.1.193

	bName					
	Multi_Family		Single_Family			
9.2 Of those, how many are large flat screen TVs over 32 inches? (Q9_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	20	67%	174	52%	194	53%
(1) One	7	23%	114	34%	121	33%
(2) Two	3	10%	35	10%	38	10%
(3) Three	.	.	9	3%	9	2%
(4) Four	.	.	2	1%	2	1%
(5) Five	.	.	2	1%	2	1%
(6) Six	.	.	1	0%	1	0%
	30	*100%*	*337*	*100%*	*367*	*100%*

Table B.1.194

	bName					
	Multi_Family		Single_Family			
9.3 NOTE: Skip if 9.2 = 0. How many of your large TVs are plasma TVs? (As opposed to LCD, DLP or other projection) (Q9_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	22	88%	237	81%	259	82%
(1) One	2	8%	36	12%	38	12%
(2) Two	1	4%	14	5%	15	5%
(3) Three	.	.	3	1%	3	1%
(4) Four	.	.	2	1%	2	1%
	25	*100%*	*292*	*100%*	*317*	*100%*

Table B.1.195

	bName					
	Multi_Family		Single_Family			
9.4 Game console (Playstation, Wii, Nintendo, xbox, Game Cube, etc.) (Q9_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	22	73%	202	60%	224	61%
(1) One	4	13%	83	25%	87	24%
(2) Two	2	7%	27	8%	29	8%
(3) Three	.	.	20	6%	20	5%
(4) Four	1	3%	2	1%	3	1%

	bName					
	Multi_Family		Single_Family			
9.4 Game console (Playstation, Wii, Nintendo, xbox, Game Cube, etc.) (Q9_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(5) Five	1	3%	3	1%	4	1%
(6) Six	.	.	1	0%	1	0%
	30	*100%*	*338*	*100%*	*368*	*100%*

Table B.1.196

	bName					
	Multi_Family		Single_Family			
9.5 Combination VCR and DVD unit (Q9_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	18	60%	175	53%	193	53%
(1) One	10	33%	110	33%	120	33%
(2) Two	2	7%	37	11%	39	11%
(3) Three	.	.	10	3%	10	3%
(7+) Seven or more	.	.	1	0%	1	0%
	30	*100%*	*333*	*100%*	*363*	*100%*

Table B.1.197

	bName					
	Multi_Family		Single_Family			
9.6 Standalone VCRs or DVD players (Q9_6)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	13	43%	115	33%	128	34%
(1) One	8	27%	112	32%	120	32%
(2) Two	7	23%	84	24%	91	24%
(3) Three	1	3%	25	7%	26	7%
(4) Four	1	3%	7	2%	8	2%
(5) Five	.	.	3	1%	3	1%
(6) Six	.	.	1	0%	1	0%
(7+) Seven or more	.	.	1	0%	1	0%
	30	*100%*	*348*	*100%*	*378*	*100%*

Table B.1.198

	bName					
	Multi_Family		Single_Family			
9.7 Stand-alone DVR (not TIVO) (Q9_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	26	84%	250	76%	276	77%
(1) One	5	16%	64	19%	69	19%
(2) Two	.	.	13	4%	13	4%
(3) Three	.	.	1	0%	1	0%

	bName					
	Multi_Family		Single_Family			
9.7 Stand-alone DVR (not TIVO) (Q9_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(4) Four	.	.	1	0%	1	0%
	31	*100%*	*329*	*100%*	*360*	*100%*

Table B.1.199

	bName					
	Multi_Family		Single_Family			
9.8 TIVO, Cable or satellite TV set-top boxes or receivers (Q9_8)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	16	52%	101	30%	117	31%
(1) One	12	39%	143	42%	155	42%
(2) Two	2	6%	67	20%	69	18%
(3) Three	1	3%	12	4%	13	3%
(4) Four	.	.	16	5%	16	4%
(5) Five	.	.	2	1%	2	1%
(6) Six	.	.	1	0%	1	0%
	31	*100%*	*342*	*100%*	*373*	*100%*

Table B.1.200

	bName					
	Multi_Family		Single_Family			
9.9 Computer monitors (Q9_9)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	25	83%	117	34%	142	38%
(1) One	3	10%	184	53%	187	50%
(2) Two	2	7%	38	11%	40	11%
(3) Three	.	.	2	1%	2	1%
(4) Four	.	.	1	0%	1	0%
(5) Five	.	.	1	0%	1	0%
(7+) Seven or more	.	.	1	0%	1	0%
	30	*100%*	*344*	*100%*	*374*	*100%*

Table B.1.201

	bName					
	Multi_Family		Single_Family			
9.10 Personal computers, including laptops (Q9_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	20	67%	158	46%	178	47%
(1) One	7	23%	130	38%	137	36%
(2) Two	3	10%	38	11%	41	11%
(3) Three	.	.	13	4%	13	3%
(4) Four	.	.	5	1%	5	1%
(5) Five	.	.	1	0%	1	0%

	bName					
	Multi_Family		Single_Family			
9.10 Personal computers, including laptops (Q9_10)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(6) Six	.	.	1	0%	1	0%
	30	*100%*	*346*	*100%*	*376*	*100%*

Table B.1.202

	bName					
	Multi_Family		Single_Family			
9.11 Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month? (Q9_11)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Yes	2	8%	65	21%	67	20%
(2) No	23	92%	238	78%	261	79%
(3) Don't know	.	.	1	0%	1	0%
	25	*100%*	*304*	*100%*	*329*	*100%*

Table B.1.203

	bName					
	Multi_Family		Single_Family			
9.11-Specify Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month? (Q9_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
2 Printers, 20 Photo Lights	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
9.11-Specify Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month? (Q9_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
3 Sewing Machines	.	.	1	1%	1	1%
4 Sewing Machines, Power Tools	.	.	1	1%	1	1%
Air Compressor	.	.	1	1%	1	1%
Air Compressor, Saw, Drills, Grinder	.	.	1	1%	1	1%
Bandsaw, Drill Press, Table Saw	.	.	1	1%	1	1%
Cd Player	.	.	1	1%	1	1%
Coffee Maker	.	.	1	1%	1	1%
Coffee Pot,	.	.	1	1%	1	1%
Coffemaker	1	50%	.	.	1	1%
Comp Keybrd	.	.	1	1%	1	1%
Compressor, Saws, Drills	.	.	1	1%	1	1%
Copier/Printer (1)	.	.	1	1%	1	1%
Desk Top Pc	.	.	1	1%	1	1%
Digital Converter Box	.	.	1	1%	1	1%
Drills	.	.	1	1%	1	1%
Drills, Compressor	.	.	1	1%	1	1%
Drills, Saws	.	.	1	1%	1	1%
Fax Machine	.	.	2	3%	2	3%
Fax Machine And Complete Metal Shop In Basement	.	.	1	1%	1	1%
Fax,copy, Fish Pond Pump And Heater)	.	.	1	1%	1	1%
Na	.	.	1	1%	1	1%
Nebulizer	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
9.11-Specify Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month? (Q9_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
No	.	.	4	6%	4	6%
O2 Concentrator	.	.	1	1%	1	1%
Police Scanner	.	.	1	1%	1	1%
Power Saw, Table Saw, Midor Saw	.	.	1	1%	1	1%
Power Tools	.	.	2	3%	2	3%
Power Tools In The Garage	.	.	1	1%	1	1%
Printer	.	.	5	7%	5	7%
Printer, Scanner	.	.	1	1%	1	1%
Printer/Fax Machine	.	.	2	3%	2	3%
Radio	.	.	2	3%	2	3%
Radon System	.	.	1	1%	1	1%
Router, And Wookworking Tools In The Garage.	.	.	1	1%	1	1%
Sanders, Grinders, Saws	.	.	1	1%	1	1%
Saw	.	.	1	1%	1	1%
Saw, Drills, Compressors	.	.	1	1%	1	1%
Saws	.	.	1	1%	1	1%
Saws, Drills	.	.	1	1%	1	1%
Sewing Machine	.	.	4	6%	4	6%
Stereo Receiver	.	.	1	1%	1	1%
Stereo Systems	.	.	1	1%	1	1%
Table Saw	.	.	1	1%	1	1%
Table Saw, Air Compressor, Weldor Including Other Shop Tools.	.	.	1	1%	1	1%

	bName					
	Multi_Family		Single_Family			
9.11-Specify Are there any other electric powered equipment in your home for any home businesses or shop tools that you use more than once a month? (Q9_11_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Tablesaw	.	.	2	3%	2	3%
Vacume	.	.	2	3%	2	3%
Vacume Cleaner	.	.	1	1%	1	1%
Vacume, Power Tools	.	.	1	1%	1	1%
Vacuum	.	.	2	3%	2	3%
Vacuum, Phone, Clock	1	50%	.	.	1	1%
Welder, Table Saw, Drill Press, Air Compressor	.	.	1	1%	1	1%
Wireless Internet, Printer/Fax, Vacume, Stereos, Shredder, Pizza Maker, Toaster Oven, Coffee Maker	.	.	1	1%	1	1%
	2	*100%*	*68*	*100%*	*70*	*100%*

Table B.1.204

	bName					
	Multi_Family		Single_Family			
10.1 Which of the following best describes your age? (Q10_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) 18-24 years old	7	22%	8	2%	15	4%
(3) 25-34 years old	3	9%	42	12%	45	11%
(4) 35-44 years old	6	19%	43	12%	49	13%
(5) 45-54 years old	3	9%	53	15%	56	14%
(6) 55-64 years old	4	13%	80	22%	84	21%

	bName					
	Multi_Family		Single_Family			
10.1 Which of the following best describes your age? (Q10_1)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(7) 65 or older	8	25%	127	35%	135	34%
(8) Don't know	.	.	1	0%	1	0%
(9) Refused	1	3%	6	2%	7	2%
	32	*100%*	*360*	*100%*	*392*	*100%*

Table B.1.205

	bName					
	Multi_Family		Single_Family			
10.2 Including yourself, how many people usually live in this residence at least six months of the year? (Q10_2)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) People: _____	31	97%	334	94%	365	95%
(2) Refused	1	3%	20	6%	21	5%
	32	*100%*	*354*	*100%*	*386*	*100%*

Table B.1.206

	bName					
	Multi_Family		Single_Family			
10.2-Specify Including yourself, how many people usually live in this residence at least six months of the year? (Q10_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	.	.	5	2%	5	1%

	bName					
	Multi_Family		Single_Family			
10.2-Specify Including yourself, how many people usually live in this residence at least six months of the year? (Q10_2_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) One	14	52%	79	24%	93	26%
(2) Two	8	30%	130	39%	138	39%
(3) Three	4	15%	46	14%	50	14%
(4) Four	.	.	40	12%	40	11%
(5) Five	1	4%	19	6%	20	6%
(6) Six	.	.	8	2%	8	2%
(7+) Seven or more	.	.	3	1%	3	1%
	27	*100%*	*330*	*100%*	*357*	*100%*

Table B.1.207

	bName					
	Multi_Family		Single_Family			
10.3 How many of them are under 18? (Q10_3)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) People: _____	26	100%	279	97%	305	97%
(2) Refused	.	.	10	3%	10	3%
	26	*100%*	*289*	*100%*	*315*	*100%*

Table B.1.208

	bName					
	Multi_Family		Single_Family			
10.3-Specify How many of them are under 18? (Q10_3_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	17	65%	183	65%	200	65%
(1) One	4	15%	44	16%	48	16%
(2) Two	4	15%	34	12%	38	12%
(3) Three	.	.	15	5%	15	5%
(4) Four	1	4%	4	1%	5	2%
	26	*100%*	*280*	*100%*	*306*	*100%*

Table B.1.209

	bName					
	Multi_Family		Single_Family			
10.4 How many of them are retired? (Q10_4)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) People: _____	27	100%	257	93%	284	94%
(2) Refused	.	.	19	7%	19	6%
	27	*100%*	*276*	*100%*	*303*	*100%*

Table B.1.210

	bName					
	Multi_Family		Single_Family			
10.4-Specify How many of them are retired? (Q10_4_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(0) Zero	17	68%	110	45%	127	47%
(1) One	7	28%	86	35%	93	34%
(2) Two	1	4%	49	20%	50	18%
(3) Three	.	.	1	0%	1	0%
	25	*100%*	*246*	*100%*	*271*	*100%*

Table B.1.211

	bName					
	Multi_Family		Single_Family			
10.5 What is the highest level of education attained by a head of the household? (Q10_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) High School or GED	11	35%	118	35%	129	35%
(2) Junior College or Vocational	9	29%	87	26%	96	26%
(3) Undergraduate Degree / Bachelors	6	19%	63	19%	69	19%
(4) Masters	1	3%	44	13%	45	12%
(5) Doctorate/PhD	1	3%	13	4%	14	4%
(6) Other (specify) _____	2	6%	8	2%	10	3%
(7) Don’t know	.	.	2	1%	2	1%

	bName					
	Multi_Family		Single_Family			
10.5 What is the highest level of education attained by a head of the household? (Q10_5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(8) Refused	1	3%	3	1%	4	1%
	31	*100%*	*338*	*100%*	*369*	*100%*

Table B.1.212

	bName					
	Multi_Family		Single_Family			
10.5-Specify What is the highest level of education attained by a head of the household? (Q10_5_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	2	4%	2	3%
2	.	.	1	2%	1	2%
2nd Year Of High School	.	.	1	2%	1	2%
3 Yrs College	.	.	1	2%	1	2%
4	.	.	1	2%	1	2%
8th	1	14%	.	.	1	2%
8th Grade	.	.	1	2%	1	2%
9th Grade	1	14%	.	.	1	2%
Bachelors	1	14%	5	10%	6	10%
Batchelors	.	.	1	2%	1	2%
College Degree	.	.	1	2%	1	2%
College Post Grad	.	.	1	2%	1	2%
Ged	.	.	1	2%	1	2%

	bName					
	Multi_Family		Single_Family			
10.5-Specify What is the highest level of education attained by a head of the household? (Q10_5_Specify)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Grade School	.	.	1	2%	1	2%
High School	1	14%	10	20%	11	19%
Masters	1	14%	6	12%	7	12%
Na	.	.	1	2%	1	2%
No Highschool Or Ged	1	14%	.	.	1	2%
Nurse School	.	.	1	2%	1	2%
Phd	.	.	3	6%	3	5%
Professional	.	.	1	2%	1	2%
Some College	.	.	8	16%	8	14%
Some High School	.	.	2	4%	2	3%
Trade School	.	.	1	2%	1	2%
Undergrad Degree	.	.	1	2%	1	2%
Undergraduate Degree	1	14%	.	.	1	2%
	7	*100%*	*51*	*100%*	*58*	*100%*

Table B.1.213

	bName					
	Multi_Family		Single_Family			
10.6 Would you please tell me what your total family income was in 2008 before taxes (and including Social Security or other payments)? (Q10_6)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Less than $15,000	10	31%	28	8%	38	10%
(2) $15,000 to $24,999	4	13%	31	9%	35	9%
(3) $25,000 to $34,999	1	3%	25	7%	26	7%
(4) $35,000 to $49,999	1	3%	37	11%	38	10%
(5) $50,000 to $59,999	1	3%	19	6%	20	5%
(6) $60,000 to $74,999	.	.	24	7%	24	6%
(7) $75,000 to $99,999	.	.	30	9%	30	8%
(8) $100,000 to $149,999	1	3%	24	7%	25	7%
(9) $150,000 or more	.	.	10	3%	10	3%
(10) Don't know	11	34%	50	15%	61	16%
(11) Refused	3	9%	64	19%	67	18%
	32	*100%*	*342*	*100%*	*374*	*100%*

Table B.1.214

	bName					
	Multi_Family		Single_Family			
10.7 Record gender of respondent. (Q10_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(1) Male	8	26%	118	35%	126	34%

	bName					
	Multi_Family		Single_Family			
10.7 Record gender of respondent. (Q10_7)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
(2) Female	23	74%	222	65%	245	66%
	31	*100%*	*340*	*100%*	*371*	*100%*

B.2 – Residential On-Site

Table B.2.1

bName	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Multi_Family	5	10.20	5	10.20
Single_Family	44	89.80	49	100.00

Table B.2.2

	bName					
	Multi_Family		Single_Family			
Type of Residence	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Condo/Apt	5	100%	.	.	5	10%
SF Attached	.	.	11	25%	11	22%
SF Detached	.	.	33	75%	33	67%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.3

	bName					
	Multi_Family		Single_Family			
Foundation Type	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Crawl Space	1	20%	11	25%	12	24%
Finished Basement	.	.	17	39%	17	35%
NA	2	40%	2	5%	4	8%
Slab	2	40%	5	11%	7	14%
Unfinished Basement	.	.	9	20%	9	18%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.4

	bName					
	Multi_Family		Single_Family			
Roof Color	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Dark	3	60%	39	89%	42	86%
Light/White	.	.	5	11%	5	10%
NA	2	40%	.	.	2	4%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.5

	bName					
	Multi_Family		Single_Family			
Number of Units in Building	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	2	7%	2	6%
1	1	25%	21	75%	22	69%
12	1	25%	.	.	1	3%
2	.	.	4	14%	4	13%
34	1	25%	.	.	1	3%
4	1	25%	1	4%	2	6%
	4	*100%*	*28*	*100%*	*32*	*100%*

Table B.2.6

	bName					
	Multi_Family		Single_Family			
Number of LED Exit Signs - (Multi-Family Common Area Only)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	100%	6	100%	7	100%
	1	*100%*	*6*	*100%*	*7*	*100%*

Table B.2.7

	bName					
	Multi_Family		Single_Family			
Number of CFL Exit Signs - (Multi-Family Common Area Only)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	100%	6	100%	7	100%
	1	*100%*	*6*	*100%*	*7*	*100%*

Table B.2.8

	bName					
	Multi_Family		Single_Family			
Number of Incandescent Exit Signs - (Multi-Family Common Area Only)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	100%	6	100%	7	100%
	1	*100%*	*6*	*100%*	*7*	*100%*

Table B.2.9

	bName					
	Multi_Family		Single_Family			
Security System	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	.	.	6	14%	6	13%
No	3	75%	35	80%	38	79%

	bName					
	Multi_Family		Single_Family			
Security System	Frequency	Percent	Frequency	Percent	Frequency	Percent
Yes	1	25%	3	7%	4	8%
	4	*100%*	*44*	*100%*	*48*	*100%*

Table B.2.10

	bName					
	Multi_Family		Single_Family			
Outdoor Security Lighting - (Hard Wired or Non-Solar)	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	.	.	6	14%	6	13%
No	4	100%	9	21%	13	28%
Yes	.	.	27	64%	27	59%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.2.11

	bName					
	Multi_Family		Single_Family			
Outdoor Security Lighting - Activation	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	.	.	2	6%	2	5%
Manual	.	.	15	42%	15	38%

	bName					
	Multi_Family		Single_Family			
Outdoor Security Lighting - Activation	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Motion Sensor	.	.	7	19%	7	18%
NA	3	100%	7	19%	10	26%
Photo Sensor	.	.	3	8%	3	8%
Timer	.	.	2	6%	2	5%
	3	*100%*	*36*	*100%*	*39*	*100%*

Table B.2.12

	bName					
	Multi_Family		Single_Family			
Square Feet of Living Space	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1000	1	25%	.	.	1	3%
1100	.	.	1	3%	1	3%
1150	.	.	1	3%	1	3%
1200	.	.	5	16%	5	14%
1281	.	.	1	3%	1	3%
1400	.	.	2	6%	2	6%
1500	.	.	3	10%	3	9%
1600	.	.	1	3%	1	3%
1700	.	.	2	6%	2	6%
1750	.	.	1	3%	1	3%
1768	.	.	1	3%	1	3%
1800	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
Square Feet of Living Space	Frequency	Percent	Frequency	Percent	Frequency	Percent
1970	.	.	1	3%	1	3%
2000	.	.	2	6%	2	6%
2300	.	.	1	3%	1	3%
2500	.	.	2	6%	2	6%
2880	.	.	1	3%	1	3%
2900	.	.	1	3%	1	3%
3000	.	.	1	3%	1	3%
3300	.	.	1	3%	1	3%
3500	.	.	1	3%	1	3%
700	2	50%	.	.	2	6%
800	.	.	1	3%	1	3%
950	1	25%	.	.	1	3%
	4	*100%*	*31*	*100%*	*35*	*100%*

Table B.2.13

	bName					
	Multi_Family		Single_Family			
Number of Levels or Stories	Frequency	Percent	Frequency	Percent	Frequency	Percent
> three	1	20%	.	.	1	2%
NA	1	20%	.	.	1	2%
One	3	60%	20	48%	23	49%
Split level or two	.	.	19	45%	19	40%

	bName					
	Multi_Family		Single_Family			
Number of Levels or Stories	Frequency	Percent	Frequency	Percent	Frequency	Percent
Tri-level or three	.	.	3	7%	3	6%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.14

	bName					
	Multi_Family		Single_Family			
Number of Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
10	.	.	3	7%	3	6%
11	.	.	1	2%	1	2%
12	.	.	2	5%	2	4%
13	.	.	1	2%	1	2%
14	.	.	2	5%	2	4%
15	.	.	5	11%	5	10%
17	.	.	2	5%	2	4%
18	.	.	2	5%	2	4%
19	.	.	2	5%	2	4%
2	2	40%	.	.	2	4%
20	.	.	2	5%	2	4%
21	.	.	1	2%	1	2%
23	.	.	3	7%	3	6%
24	.	.	1	2%	1	2%
3	2	40%	.	.	2	4%

	bName					
	Multi_Family		Single_Family			
Number of Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
30	.	.	1	2%	1	2%
35	.	.	1	2%	1	2%
4	1	20%	1	2%	2	4%
5	.	.	1	2%	1	2%
6	.	.	4	9%	4	8%
7	.	.	3	7%	3	6%
8	.	.	4	9%	4	8%
9	.	.	2	5%	2	4%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.15

	bName					
	Multi_Family		Single_Family			
Number of Single Pane Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	1	100%	1	5%	2	9%
10	.	.	1	5%	1	5%
100	.	.	7	33%	7	32%
12	.	.	1	5%	1	5%
16	.	.	1	5%	1	5%
16%	.	.	1	5%	1	5%
2	.	.	1	5%	1	5%
3	.	.	1	5%	1	5%

	bName					
	Multi_Family		Single_Family			
Number of Single Pane Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
31	.	.	1	5%	1	5%
4	.	.	1	5%	1	5%
6	.	.	1	5%	1	5%
67	.	.	1	5%	1	5%
70	.	.	1	5%	1	5%
8	.	.	2	10%	2	9%
	1	*100%*	*21*	*100%*	*22*	*100%*

Table B.2.16

	bName					
	Multi_Family		Single_Family			
Number of Double Pane Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	1	3%	1	2%
1	.	.	2	6%	2	5%
100	3	60%	14	39%	17	41%
12	.	.	1	3%	1	2%
14	.	.	1	3%	1	2%
15	.	.	3	8%	3	7%
16	.	.	1	3%	1	2%
17	.	.	1	3%	1	2%
20	.	.	1	3%	1	2%
23	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
Number of Double Pane Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
3	2	40%	.	.	2	5%
30	.	.	1	3%	1	2%
33	.	.	1	3%	1	2%
4	.	.	1	3%	1	2%
50	.	.	1	3%	1	2%
6	.	.	1	3%	1	2%
7	.	.	2	6%	2	5%
74%	.	.	1	3%	1	2%
75	.	.	1	3%	1	2%
90	.	.	1	3%	1	2%
	5	*100%*	*36*	*100%*	*41*	*100%*

Table B.2.17

	bName					
	Multi_Family		Single_Family			
Number of Triple Pane Windows	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	1	100%	2	67%	3	75%
100	.	.	1	33%	1	25%
	1	*100%*	*3*	*100%*	*4*	*100%*

Table B.2.18

	bName					
	Multi_Family		Single_Family			
Number of Storm Windows (Verify Frames)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	100%	4	33%	5	38%
100	.	.	2	17%	2	15%
11	.	.	1	8%	1	8%
13	.	.	1	8%	1	8%
25	.	.	1	8%	1	8%
50	.	.	1	8%	1	8%
6	.	.	1	8%	1	8%
8	.	.	1	8%	1	8%
	1	*100%*	*12*	*100%*	*13*	*100%*

Table B.2.19

	bName					
	Multi_Family		Single_Family			
Number of Insulated Blinds	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	100%	5	42%	6	46%
10	.	.	1	8%	1	8%
15	.	.	1	8%	1	8%
18	.	.	1	8%	1	8%
20	.	.	1	8%	1	8%
4	.	.	1	8%	1	8%

	bName					
	Multi_Family		Single_Family			
Number of Insulated Blinds	Frequency	Percent	Frequency	Percent	Frequency	Percent
5	.	.	1	8%	1	8%
9	.	.	1	8%	1	8%
	1	*100%*	*12*	*100%*	*13*	*100%*

Table B.2.20

	bName					
	Multi_Family		Single_Family			
Weatherstripping	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	1	20%	.	.	1	2%
No	1	20%	13	32%	14	30%
Yes	3	60%	28	68%	31	67%
	5	*100%*	*41*	*100%*	*46*	*100%*

Table B.2.21

	bName					
	Multi_Family		Single_Family			
Attic Type	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	.	.	1	3%	1	2%
Heat/Cond.	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
Attic Type	Frequency	Percent	Frequency	Percent	Frequency	Percent
NA	2	50%	3	8%	5	12%
Uncond	2	50%	33	87%	35	83%
	4	*100%*	*38*	*100%*	*42*	*100%*

Table B.2.22

	bName			
	Single_Family			
Attic Insulation	Frequency	Percent	Frequency	Percent
0	1	10%	1	10%
10	1	10%	1	10%
12	1	10%	1	10%
14.8	1	10%	1	10%
18	1	10%	1	10%
19	2	20%	2	20%
20	1	10%	1	10%
21	1	10%	1	10%
38	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.2.23

	bName					
	Multi_Family		Single_Family			
Side Wall Insulation (if accessible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	2	20%	2	18%
12	.	.	2	20%	2	18%
13	.	.	2	20%	2	18%
4 inches	1	100%	.	.	1	9%
5	.	.	1	10%	1	9%
6	.	.	1	10%	1	9%
9	.	.	2	20%	2	18%
	1	*100%*	*10*	*100%*	*11*	*100%*

Table B.2.24

	bName			
	Single_Family			
Crawl Space Insulation	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	5	100%
	5	*100%*	*5*	*100%*

Table B.2.25

	bName			
	Single_Family			
Basement Wall Insulation	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	57%	4	57%
None	3	43%	3	43%
	7	*100%*	*7*	*100%*

Table B.2.26

	bName					
	Multi_Family		Single_Family			
Basement Type (if accessible)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	80%	28	76%	32	76%
1	.	.	8	22%	8	19%
2	1	20%	1	3%	2	5%
	5	*100%*	*37*	*100%*	*42*	*100%*

Table B.2.27

	bName					
	Multi_Family		Single_Family			
Wall Framing	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
2x4 wood	3	75%	27	73%	30	73%
2x6 wood	.	.	4	11%	4	10%
DK/-99	1	25%	6	16%	7	17%
	4	*100%*	*37*	*100%*	*41*	*100%*

Table B.2.28

	bName					
	Multi_Family		Single_Family			
Duct Location (% in Conditioned Space)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	33%	11	34%	12	34%
100	1	33%	17	53%	18	51%
50	.	.	2	6%	2	6%
80	1	33%	2	6%	3	9%
	3	*100%*	*32*	*100%*	*35*	*100%*

Table B.2.29

	bName					
	Multi_Family		Single_Family			
Duct Insulation	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	1	25%	6	15%	7	16%
NA	.	.	2	5%	2	4%
No	2	50%	27	66%	29	64%
Yes	1	25%	6	15%	7	16%
	4	*100%*	*41*	*100%*	*45*	*100%*

Table B.2.30

	bName					
	Multi_Family		Single_Family			
Shared Heating (Another Residence) - MF Only	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
More than one Residence	1	20%	.	.	1	3%
NA	.	.	8	27%	8	23%
Only this Residence	4	80%	22	73%	26	74%
	5	*100%*	*30*	*100%*	*35*	*100%*

Table B.2.31

	bName					
	Multi_Family		Single_Family			
Primary Heating System Type	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Central forced air gas furnace	1	20%	38	86%	39	80%
DK/-99	1	20%	.	.	1	2%
Electric central forced air furnace	2	40%	1	2%	3	6%
Electric hot water boiler	.	.	1	2%	1	2%
Natural gas Boiler with radiators	.	.	2	5%	2	4%
Other System & Fuel	1	20%	2	5%	3	6%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.32

	bName					
	Multi_Family		Single_Family			
Primary Heating System Make	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
AMANA	.	.	1	3%	1	2%
Amana	.	.	1	3%	1	2%
Bard	.	.	1	3%	1	2%
Borg Warner	.	.	1	3%	1	2%
COMFORT MAKER	.	.	1	3%	1	2%
Carrier	1	33%	2	5%	3	7%
Coleman	.	.	2	5%	2	5%

	bName					
	Multi_Family		Single_Family			
Primary Heating System Make	Frequency	Percent	Frequency	Percent	Frequency	Percent
Comfort Maker	.	.	1	3%	1	2%
Comfortmaker	.	.	2	5%	2	5%
Evcon	.	.	1	3%	1	2%
GE	.	.	1	3%	1	2%
GOODMAN	.	.	1	3%	1	2%
HEIL	.	.	1	3%	1	2%
INTERTEMP	.	.	1	3%	1	2%
INTERTHERM	.	.	1	3%	1	2%
Janitrol	.	.	1	3%	1	2%
Kenmore	.	.	1	3%	1	2%
Lennox	.	.	4	10%	4	9%
Luxair	.	.	1	3%	1	2%
Meyer	1	33%	.	.	1	2%
N-G, American Assoc	.	.	1	3%	1	2%
RHEEM	.	.	1	3%	1	2%
Rheem	1	33%	.	.	1	2%
STANDARD	.	.	1	3%	1	2%
Sears	.	.	1	3%	1	2%
Siegler	.	.	1	3%	1	2%
TRANE	.	.	3	8%	3	7%
Tempstar	.	.	1	3%	1	2%
Trane	.	.	3	8%	3	7%
WEIL MCLAIN	.	.	1	3%	1	2%
York	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
Primary Heating System Make	Frequency	Percent	Frequency	Percent	Frequency	Percent
payne	.	.	1	3%	1	2%
	3	*100%*	*40*	*100%*	*43*	*100%*

Table B.2.33

	bName					
	Multi_Family		Single_Family			
Primary Heating System Age	Frequency	Percent	Frequency	Percent	Frequency	Percent
0 to 2 years	2	67%	2	5%	4	9%
10 to 19 years	.	.	9	22%	9	20%
20 or more years	1	33%	11	27%	12	27%
3 to 9 years	.	.	15	37%	15	34%
DK/-99	.	.	4	10%	4	9%
	3	*100%*	*41*	*100%*	*44*	*100%*

Table B.2.34

	bName					
	Multi_Family		Single_Family			
Secondary Heating System Type	Frequency	Percent	Frequency	Percent	Frequency	Percent
Central forced air gas furnace	.	.	1	6%	1	5%
Electric portable heaters	.	.	2	11%	2	11%

	bName					
	Multi_Family		Single_Family			
Secondary Heating System Type	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
NA	1	100%	12	67%	13	68%
Other System & Fuel	.	.	3	17%	3	16%
	1	*100%*	*18*	*100%*	*19*	*100%*

Table B.2.35

	bName					
	Multi_Family		Single_Family			
Temperature Control - Main Heat	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Clock/Prog	.	.	21	51%	21	47%
DK/-99	.	.	1	2%	1	2%
NA	.	.	1	2%	1	2%
Regular Temp	4	100%	18	44%	22	49%
	4	*100%*	*41*	*100%*	*45*	*100%*

Table B.2.36

	bName					
	Multi_Family		Single_Family			
Awake Temp - Heat	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
67	.	.	2	5%	2	5%

	bName					
	Multi_Family		Single_Family			
Awake Temp - Heat	Frequency	Percent	Frequency	Percent	Frequency	Percent
68	.	.	7	18%	7	16%
69	.	.	4	10%	4	9%
70	3	75%	11	28%	14	32%
71	.	.	3	8%	3	7%
72	.	.	2	5%	2	5%
73	.	.	1	3%	1	2%
74	.	.	5	13%	5	11%
75	.	.	3	8%	3	7%
76	1	25%	1	3%	2	5%
78	.	.	1	3%	1	2%
	4	*100%*	*40*	*100%*	*44*	*100%*

Table B.2.37

	bName					
	Multi_Family		Single_Family			
Sleep Temp - Heat	Frequency	Percent	Frequency	Percent	Frequency	Percent
62	.	.	1	3%	1	2%
63	.	.	1	3%	1	2%
64	.	.	1	3%	1	2%
65	.	.	4	10%	4	9%
67	.	.	1	3%	1	2%
68	.	.	13	33%	13	30%

	bName					
	Multi_Family		Single_Family			
Sleep Temp - Heat	Frequency	Percent	Frequency	Percent	Frequency	Percent
69	.	.	2	5%	2	5%
70	3	75%	6	15%	9	20%
71	.	.	2	5%	2	5%
72	.	.	1	3%	1	2%
73	.	.	1	3%	1	2%
74	.	.	2	5%	2	5%
75	.	.	3	8%	3	7%
76	1	25%	1	3%	2	5%
off	.	.	1	3%	1	2%
	4	*100%*	*40*	*100%*	*44*	*100%*

Table B.2.38

	bName					
	Multi_Family		Single_Family			
Away Temp - Heat	Frequency	Percent	Frequency	Percent	Frequency	Percent
55	.	.	1	3%	1	2%
60	1	25%	4	10%	5	12%
61	.	.	1	3%	1	2%
63	.	.	1	3%	1	2%
65	.	.	2	5%	2	5%
67	.	.	1	3%	1	2%
68	.	.	8	21%	8	19%

	bName					
	Multi_Family		Single_Family			
Away Temp - Heat	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
69	.	.	2	5%	2	5%
70	3	75%	6	15%	9	21%
71	.	.	2	5%	2	5%
72	.	.	3	8%	3	7%
73	.	.	1	3%	1	2%
74	.	.	2	5%	2	5%
75	.	.	3	8%	3	7%
76	.	.	1	3%	1	2%
off	.	.	1	3%	1	2%
	4	*100%*	*39*	*100%*	*43*	*100%*

Table B.2.39

	bName					
	Multi_Family		Single_Family			
Shared Cooling (Another Residence) - MF Only	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Air-source heat pump	.	.	1	3%	1	3%
Central AC	1	20%	6	18%	7	18%
NA	4	80%	26	79%	30	79%
	5	*100%*	*33*	*100%*	*38*	*100%*

Table B.2.40

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Efficiency	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
10	.	.	1	5%	1	5%
10 SEER	.	.	7	37%	7	33%
10.5 SEER	.	.	1	5%	1	5%
11.5 EER	1	50%	.	.	1	5%
11.5 SEER	.	.	1	5%	1	5%
12	.	.	3	16%	3	14%
12 SEER	.	.	2	11%	2	10%
13 SEER	.	.	2	11%	2	10%
14 SEER	.	.	1	5%	1	5%
9.7	.	.	1	5%	1	5%
9.7 EER	1	50%	.	.	1	5%
	2	*100%*	*19*	*100%*	*21*	*100%*

Table B.2.41

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Make Model	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Amana	.	.	2	5%	2	5%
American Standard	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Make Model	Frequency	Percent	Frequency	Percent	Frequency	Percent
COMFORT MAKER	.	.	1	3%	1	2%
CROSLEY	.	.	1	3%	1	2%
Carrier	1	25%	3	8%	4	10%
Coleman	.	.	1	3%	1	2%
Comfort Maker	.	.	1	3%	1	2%
FREIDRICH	.	.	1	3%	1	2%
Fedders	.	.	2	5%	2	5%
GOODMAN	.	.	2	5%	2	5%
Goodman	.	.	1	3%	1	2%
HEIL	.	.	1	3%	1	2%
INTERTHERM	.	.	1	3%	1	2%
Lennox	.	.	5	14%	5	12%
Magic Chef	1	25%	.	.	1	2%
PAYNE	.	.	1	3%	1	2%
Payne	.	.	1	3%	1	2%
Pelonis	1	25%	.	.	1	2%
RHEEM	.	.	1	3%	1	2%
Rheem	1	25%	.	.	1	2%
STANDARD	.	.	1	3%	1	2%
TRANE	.	.	3	8%	3	7%
Trane	.	.	3	8%	3	7%
Westinghouse	.	.	1	3%	1	2%
YORK	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Make Model	Frequency	Percent	Frequency	Percent	Frequency	Percent
York	.	.	2	5%	2	5%
	4	*100%*	*37*	*100%*	*41*	*100%*

Table B.2.42

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Age	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	1	4%	1	4%
10	.	.	1	4%	1	4%
11	.	.	2	9%	2	8%
13	.	.	1	4%	1	4%
14	.	.	1	4%	1	4%
16 years	.	.	1	4%	1	4%
18 years	.	.	1	4%	1	4%
2	.	.	1	4%	1	4%
20 years	.	.	1	4%	1	4%
2001	.	.	1	4%	1	4%
2007	1	50%	.	.	1	4%
25	1	50%	.	.	1	4%
3	.	.	3	13%	3	12%
4 yrs old	.	.	1	4%	1	4%

	bName					
	Multi_Family		Single_Family			
Primary Cooling System Age	Frequency	Percent	Frequency	Percent	Frequency	Percent
4-5 years	.	.	1	4%	1	4%
5	.	.	2	9%	2	8%
6 years	.	.	1	4%	1	4%
8 years	.	.	1	4%	1	4%
8 years.	.	.	1	4%	1	4%
9	.	.	1	4%	1	4%
9 years	.	.	1	4%	1	4%
	2	*100%*	*23*	*100%*	*25*	*100%*

Table B.2.43

	bName					
	Multi_Family		Single_Family			
Cooling System Maintenance	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	.	.	1	2%	1	2%
NA	.	.	2	5%	2	4%
No	2	50%	13	30%	15	32%
Yes	2	50%	27	63%	29	62%
	4	*100%*	*43*	*100%*	*47*	*100%*

Table B.2.44

	bName					
	Multi_Family		Single_Family			
Temperature Control - Main Cooling	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Clock/Prog	.	.	21	48%	21	43%
DK/-99	.	.	2	5%	2	4%
Dial w/o temp	.	.	1	2%	1	2%
NA	.	.	1	2%	1	2%
Regular Temp	4	80%	18	41%	22	45%
Switch/none	1	20%	1	2%	2	4%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.45

	bName					
	Multi_Family		Single_Family			
Awake Temp - Cool	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
67	.	.	1	2%	1	2%
68	.	.	1	2%	1	2%
70	.	.	3	7%	3	7%
72	1	33%	6	15%	7	16%
73	.	.	3	7%	3	7%
74	.	.	3	7%	3	7%
75	.	.	8	20%	8	18%

	bName					
	Multi_Family		Single_Family			
Awake Temp - Cool	Frequency	Percent	Frequency	Percent	Frequency	Percent
76	1	33%	3	7%	4	9%
77	.	.	1	2%	1	2%
78	1	33%	7	17%	8	18%
79	.	.	2	5%	2	5%
80	.	.	1	2%	1	2%
81	.	.	1	2%	1	2%
on	.	.	1	2%	1	2%
	3	*100%*	*41*	*100%*	*44*	*100%*

Table B.2.46

	bName					
	Multi_Family		Single_Family			
Sleep Temp - Cool	Frequency	Percent	Frequency	Percent	Frequency	Percent
67	.	.	1	2%	1	2%
68	.	.	1	2%	1	2%
70	.	.	3	7%	3	7%
72	1	33%	7	17%	8	18%
73	.	.	4	10%	4	9%
74	.	.	2	5%	2	5%
75	.	.	6	15%	6	14%
76	1	33%	3	7%	4	9%
77	.	.	2	5%	2	5%

	bName					
	Multi_Family		Single_Family			
Sleep Temp - Cool	Frequency	Percent	Frequency	Percent	Frequency	Percent
78	1	33%	5	12%	6	14%
79	.	.	1	2%	1	2%
80	.	.	1	2%	1	2%
81	.	.	1	2%	1	2%
83	.	.	1	2%	1	2%
OFF	.	.	2	5%	2	5%
on	.	.	1	2%	1	2%
	3	*100%*	*41*	*100%*	*44*	*100%*

Table B.2.47

	bName					
	Multi_Family		Single_Family			
Away Temp - Cool	Frequency	Percent	Frequency	Percent	Frequency	Percent
67	.	.	1	3%	1	3%
68	.	.	1	3%	1	3%
70	.	.	2	5%	2	5%
72	1	33%	7	19%	8	20%
73	.	.	4	11%	4	10%
74	.	.	2	5%	2	5%
75	.	.	6	16%	6	15%
76	.	.	2	5%	2	5%
77	.	.	2	5%	2	5%

	bName					
	Multi_Family		Single_Family			
Away Temp - Cool	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
78	1	33%	3	8%	4	10%
79	.	.	1	3%	1	3%
81	.	.	1	3%	1	3%
82	.	.	1	3%	1	3%
83	.	.	1	3%	1	3%
85	1	33%	.	.	1	3%
OFF	.	.	2	5%	2	5%
on	.	.	1	3%	1	3%
	3	*100%*	*37*	*100%*	*40*	*100%*

Table B.2.48

	bName					
	Multi_Family		Single_Family			
Central AC Quantity	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	100%	30	100%	33	100%
	3	*100%*	*30*	*100%*	*33*	*100%*

Table B.2.49

	bName			
	Single_Family			
Air-Source Heat Pump Quantity	**Frequency**	**Percent**	**Frequency**	**Percent**
1	4	80%	4	80%
2	1	20%	1	20%
	5	*100%*	*5*	*100%*

Table B.2.50

	bName			
	Single_Family			
Geothermal Heat Pump Quantity	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.2.51

	bName					
	Multi_Family		Single_Family			
Room AC Quantity	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	4	44%	4	40%

	bName					
	Multi_Family		Single_Family			
Room AC Quantity	Frequency	Percent	Frequency	Percent	Frequency	Percent
2	1	100%	4	44%	5	50%
3	.	.	1	11%	1	10%
	1	*100%*	*9*	*100%*	*10*	*100%*

Table B.2.52

	bName			
	Single_Family			
Portable Fans Quantity	Frequency	Percent	Frequency	Percent
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.2.53

	bName					
	Multi_Family		Single_Family			
Whole House Fans Quantity	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	1	100%	4	50%	5	56%
1	.	.	4	50%	4	44%
	1	*100%*	*8*	*100%*	*9*	*100%*

Table B.2.54

	bName					
	Multi_Family		Single_Family			
Ceiling Fans Quantity	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	50%	2	9%	3	12%
12	.	.	1	4%	1	4%
2	1	50%	3	13%	4	16%
3	.	.	6	26%	6	24%
4	.	.	3	13%	3	12%
5	.	.	3	13%	3	12%
7	.	.	3	13%	3	12%
8	.	.	1	4%	1	4%
9	.	.	1	4%	1	4%
	2	*100%*	*23*	*100%*	*25*	*100%*

Table B.2.55

	bName					
	Multi_Family		Single_Family			
Shared Water Heat (Another Residence) - MF Only	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
More than one residence	1	20%	1	3%	2	5%
NA	.	.	10	31%	10	27%

	bName					
	Multi_Family		Single_Family			
Shared Water Heat (Another Residence) - MF Only	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Only this residence	4	80%	21	66%	25	68%
	5	*100%*	*32*	*100%*	*37*	*100%*

Table B.2.56

	bName					
	Multi_Family		Single_Family			
Type of Water Heating	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
NA	1	20%	.	.	1	2%
Tank type storage water heater.	4	80%	43	98%	47	96%
Tankless hotwater heater	.	.	1	2%	1	2%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.57

	bName					
	Multi_Family		Single_Family			
Fuel Type for Primary Water Heating	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	1	20%	1	2%	2	4%
Electricity	3	60%	8	19%	11	23%
Natural gas	1	20%	33	77%	34	71%

	bName					
	Multi_Family		Single_Family			
Fuel Type for Primary Water Heating	Frequency	Percent	Frequency	Percent	Frequency	Percent
Propane/bottled gas	.	.	1	2%	1	2%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.58

	bName					
	Multi_Family		Single_Family			
[IF WH = SOLAR] ALT OR B U WH TYPE	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	1	33%	.	.	1	5%
NA	1	33%	11	58%	12	55%
Standard Storage	1	33%	8	42%	9	41%
	3	*100%*	*19*	*100%*	*22*	*100%*

Table B.2.59

	bName					
	Multi_Family		Single_Family			
Water Heaters Quantity	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	4	100%	43	98%	47	98%

	bName					
	Multi_Family		Single_Family			
Water Heaters Quantity	Frequency	Percent	Frequency	Percent	Frequency	Percent
2	.	.	1	2%	1	2%
	4	*100%*	*44*	*100%*	*48*	*100%*

Table B.2.60

	bName					
	Multi_Family		Single_Family			
Water Heater Temperature	Frequency	Percent	Frequency	Percent	Frequency	Percent
120	.	.	3	43%	3	38%
125 F	.	.	2	29%	2	25%
130	.	.	1	14%	1	13%
140	.	.	1	14%	1	13%
160 F	1	100%	.	.	1	13%
	1	*100%*	*7*	*100%*	*8*	*100%*

Table B.2.61

	bName					
	Multi_Family		Single_Family			
WH NO TEMP - L M H -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	2	40%	3	7%	5	11%

	bName					
	Multi_Family		Single_Family			
WH NO TEMP - L M H -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
High	1	20%	10	24%	11	24%
Low	.	.	3	7%	3	7%
Med	1	20%	9	22%	10	22%
Med - High	1	20%	10	24%	11	24%
Med - Low	.	.	5	12%	5	11%
NA	.	.	1	2%	1	2%
	5	*100%*	*41*	*100%*	*46*	*100%*

Table B.2.62

	bName					
	Multi_Family		Single_Family			
WH EFFICIENCY -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
.80	.	.	3	19%	3	18%
0.54	.	.	1	6%	1	6%
0.55	.	.	1	6%	1	6%
0.58	.	.	1	6%	1	6%
0.59 EF	.	.	3	19%	3	18%
0.61	.	.	1	6%	1	6%
0.9 EF	.	.	1	6%	1	6%
0.92 EF	1	100%	1	6%	2	12%

	bName					
	Multi_Family		Single_Family			
WH EFFICIENCY -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
263 THERMS/YR (ENERGYGUIDE)	.	.	1	6%	1	6%
57	.	.	1	6%	1	6%
80%	.	.	2	13%	2	12%
	1	*100%*	*16*	*100%*	*17*	*100%*

Table B.2.63

	bName					
	Multi_Family		Single_Family			
WH MAKE MODEL -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
A O Smith	.	.	1	3%	1	2%
A.O Smith	.	.	1	3%	1	2%
A.O Smitth	.	.	1	3%	1	2%
A.O. SMITH	.	.	4	10%	4	9%
A.O. Smith	1	25%	1	3%	2	5%
AMERICAN	.	.	2	5%	2	5%
AO Smith	.	.	1	3%	1	2%
Ambassador	1	25%	.	.	1	2%
American	.	.	1	3%	1	2%
BRADFORD WHITE	.	.	1	3%	1	2%
Bradford White Corporation	.	.	1	3%	1	2%
Envirotemp	.	.	2	5%	2	5%

	bName					
	Multi_Family		Single_Family			
WH MAKE MODEL -1	Frequency	Percent	Frequency	Percent	Frequency	Percent
General Electric	.	.	1	3%	1	2%
Kenmore	.	.	1	3%	1	2%
Maytag	.	.	1	3%	1	2%
NA	.	.	1	3%	1	2%
RELIANCE	.	.	1	3%	1	2%
RICHMOND	.	.	2	5%	2	5%
Reliance	1	25%	2	5%	3	7%
Rheem	.	.	1	3%	1	2%
Richmond	.	.	2	5%	2	5%
Richmond Miser	.	.	2	5%	2	5%
Rinnai	.	.	1	3%	1	2%
STATE	.	.	1	3%	1	2%
Sears	.	.	2	5%	2	5%
State	1	25%	.	.	1	2%
State Censible	.	.	1	3%	1	2%
State Industries	.	.	1	3%	1	2%
WHIRLPOOL	.	.	1	3%	1	2%
Whirlpool	.	.	2	5%	2	5%
	4	*100%*	*39*	*100%*	*43*	*100%*

Table B.2.64

	bName					
	Multi_Family		Single_Family			
WH AGE - MFG DATE - PRIMARY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0 to 2 years	2	40%	9	23%	11	24%
10 to 19 years	.	.	6	15%	6	13%
20 or more years	1	20%	3	8%	4	9%
3 to 9 years	1	20%	19	48%	20	44%
DK/-99	1	20%	3	8%	4	9%
	5	*100%*	*40*	*100%*	*45*	*100%*

Table B.2.65

	bName					
	Multi_Family		Single_Family			
WH SIZE - GAL - PRIMARY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
30	1	33%	5	13%	6	14%
31.9	.	.	1	3%	1	2%
40	1	33%	22	56%	23	55%
42	1	33%	.	.	1	2%
50	.	.	10	26%	10	24%
52	.	.	1	3%	1	2%
	3	*100%*	*39*	*100%*	*42*	*100%*

Table B.2.66

	bName					
	Multi_Family		Single_Family			
WH BLANKET WRAP ON MAIN WH	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	1	20%	1	2%	2	4%
NA	.	.	1	2%	1	2%
No	4	80%	38	88%	42	88%
Yes	.	.	3	7%	3	6%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.67

	bName					
	Multi_Family		Single_Family			
WH TIMER	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	2	40%	1	2%	3	6%
NA	.	.	1	2%	1	2%
No	3	60%	42	95%	45	92%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.68

	bName					
	Multi_Family		Single_Family			
DRAIN HEAT RECOVERY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	1	20%	.	.	1	2%
NA	.	.	1	2%	1	2%
No	4	80%	41	95%	45	94%
Yes	.	.	1	2%	1	2%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.69

	bName					
	Multi_Family		Single_Family			
CLOTHES DRYER	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
None	1	20%	2	5%	3	6%
Private	2	40%	41	95%	43	90%
Shared	2	40%	.	.	2	4%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.70

	bName					
	Multi_Family		Single_Family			
NUM CLOTHES DRYERS	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	3	75%	39	95%	42	93%
2	.	.	1	2%	1	2%
4	1	25%	.	.	1	2%
`	.	.	1	2%	1	2%
	4	*100%*	*41*	*100%*	*45*	*100%*

Table B.2.71

	bName					
	Multi_Family		Single_Family			
CLOTHES DRYER MAKE MODEL – PRIMARY	Frequency	Percent	Frequency	Percent	Frequency	Percent
Electricity	3	75%	29	69%	32	70%
NA	.	.	1	2%	1	2%
Nat Gas	1	25%	12	29%	13	28%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.2.72

	bName					
	Multi_Family		Single_Family			
CLOTHES DRYER AGE – MFG DATE – PRIMARY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	1	3%	1	2%
AMANA	.	.	1	3%	1	2%
ELTROLUX	.	.	1	3%	1	2%
FISHER & PAYKEL	.	.	1	3%	1	2%
Fisher & Paykel	.	.	1	3%	1	2%
Frigidaire	1	25%	2	5%	3	7%
GE	2	50%	2	5%	4	10%
KENMORE	.	.	4	11%	4	10%
Kenmore	.	.	4	11%	4	10%
MAYTAG	.	.	4	11%	4	10%
Maytag	.	.	8	21%	8	19%
RCA	.	.	1	3%	1	2%
Roper	.	.	1	3%	1	2%
WHIRLPOOL	.	.	2	5%	2	5%
Whirlpool	1	25%	4	11%	5	12%
White-Westinghouse	.	.	1	3%	1	2%
	4	*100%*	*38*	*100%*	*42*	*100%*

Table B.2.73

	bName					
	Multi_Family		Single_Family			
CLOTHES DRYER FUEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	1	3%	1	3%
1	.	.	3	9%	3	8%
1 year	.	.	1	3%	1	3%
10	.	.	1	3%	1	3%
15	.	.	1	3%	1	3%
15 years	.	.	1	3%	1	3%
15-20	.	.	1	3%	1	3%
16	.	.	1	3%	1	3%
18	.	.	1	3%	1	3%
2 years	1	50%	.	.	1	3%
20	.	.	1	3%	1	3%
20+	.	.	3	9%	3	8%
20-30	.	.	1	3%	1	3%
2002	.	.	1	3%	1	3%
2007	1	50%	.	.	1	3%
2008	.	.	2	6%	2	5%
23	.	.	1	3%	1	3%
25 years	.	.	1	3%	1	3%
28	.	.	1	3%	1	3%
3	.	.	2	6%	2	5%
4	.	.	1	3%	1	3%
4 years	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
CLOTHES DRYER FUEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
5	.	.	2	6%	2	5%
6	.	.	3	9%	3	8%
6 years	.	.	1	3%	1	3%
6 yrs old	.	.	1	3%	1	3%
6-7 yrs	.	.	1	3%	1	3%
8 years.	.	.	1	3%	1	3%
	2	*100%*	*35*	*100%*	*37*	*100%*

Table B.2.74

	bName					
	Multi_Family		Single_Family			
NUM CLOTHES DRYER – W MOISTURE SENSOR	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	3	100%	11	35%	14	41%
1	.	.	20	65%	20	59%
	3	*100%*	*31*	*100%*	*34*	*100%*

Table B.2.75

	bName					
	Multi_Family		Single_Family			
CLOTHES WASHER	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
None	1	20%	1	2%	2	4%
Private	2	40%	42	98%	44	92%
Shared	2	40%	.	.	2	4%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.76

	bName					
	Multi_Family		Single_Family			
NUM CLOTHES WASHER (Vertical Axis)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	67%	36	100%	38	97%
3	1	33%	.	.	1	3%
	3	*100%*	*36*	*100%*	*39*	*100%*

Table B.2.77

	bName					
	Multi_Family		Single_Family			
NUMCLOTHES WASHER (Hor izontal Axis)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Front Load	1	25%	3	7%	4	9%

	bName					
	Multi_Family		Single_Family			
NUMCLOTHES WASHER (Hor izontal Axis)	Frequency	Percent	Frequency	Percent	Frequency	Percent
NA	.	.	1	2%	1	2%
Top Load	3	75%	39	91%	42	89%
	4	*100%*	*43*	*100%*	*47*	*100%*

Table B.2.78

	bName			
	Single_Family			
h33_outdoor_security_lighting__0	Frequency	Percent	Frequency	Percent
DK/-99	1	8%	1	8%
Manual	3	23%	3	23%
NA	9	69%	9	69%
	13	*100%*	*13*	*100%*

Table B.2.79

	bName			
	Single_Family			
h33_outdoor_security_lighting__3	Frequency	Percent	Frequency	Percent
DK/-99	1	8%	1	8%
Manual	2	17%	2	17%

	bName			
	Single_Family			
h33_outdoor_security_lighting__3	Frequency	Percent	Frequency	Percent
NA	9	75%	9	75%
	12	*100%*	*12*	*100%*

Table B.2.80

	bName					
	Multi_Family		Single_Family			
na_clothes_washer_age	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	1	6%	1	6%
1	.	.	2	13%	2	12%
10 years	.	.	1	6%	1	6%
15 years	.	.	1	6%	1	6%
16	.	.	1	6%	1	6%
18	.	.	1	6%	1	6%
2 years	1	100%	.	.	1	6%
20+	.	.	3	19%	3	18%
20-30	.	.	1	6%	1	6%
30	.	.	1	6%	1	6%
4 years	.	.	2	13%	2	12%
6	.	.	1	6%	1	6%
6 years	.	.	1	6%	1	6%
	1	*100%*	*16*	*100%*	*17*	*100%*

Table B.2.81

	bName					
	Multi_Family		Single_Family			
CLOTHES WASHER EFFICIENCY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	.	.	1	3%	1	2%
Energy Star	1	25%	6	16%	7	17%
NA	.	.	1	3%	1	2%
Non Energy Star	3	75%	29	78%	32	78%
	4	*100%*	*37*	*100%*	*41*	*100%*

Table B.2.82

	bName					
	Multi_Family		Single_Family			
LOW-FLOW SHOWERHEADS (GPM ? 2.5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	13	57%	13	50%
1	2	67%	3	13%	5	19%
2	1	33%	6	26%	7	27%
3	.	.	1	4%	1	4%
	3	*100%*	*23*	*100%*	*26*	*100%*

Table B.2.83

	bName					
	Multi_Family		Single_Family			
TOTAL NUM SHOWERS	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	50%	23	53%	25	53%
2	2	50%	17	40%	19	40%
3	.	.	3	7%	3	6%
	4	*100%*	*43*	*100%*	*47*	*100%*

Table B.2.84

	bName					
	Multi_Family		Single_Family			
LOW-FLOW AIRATORS (GPM ? 2.5)	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	33%	15	54%	16	52%
1	1	33%	3	11%	4	13%
2	1	33%	5	18%	6	19%
3	.	.	3	11%	3	10%
6	.	.	1	4%	1	3%
7	.	.	1	4%	1	3%
	3	*100%*	*28*	*100%*	*31*	*100%*

Table B.2.85

	bName					
	Multi_Family		Single_Family			
TOTAL NUM SINKS	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	25%	7	16%	8	17%
2	1	25%	7	16%	8	17%
3	2	50%	15	35%	17	36%
4	.	.	10	23%	10	21%
5	.	.	1	2%	1	2%
7	.	.	2	5%	2	4%
8	.	.	1	2%	1	2%
	4	*100%*	*43*	*100%*	*47*	*100%*

Table B.2.86

	bName					
	Multi_Family		Single_Family			
NUM OVENS	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	100%	42	95%	47	96%
2	.	.	2	5%	2	4%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.87

	bName					
	Multi_Family		Single_Family			
OVEN FUEL – PRIMRY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Electricity	5	100%	29	67%	34	71%
Nat Gas	.	.	14	33%	14	29%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.88

	bName					
	Multi_Family		Single_Family			
CONVECTION OVEN – PRIMARY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	.	.	2	5%	2	4%
No	3	60%	32	73%	35	71%
Yes	2	40%	10	23%	12	24%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.89

	bName					
	Multi_Family		Single_Family			
NUM COOKING STOVES	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	100%	41	95%	46	96%
2	.	.	1	2%	1	2%
4	.	.	1	2%	1	2%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.90

	bName					
	Multi_Family		Single_Family			
COOKING STOVE FUEL	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Electricity	5	100%	26	60%	31	65%
Nat Gas	.	.	17	40%	17	35%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.91

	bName					
	Multi_Family		Single_Family			
NUM REFRIGERATORS	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	5	100%	34	77%	39	80%
2	.	.	9	20%	9	18%
4	.	.	1	2%	1	2%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.92

	bName					
	Multi_Family		Single_Family			
REFRGERATOR MAKE MODEL - PRIMARY	Frequency	Percent	Frequency	Percent	Frequency	Percent
ADMIRAL	.	.	1	2%	1	2%
AMANA	.	.	2	5%	2	4%
Amana	.	.	2	5%	2	4%
ELECTROLUX	.	.	1	2%	1	2%
ESTATE	.	.	1	2%	1	2%
Frigidaire	1	20%	4	9%	5	10%
GALAXY	.	.	1	2%	1	2%
GE	.	.	5	11%	5	10%
General Electric	.	.	2	5%	2	4%
Gibson	.	.	1	2%	1	2%

	bName					
	Multi_Family		Single_Family			
REFRGERATOR MAKE MODEL - PRIMARY	Frequency	Percent	Frequency	Percent	Frequency	Percent
Haier	1	20%	.	.	1	2%
Hotpoint	1	20%	.	.	1	2%
JENN-AIR	.	.	1	2%	1	2%
KELVINATOR	.	.	1	2%	1	2%
KENMORE	.	.	4	9%	4	8%
Kenmore	.	.	4	9%	4	8%
MAYTAG	.	.	1	2%	1	2%
Magic Chef	.	.	1	2%	1	2%
Maytag	.	.	2	5%	2	4%
Roper	1	20%	1	2%	2	4%
WHIRLPOOL	.	.	1	2%	1	2%
Whirlpool	1	20%	7	16%	8	16%
White-Westinghouse	.	.	1	2%	1	2%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.93

	bName					
	Multi_Family		Single_Family			
AGE PRIMARY REFRIGERATOR	Frequency	Percent	Frequency	Percent	Frequency	Percent
15+	1	20%	9	21%	10	21%
6 or less	4	80%	16	38%	20	43%

	bName					
	Multi_Family		Single_Family			
AGE PRIMARY REFRIGERATOR	Frequency	Percent	Frequency	Percent	Frequency	Percent
7 to 14	.	.	16	38%	16	34%
DK/-99	.	.	1	2%	1	2%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.94

	bName					
	Multi_Family		Single_Family			
REFRIGERATOR EFFICIENCY	Frequency	Percent	Frequency	Percent	Frequency	Percent
DK/-99	.	.	4	9%	4	8%
Energy Star	1	20%	4	9%	5	10%
Non Energy Star	4	80%	35	81%	39	81%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.95

	bName					
	Multi_Family		Single_Family			
NUM STAND-ALONE FREEZERS	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	3	75%	9	33%	12	39%
1	1	25%	15	56%	16	52%

	bName					
	Multi_Family		Single_Family			
NUM STAND-ALONE FREEZERS	Frequency	Percent	Frequency	Percent	Frequency	Percent
2	.	.	3	11%	3	10%
	4	*100%*	*27*	*100%*	*31*	*100%*

Table B.2.96

	bName					
	Multi_Family		Single_Family			
STAND-ALONE FREEZER MAKE MODEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
ABSOCOLD	.	.	1	6%	1	6%
ADMIRAL	.	.	1	6%	1	6%
Borg-Warner	.	.	1	6%	1	6%
Coronado	.	.	1	6%	1	6%
Frigidaire	.	.	4	25%	4	24%
GE	.	.	1	6%	1	6%
KENMORE	.	.	1	6%	1	6%
Kenmore	.	.	4	25%	4	24%
Marquetts	.	.	1	6%	1	6%
Sears	.	.	1	6%	1	6%
White Consolidated	1	100%	.	.	1	6%
	1	*100%*	*16*	*100%*	*17*	*100%*

Table B.2.97

	bName					
	Multi_Family		Single_Family			
AGE PRIMARY STAND-ALONE FREEZER	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
15+	.	.	8	38%	8	35%
6 or less	.	.	5	24%	5	22%
7 to 14	1	50%	5	24%	6	26%
NA	1	50%	3	14%	4	17%
	2	*100%*	*21*	*100%*	*23*	*100%*

Table B.2.98

	bName					
	Multi_Family		Single_Family			
FREEZER EFFICIENCY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	.	.	2	10%	2	9%
Energy Star	.	.	2	10%	2	9%
NA	1	50%	3	14%	4	17%
Non Energy Star	1	50%	14	67%	15	65%
	2	*100%*	*21*	*100%*	*23*	*100%*

Table B.2.99

	bName					
	Multi_Family		Single_Family			
NUM DISHWASHERS	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	1	20%	3	8%	4	10%
1	4	80%	34	92%	38	90%
	5	*100%*	*37*	*100%*	*42*	*100%*

Table B.2.100

	bName					
	Multi_Family		Single_Family			
DISHWASHER MAKE MODEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	1	3%	1	3%
Amana	.	.	1	3%	1	3%
Frigidaire	1	25%	2	6%	3	8%
GE	.	.	3	9%	3	8%
General Electric	.	.	1	3%	1	3%
Hotpoint	1	25%	.	.	1	3%
KENMORE	.	.	3	9%	3	8%
KITCHEN AID	.	.	2	6%	2	5%
Kenmore	.	.	5	15%	5	14%
Kitchenaid	.	.	1	3%	1	3%
MAYTAG	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
DISHWASHER MAKE MODEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
Maytag	.	.	3	9%	3	8%
WHIRLPOOL	.	.	3	9%	3	8%
Whirlpool	2	50%	6	18%	8	22%
kitchen aid	.	.	1	3%	1	3%
	4	*100%*	*33*	*100%*	*37*	*100%*

Table B.2.101

	bName					
	Multi_Family		Single_Family			
AGE DISHWASHER	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	1	3%	1	3%
10	.	.	1	3%	1	3%
10 years	.	.	1	3%	1	3%
10+	.	.	1	3%	1	3%
13	.	.	2	7%	2	6%
15	.	.	2	7%	2	6%
15+	.	.	1	3%	1	3%
16	.	.	1	3%	1	3%
19	.	.	1	3%	1	3%
2	.	.	1	3%	1	3%
2 years	1	33%	1	3%	2	6%

	bName					
	Multi_Family		Single_Family			
AGE DISHWASHER	Frequency	Percent	Frequency	Percent	Frequency	Percent
20+	.	.	1	3%	1	3%
2005	.	.	1	3%	1	3%
2006	.	.	1	3%	1	3%
2007	1	33%	1	3%	2	6%
2008	.	.	1	3%	1	3%
25	.	.	1	3%	1	3%
3	.	.	3	10%	3	9%
3 years	.	.	1	3%	1	3%
30	.	.	1	3%	1	3%
30 years	1	33%	.	.	1	3%
5	.	.	1	3%	1	3%
5 years	.	.	1	3%	1	3%
6 years	.	.	1	3%	1	3%
8 years	.	.	1	3%	1	3%
8 years.	.	.	1	3%	1	3%
DS603I	.	.	1	3%	1	3%
	3	*100%*	*30*	*100%*	*33*	*100%*

Table B.2.102

	bName					
	Multi_Family		Single_Family			
DISHWASHER EFFICIENCY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	.	.	3	9%	3	8%
Energy Star	1	25%	10	30%	11	30%
NA	.	.	1	3%	1	3%
Non Energy Star	3	75%	19	58%	22	59%
	4	*100%*	*33*	*100%*	*37*	*100%*

Table B.2.103

	bName					
	Multi_Family		Single_Family			
NUM MICROWAVES	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	100%	38	90%	43	91%
2	.	.	4	10%	4	9%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.104

	bName					
	Multi_Family		Single_Family			
DEHUMIDIFIER	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
NA	.	.	1	3%	1	2%
No	4	80%	21	58%	25	61%
Yes	1	20%	14	39%	15	37%
	5	*100%*	*36*	*100%*	*41*	*100%*

Table B.2.105

	bName					
	Multi_Family		Single_Family			
DEHUMIDFIER MAKE MODEL	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
COOLERATOR	.	.	1	11%	1	10%
Comfort Care	1	100%	.	.	1	10%
Coolerator	.	.	1	11%	1	10%
GE	.	.	1	11%	1	10%
JCPENNY	.	.	1	11%	1	10%
Kenmore	.	.	1	11%	1	10%
Little Giant	.	.	1	11%	1	10%
Sears	.	.	1	11%	1	10%

	bName					
	Multi_Family		Single_Family			
DEHUMIDFIER MAKE MODEL	Frequency	Percent	Frequency	Percent	Frequency	Percent
Whirlpool	.	.	2	22%	2	20%
	1	*100%*	*9*	*100%*	*10*	*100%*

Table B.2.106

	bName					
	Multi_Family		Single_Family			
DEHUMIDIFIER AGE	Frequency	Percent	Frequency	Percent	Frequency	Percent
1 year	1	100%	.	.	1	11%
10 yrs old	.	.	1	13%	1	11%
15	.	.	1	13%	1	11%
20 years	.	.	1	13%	1	11%
25	.	.	1	13%	1	11%
3 years	.	.	1	13%	1	11%
4	.	.	1	13%	1	11%
7 - 8	.	.	1	13%	1	11%
8	.	.	1	13%	1	11%
	1	*100%*	*8*	*100%*	*9*	*100%*

Table B.2.107

	bName					
	Multi_Family		Single_Family			
DEHUMIDIFIER EFFICIENCY	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
DK/-99	1	50%	3	14%	4	17%
Energy Star	.	.	3	14%	3	13%
NA	1	50%	8	38%	9	39%
Non Energy Star	.	.	7	33%	7	30%
	2	*100%*	*21*	*100%*	*23*	*100%*

Table B.2.108

	bName					
	Multi_Family		Single_Family			
na_heat_system_model_primary	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
2TGB3F25A1000AB	.	.	1	3%	1	2%
58SXC080-JG	.	.	1	3%	1	2%
AGF 08C 05000	1	25%	.	.	1	2%
AZ28E12DAEM1	1	25%	.	.	1	2%
Air Command 90	.	.	1	3%	1	2%
BLU06E93640	.	.	1	3%	1	2%
BWV730A100D2	.	.	1	3%	1	2%
C23-41W-1	.	.	1	3%	1	2%
C8MPN100J20A1	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
na_heat_system_model_primary	Frequency	Percent	Frequency	Percent	Frequency	Percent
CCJ-125-D3	.	.	1	3%	1	2%
CUB080A938C2	.	.	1	3%	1	2%
DGRT070AUA	.	.	1	3%	1	2%
EVCON	.	.	1	3%	1	2%
EXECUTIVE HE	.	.	1	3%	1	2%
Elite G26R3/4-125-5	.	.	1	3%	1	2%
FE4ANF003000AAAA	.	.	1	3%	1	2%
FF1ENP018	1	25%	.	.	1	2%
G20q3/4e-100	.	.	1	3%	1	2%
G3RA144A-20	.	.	1	3%	1	2%
GM9S060B12DH11H	.	.	1	3%	1	2%
GMV95	.	.	1	3%	1	2%
GUX090X35B	.	.	1	3%	1	2%
H8MPV100J20A1	.	.	1	3%	1	2%
M/N IL115D48A	.	.	1	3%	1	2%
MDE24-F10D21F-3	1	25%	.	.	1	2%
MG-055A	.	.	1	3%	1	2%
N9MP1	.	.	1	3%	1	2%
NA	.	.	2	5%	2	5%
NDGG100DF03	.	.	1	3%	1	2%
NTC5100BFE1	.	.	1	3%	1	2%
P2CGD08N06501A	.	.	1	3%	1	2%
PCCU-LD08N080B	.	.	1	3%	1	2%
PCG-5R	.	.	1	3%	1	2%

	bName					
	Multi_Family		Single_Family			
na_heat_system_model_primary	Frequency	Percent	Frequency	Percent	Frequency	Percent
PG8MAA042090	.	.	1	3%	1	2%
RGTA10EZAJS	.	.	1	3%	1	2%
Sieglermatic 777	.	.	1	3%	1	2%
TG95080B12MP11A	.	.	1	3%	1	2%
TUX080C942C2	.	.	1	3%	1	2%
TXC043C4HPCO	.	.	1	3%	1	2%
XE80	.	.	1	3%	1	2%
	4	*100%*	*37*	*100%*	*41*	*100%*

Table B.2.109

	bName					
	Multi_Family		Single_Family			
na_cooling_system_model_primary	Frequency	Percent	Frequency	Percent	Frequency	Percent
2TTB3024A1	.	.	1	3%	1	3%
38TRA036	.	.	1	3%	1	3%
7B0023B100A1	.	.	1	3%	1	3%
A6Y18F7A-L	.	.	1	3%	1	3%
AZ28E12DABM1	1	25%	.	.	1	3%
BTD730A100B0	.	.	1	3%	1	3%
CA5530VKD2	.	.	1	3%	1	3%
CAC236AKA4	.	.	1	3%	1	3%
CKJ3P-1B	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_cooling_system_model_primary	Frequency	Percent	Frequency	Percent	Frequency	Percent
CM 24-41 T	.	.	1	3%	1	3%
Consaire	1	25%	.	.	1	3%
Cool Zone	.	.	1	3%	1	3%
ES036S1ANBSSB	.	.	1	3%	1	3%
Evcon (cooler 10)	.	.	1	3%	1	3%
FF1ENP018	1	25%	.	.	1	3%
GSC130301AE	.	.	1	3%	1	3%
GSC14	.	.	1	3%	1	3%
H1DA030506A	.	.	1	3%	1	3%
H2RA036S06A	.	.	1	3%	1	3%
HS26-036-2P	.	.	1	3%	1	3%
HS29 048 IP	.	.	1	3%	1	3%
HS29-030-1P	.	.	1	3%	1	3%
HS29-411-1P	.	.	1	3%	1	3%
M/N A6D18E7A	.	.	1	3%	1	3%
M/N HS23-411-1P	.	.	1	3%	1	3%
MWF1	1	25%	.	.	1	3%
NAC236AKC3	.	.	1	3%	1	3%
NAC248GKC3	.	.	1	3%	1	3%
PA10JA036-C	.	.	1	3%	1	3%
PA12NA030	.	.	1	3%	1	3%
RAMB036JAZ	.	.	1	3%	1	3%
RCC42A2B	.	.	1	3%	1	3%
SP023AM	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_cooling_system_model_primary	Frequency	Percent	Frequency	Percent	Frequency	Percent
TTD730B100A1	.	.	1	3%	1	3%
TTP030D100A0	.	.	1	3%	1	3%
TTR030C100A4	.	.	1	3%	1	3%
TTR036C100A1	.	.	1	3%	1	3%
	4	*100%*	*33*	*100%*	*37*	*100%*

Table B.2.110

	bName					
	Multi_Family		Single_Family			
na_wh_model_1	Frequency	Percent	Frequency	Percent	Frequency	Percent
153.332441	.	.	1	3%	1	3%
153.335550	.	.	1	3%	1	3%
5V30S-2	.	.	1	3%	1	3%
5V40-36F	.	.	1	3%	1	3%
5V40-7	.	.	1	3%	1	3%
5V50-2	.	.	1	3%	1	3%
630DOLS	1	50%	.	.	1	3%
640NORT	.	.	1	3%	1	3%
650NORT	.	.	1	3%	1	3%
6G40S-3671	.	.	1	3%	1	3%
8MV40-2D	.	.	1	3%	1	3%
BFG6140T403N0V	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_wh_model_1	Frequency	Percent	Frequency	Percent	Frequency	Percent
DRV 40 NORTO	.	.	1	3%	1	3%
E1F50RD045V	.	.	1	3%	1	3%
E62-40H-045DV	.	.	1	3%	1	3%
ECS 40 20	1	50%	.	.	1	3%
ECS 50 200	.	.	1	3%	1	3%
FCG 40 246	.	.	1	3%	1	3%
FCG40246	.	.	1	3%	1	3%
FCG40248	.	.	1	3%	1	3%
FG1J404073NOV	.	.	1	3%	1	3%
G1F4033S3NV	.	.	1	3%	1	3%
G51-40S33-3NV	.	.	1	3%	1	3%
GCV40200	.	.	2	6%	2	6%
GG40T6A	.	.	1	3%	1	3%
GIF5040T3NV	.	.	1	3%	1	3%
HN4X50X960	.	.	1	3%	1	3%
MI30S6EN10	.	.	1	3%	1	3%
MI30T6FBN4	.	.	1	3%	1	3%
NA	.	.	1	3%	1	3%
PR640NORS	.	.	1	3%	1	3%
PV5210RS70	.	.	1	3%	1	3%
Power Miser 9	.	.	1	3%	1	3%
R75LS	.	.	1	3%	1	3%
	2	*100%*	*33*	*100%*	*35*	*100%*

Table B.2.111

	bName					
	Multi_Family		Single_Family			
na_clothes_dryer_model	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
110.66642500	.	.	1	3%	1	3%
110.67422600	.	.	1	3%	1	3%
110.76975830	.	.	1	3%	1	3%
110.87475130	.	.	1	3%	1	3%
110.88090600	.	.	1	3%	1	3%
111	.	.	1	3%	1	3%
86082110	.	.	1	3%	1	3%
ALE866SAC	.	.	1	3%	1	3%
Atlantis MDG6200AWW	.	.	1	3%	1	3%
DCCB330EG4WC	1	33%	.	.	1	3%
DE400KDW-4	.	.	1	3%	1	3%
DRL448SBLWW	.	.	1	3%	1	3%
FDGB23RGS0	.	.	1	3%	1	3%
FGR231AS4	.	.	1	3%	1	3%
Heavy Duty SE1000	.	.	1	3%	1	3%
Kenmore	.	.	1	3%	1	3%
LE02152H50	.	.	1	3%	1	3%
LEQ8000J013	.	.	1	3%	1	3%
LER5624DQO	.	.	1	3%	1	3%
LGR5620KQ1	.	.	1	3%	1	3%
LSE1000	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_clothes_dryer_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
LSG9900	.	.	1	3%	1	3%
MD0942919	.	.	1	3%	1	3%
MDE2301AYW	.	.	1	3%	1	3%
MDE2600AYW	.	.	1	3%	1	3%
MDE3500AYW	.	.	1	3%	1	3%
MDG9206AWW	.	.	1	3%	1	3%
MED5600TQ0	.	.	1	3%	1	3%
MEDB700VQO	.	.	1	3%	1	3%
NA	1	33%	1	3%	2	6%
RES7745RQ0	.	.	1	3%	1	3%
WSM2700HAWW	1	33%	.	.	1	3%
	3	*100%*	*30*	*100%*	*33*	*100%*

Table B.2.112

	bName			
	Single_Family			
na_clothes_washer_model	Frequency	Percent	Frequency	Percent
ALW480DAC	1	11%	1	11%
Bravo Quiet	1	11%	1	11%
FWS833AS2	1	11%	1	11%
LSG9900	1	11%	1	11%
MAH6500AWW	1	11%	1	11%

	bName			
	Single_Family			
na_clothes_washer_model	Frequency	Percent	Frequency	Percent
MAV3905AWW	1	11%	1	11%
MTW5600TQ1	1	11%	1	11%
NA	2	22%	2	22%
	9	*100%*	*9*	*100%*

Table B.2.113

	bName					
	Multi_Family		Single_Family			
na_refrigerator_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
106.55622500	.	.	1	3%	1	3%
106.59439800	.	.	1	3%	1	3%
106.70204990	.	.	1	3%	1	3%
106.77297790	.	.	1	3%	1	3%
253.68979801	.	.	1	3%	1	3%
596.53462300	.	.	1	3%	1	3%
ATB1710DRW	.	.	1	3%	1	3%
ATB2232MRW01	.	.	1	3%	1	3%
ED20TKXDN01	.	.	1	3%	1	3%
ED22DQA1	.	.	1	3%	1	3%
ED2FHAXS004	.	.	1	3%	1	3%
ET1FTTXKQO2	.	.	1	3%	1	3%
ET20DKXBW00	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_refrigerator_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
ETICHEXVQ00	.	.	1	3%	1	3%
FRT18S6JS4	.	.	1	3%	1	3%
GLRT183TDBD	.	.	1	3%	1	3%
GS55HAXJB01	.	.	1	3%	1	3%
GSS22VGMCWW	.	.	1	3%	1	3%
GTS18JBPRRCC	.	.	1	3%	1	3%
HTS18BBPWLWW	1	25%	.	.	1	3%
HTV15WNCWW	1	25%	.	.	1	3%
JRSD246	.	.	1	3%	1	3%
NA	.	.	1	3%	1	3%
No Frost TBF19ZC	.	.	1	3%	1	3%
PTB21530RW	.	.	1	3%	1	3%
R817KA-1A	.	.	1	3%	1	3%
RT14DKXAW00	1	25%	.	.	1	3%
RT18AKXQ09	.	.	1	3%	1	3%
RTD1900DAE	.	.	1	3%	1	3%
TBX18IIZKRWW	.	.	1	3%	1	3%
TBX18PGB	.	.	1	3%	1	3%
TBXW19ZP	.	.	1	3%	1	3%
TFXW24RMA	.	.	1	3%	1	3%
TG21VW	.	.	1	3%	1	3%
THI18TW	.	.	1	3%	1	3%
TPK180JNOD	.	.	1	3%	1	3%
TS22AFXKQ05	.	.	1	3%	1	3%

	bName					
	Multi_Family		Single_Family			
na_refrigerator_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
TT14DKXST00	1	25%	.	.	1	3%
TX21VW	.	.	1	3%	1	3%
WRT21NRB	.	.	1	3%	1	3%
	4	*100%*	*36*	*100%*	*40*	*100%*

Table B.2.114

	bName					
	Multi_Family		Single_Family			
na_freezer_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
106625220	.	.	1	13%	1	11%
253.29111990	.	.	1	13%	1	11%
253.9103281	.	.	1	13%	1	11%
253.9209381	.	.	1	13%	1	11%
FFC15C3AWO	.	.	1	13%	1	11%
HF18T	.	.	1	13%	1	11%
M/N AFFC1526DW3	.	.	1	13%	1	11%
MFC05M1FW1	1	100%	.	.	1	11%
MFU20F3GWS	.	.	1	13%	1	11%
	1	*100%*	*8*	*100%*	*9*	*100%*

Table B.2.115

	bName					
	Multi_Family		Single_Family			
na_dishwasher_model	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1514591	.	.	1	4%	1	3%
1779299	.	.	1	4%	1	3%
363.16129100	.	.	1	4%	1	3%
587.160792201	.	.	1	4%	1	3%
665.16029402	.	.	1	4%	1	3%
665.17352300	.	.	1	4%	1	3%
66513122k700	.	.	1	4%	1	3%
Custom 300	1	33%	.	.	1	3%
DU915PWPT2	.	.	1	4%	1	3%
DU930PWPQ2	.	.	1	4%	1	3%
DU930PWPQO	.	.	1	4%	1	3%
DU9400X	.	.	1	4%	1	3%
DU940QWDQ3	.	.	1	4%	1	3%
DU945PW02	.	.	1	4%	1	3%
DUB550X	.	.	1	4%	1	3%
Fisher & Paykel	.	.	1	4%	1	3%
GSD3435FOOWW	.	.	1	4%	1	3%
GSD5124D02BB	.	.	1	4%	1	3%
GSD5700G00WW	.	.	1	4%	1	3%
GSD980T-02	.	.	1	4%	1	3%
GU2200XTSB3	.	.	1	4%	1	3%
HDA 3400G02WW	1	33%	.	.	1	3%
KUD1220T2	.	.	1	4%	1	3%

	bName					
	Multi_Family		Single_Family			
na_dishwasher_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
KUDJ230YWH3	.	.	1	4%	1	3%
M/N ADB2500AWB	.	.	1	4%	1	3%
MDB6000AWA	.	.	1	4%	1	3%
MDB61004WW	.	.	1	4%	1	3%
MDB9100AWW	.	.	1	4%	1	3%
PLD4375RFC3	.	.	1	4%	1	3%
RUD3000KB1	1	33%	.	.	1	3%
kudm220t2	.	.	1	4%	1	3%
	3	*100%*	*28*	*100%*	*31*	*100%*

Table B.2.116

	bName					
	Multi_Family		Single_Family			
na_dehumidifier_model	Frequency	Percent	Frequency	Percent	Frequency	Percent
A52500XV	.	.	1	20%	1	17%
AD40JO	.	.	1	20%	1	17%
AK2500XZ	.	.	1	20%	1	17%
BHD-301-B	1	100%	.	.	1	17%
NA	.	.	1	20%	1	17%
VCMA-15ULS	.	.	1	20%	1	17%
	1	*100%*	*5*	*100%*	*6*	*100%*

Table B.2.117

	bName			
	Single_Family			
f4_age_of_air_source_heat_pump	**Frequency**	**Percent**	**Frequency**	**Percent**
20 years	1	25%	1	25%
20+	1	25%	1	25%
40+ years	1	25%	1	25%
8 years	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.2.118

	bName					
	Multi_Family		Single_Family			
f4_age_of_room_ac	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
15 years	1	100%	.	.	1	25%
4 yrs old	.	.	1	33%	1	25%
6	.	.	1	33%	1	25%
7 years	.	.	1	33%	1	25%
	1	*100%*	*3*	*100%*	*4*	*100%*

Table B.2.119

	bName			
	Single_Family			
e4_month_last_maintenance	**Frequency**	**Percent**	**Frequency**	**Percent**
July	1	33%	1	33%
October	1	33%	1	33%
annual	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.2.120

	bName			
	Single_Family			
e4_year_last_maintenance	**Frequency**	**Percent**	**Frequency**	**Percent**
2007	1	11%	1	11%
2008	2	22%	2	22%
2009	4	44%	4	44%
3-5 YRS	1	11%	1	11%
Annual Maintenance	1	11%	1	11%
	9	*100%*	*9*	*100%*

Table B.2.121

	bName			
	Single_Family			
na_clothes_washer_makemodel	**Frequency**	**Percent**	**Frequency**	**Percent**
AMANA	1	6%	1	6%
ELECTROLUX	1	6%	1	6%
FISHER & PAYKEL	1	6%	1	6%
Frigidaire	2	11%	2	11%
Kenmore	2	11%	2	11%
Maytag	8	44%	8	44%
NA	1	6%	1	6%
WHIRLPOOL	2	11%	2	11%
	18	*100%*	*18*	*100%*

Table B.2.122

	bName			
	Single_Family			
e3_secondary_heat_ing_system_typ	**Frequency**	**Percent**	**Frequency**	**Percent**
Natural gas fireplace	1	17%	1	17%
Only when it is peak winter - Amana G0C115X50B	1	17%	1	17%
gas fireplace in downstairs living room, and baseboard electric heater in smoke room	1	17%	1	17%
in basement -- rarely used	1	17%	1	17%
natural gas radiant space heater-fireplace	1	17%	1	17%

	bName			
	Single_Family			
e3_secondary_heat_ing_system_typ	Frequency	Percent	Frequency	Percent
used on front porch only	1	17%	1	17%
	6	*100%*	*6*	*100%*

Table B.2.123

	bName					
	Multi_Family		Single_Family			
b1_turn_off_lights_when_not_in_u	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	10	23%	10	20%
1	5	100%	34	77%	39	80%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.124

	bName					
	Multi_Family		Single_Family			
b1_replace_light_bulbs_with_comp	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	2	40%	18	41%	20	41%
1	3	60%	26	59%	29	59%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.125

	bName					
	Multi_Family		Single_Family			
b1_adjust_thermostat_setting_at_	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	80%	25	57%	29	59%
1	1	20%	19	43%	20	41%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.126

	bName					
	Multi_Family		Single_Family			
b1_adjust_thermostat_setting_whe	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	3	60%	28	64%	31	63%
1	2	40%	16	36%	18	37%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.127

	bName					
	Multi_Family		Single_Family			
b1_reduce_thermostat_setting_in_	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	80%	25	57%	29	59%
1	1	20%	19	43%	20	41%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.128

	bName					
	Multi_Family		Single_Family			
b1_increase_thermostat_setting_i	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	80%	29	66%	33	67%
1	1	20%	15	34%	16	33%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.129

	bName					
	Multi_Family		Single_Family			
b1_installed_programmable_thermo	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	37	84%	42	86%

	bName					
	Multi_Family		Single_Family			
b1_installed_programmable_thermo	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	7	16%	7	14%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.130

	bName					
	Multi_Family		Single_Family			
b1_unplug_adapters_and_charging_	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	4	80%	29	66%	33	67%
1	1	20%	15	34%	16	33%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.131

	bName					
	Multi_Family		Single_Family			
b1_unplug_electronic_devices_wit	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	5	100%	40	91%	45	92%
1	.	.	4	9%	4	8%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.132

	bName					
	Multi_Family		Single_Family			
b1_purchase_energy_efficient_app	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	80%	34	77%	38	78%
1	1	20%	10	23%	11	22%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.133

	bName					
	Multi_Family		Single_Family			
b1_take_shorter_showers	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	3	60%	31	70%	34	69%
1	2	40%	13	30%	15	31%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.134

	bName					
	Multi_Family		Single_Family			
b1_increase_level_of_insulation	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	37	84%	42	86%

	bName					
	Multi_Family		Single_Family			
b1_increase_level_of_insulation	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	7	16%	7	14%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.135

	bName					
	Multi_Family		Single_Family			
b1_reduce_air_infiltration_or_le	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	4	80%	36	82%	40	82%
1	1	20%	8	18%	9	18%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.136

	bName					
	Multi_Family		Single_Family			
b1_other	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	4	80%	42	95%	46	94%
1	1	20%	2	5%	3	6%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.137

	bName					
	Multi_Family		Single_Family			
b2_primary_motive_to_reduce_ener	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Reduce pollution/carbon footprint	.	.	2	5%	2	4%
To save energy	.	.	3	7%	3	7%
To save money on utility bill	5	100%	36	88%	41	89%
	5	*100%*	*41*	*100%*	*46*	*100%*

Table B.2.138

	bName					
	Multi_Family		Single_Family			
b3_compact_flourescent_lights	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	20%	18	41%	19	39%
1	4	80%	26	59%	30	61%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.139

	bName					
	Multi_Family		Single_Family			
b3_central_ac	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	38	86%	43	88%
1	.	.	6	14%	6	12%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.140

	bName					
	Multi_Family		Single_Family			
b3_window_through_the_wall_ac	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	44	100%	49	100%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.141

	bName					
	Multi_Family		Single_Family			
b3_heat_pump	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	44	100%	49	100%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.142

	bName					
	Multi_Family		Single_Family			
b3_water_heater	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	36	82%	41	84%
1	.	.	8	18%	8	16%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.143

	bName					
	Multi_Family		Single_Family			
b3_refrigerator	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	35	80%	40	82%
1	.	.	9	20%	9	18%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.144

	bName					
	Multi_Family		Single_Family			
b3_dishwasher	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	5	100%	36	82%	41	84%

	bName					
	Multi_Family		Single_Family			
b3_dishwasher	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	8	18%	8	16%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.145

	bName					
	Multi_Family		Single_Family			
b3_clotheswasher	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	5	100%	40	91%	45	92%
1	.	.	4	9%	4	8%
	5	*100%*	*44*	*100%*	*49*	*100%*

Table B.2.146

	bName			
	Single_Family			
b3_other	Frequency	Percent	Frequency	Percent
Dryer	2	22%	2	22%
Dryer and Stove	1	11%	1	11%
Dryer and electric stove	1	11%	1	11%
Furnace	1	11%	1	11%

	bName			
	Single_Family			
b3_other	Frequency	Percent	Frequency	Percent
Power Strips	1	11%	1	11%
Stove, microwave	1	11%	1	11%
dehumidifier, low-flow toilets, reflective shield in attic	1	11%	1	11%
furnace, double-pane windows	1	11%	1	11%
	9	*100%*	*9*	*100%*

Table B.2.147

	bName					
	Multi_Family		Single_Family			
b4a_200_rating	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	4	100%	30	71%	34	74%
2	.	.	8	19%	8	17%
4	.	.	1	2%	1	2%
5	.	.	3	7%	3	7%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.2.148

	bName					
	Multi_Family		Single_Family			
b4a_250_rating	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	26	79%	27	79%
2	.	.	2	6%	2	6%
3	.	.	2	6%	2	6%
5	.	.	3	9%	3	9%
	1	*100%*	*33*	*100%*	*34*	*100%*

Table B.2.149

	bName					
	Multi_Family		Single_Family			
b4a_300_rating	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	26	81%	27	82%
2	.	.	1	3%	1	3%
3	.	.	2	6%	2	6%
4	.	.	1	3%	1	3%
5	.	.	2	6%	2	6%
	1	*100%*	*32*	*100%*	*33*	*100%*

Table B.2.150

	bName					
	Multi_Family		Single_Family			
b4b_rating	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	67%	6	14%	8	18%
2	.	.	5	12%	5	11%
3	.	.	5	12%	5	11%
4	.	.	5	12%	5	11%
5	1	33%	21	50%	22	49%
	3	*100%*	*42*	*100%*	*45*	*100%*

Table B.2.151

	bName					
	Multi_Family		Single_Family			
b5a_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	10	24%	11	23%
1 He is working to design a new home and is in the process of eventually moving.	.	.	1	2%	1	2%
2	.	.	3	7%	3	6%
3	.	.	4	10%	4	9%
4	2	40%	2	5%	4	9%
5	2	40%	22	52%	24	51%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.152

	bName					
	Multi_Family		Single_Family			
b5a_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	50%	2	12%	3	16%
2	.	.	2	12%	2	11%
3	.	.	2	12%	2	11%
5	1	50%	11	65%	12	63%
	2	*100%*	*17*	*100%*	*19*	*100%*

Table B.2.153

	bName					
	Multi_Family		Single_Family			
b5a_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	3	25%	4	31%
3	.	.	2	17%	2	15%
4	.	.	1	8%	1	8%
5	.	.	6	50%	6	46%
	1	*100%*	*12*	*100%*	*13*	*100%*

Table B.2.154

	bName					
	Multi_Family		Single_Family			
b5b_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	50%	26	62%	28	61%
2	1	25%	5	12%	6	13%
3	.	.	3	7%	3	7%
4	.	.	1	2%	1	2%
5	1	25%	7	17%	8	17%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.2.155

	bName					
	Multi_Family		Single_Family			
b5b_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	50%	7	37%	8	38%
2	.	.	2	11%	2	10%
3	.	.	3	16%	3	14%
4	.	.	2	11%	2	10%
5	1	50%	5	26%	6	29%
	2	*100%*	*19*	*100%*	*21*	*100%*

Table B.2.156

	bName					
	Multi_Family		Single_Family			
b5b_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	6	40%	7	44%
2	.	.	1	7%	1	6%
3	.	.	2	13%	2	13%
4	.	.	2	13%	2	13%
5	.	.	4	27%	4	25%
	1	*100%*	*15*	*100%*	*16*	*100%*

Table B.2.157

	bName					
	Multi_Family		Single_Family			
b5c_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	75%	22	54%	25	56%
2	.	.	5	12%	5	11%
3	.	.	3	7%	3	7%
4	.	.	2	5%	2	4%
5	1	25%	9	22%	10	22%
	4	*100%*	*41*	*100%*	*45*	*100%*

Table B.2.158

	bName					
	Multi_Family		Single_Family			
b5c_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	5	28%	6	32%
2	.	.	2	11%	2	11%
3	.	.	3	17%	3	16%
4	.	.	1	6%	1	5%
5	.	.	7	39%	7	37%
	1	*100%*	*18*	*100%*	*19*	*100%*

Table B.2.159

	bName					
	Multi_Family		Single_Family			
b5c_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	4	29%	5	33%
2	.	.	1	7%	1	7%
3	.	.	2	14%	2	13%
4	.	.	3	21%	3	20%
5	.	.	4	29%	4	27%
	1	*100%*	*14*	*100%*	*15*	*100%*

Table B.2.160

	bName					
	Multi_Family		Single_Family			
b5d_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	60%	19	45%	22	47%
2	.	.	6	14%	6	13%
3	1	20%	2	5%	3	6%
4	.	.	6	14%	6	13%
5	1	20%	9	21%	10	21%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.161

	bName					
	Multi_Family		Single_Family			
b5d_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	50%	3	14%	4	17%
3	1	50%	5	24%	6	26%
4	.	.	6	29%	6	26%
5	.	.	7	33%	7	30%
	2	*100%*	*21*	*100%*	*23*	*100%*

Table B.2.162

	bName					
	Multi_Family		Single_Family			
b5d_c	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	1	100%	3	20%	4	25%
3	.	.	2	13%	2	13%
4	.	.	4	27%	4	25%
5	.	.	6	40%	6	38%
	1	*100%*	*15*	*100%*	*16*	*100%*

Table B.2.163

	bName					
	Multi_Family		Single_Family			
b5e_a	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	2	40%	22	52%	24	51%
2	1	20%	5	12%	6	13%
3	1	20%	3	7%	4	9%
4	.	.	4	10%	4	9%
5	1	20%	8	19%	9	19%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.164

	bName					
	Multi_Family		Single_Family			
b5e_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	33%	3	17%	4	19%
3	1	33%	3	17%	4	19%
4	1	33%	8	44%	9	43%
5	.	.	4	22%	4	19%
	3	*100%*	*18*	*100%*	*21*	*100%*

Table B.2.165

	bName					
	Multi_Family		Single_Family			
b5e_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	33%	3	19%	4	21%
3	1	33%	1	6%	2	11%
4	.	.	6	38%	6	32%
5	1	33%	6	38%	7	37%
	3	*100%*	*16*	*100%*	*19*	*100%*

Table B.2.166

	bName					
	Multi_Family		Single_Family			
b5f_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	60%	27	64%	30	64%
2	.	.	2	5%	2	4%
3	1	20%	6	14%	7	15%
4	.	.	1	2%	1	2%
5	1	20%	6	14%	7	15%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.167

	bName					
	Multi_Family		Single_Family			
b5f_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	9	47%	10	50%
3	.	.	1	5%	1	5%
4	.	.	6	32%	6	30%
5	.	.	3	16%	3	15%
	1	*100%*	*19*	*100%*	*20*	*100%*

Table B.2.168

	bName					
	Multi_Family		Single_Family			
b5f_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	8	47%	9	50%
2	.	.	1	6%	1	6%
4	.	.	3	18%	3	17%
5	.	.	5	29%	5	28%
	1	*100%*	*17*	*100%*	*18*	*100%*

Table B.2.169

	bName					
	Multi_Family		Single_Family			
b6_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	75%	7	17%	10	22%
2	.	.	2	5%	2	4%
3	.	.	8	19%	8	17%
4	.	.	11	26%	11	24%
5	1	25%	14	33%	15	33%
	4	*100%*	*42*	*100%*	*46*	*100%*

Table B.2.170

	bName					
	Multi_Family		Single_Family			
b6_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	6	14%	7	15%
2	1	20%	6	14%	7	15%
3	1	20%	16	38%	17	36%
4	1	20%	4	10%	5	11%
5	1	20%	10	24%	11	23%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.171

	bName					
	Multi_Family		Single_Family			
b6_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	.	.	2	5%	2	4%
2	.	.	1	2%	1	2%
3	1	20%	2	5%	3	6%
4	.	.	8	19%	8	17%
5	4	80%	30	70%	34	71%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.172

	bName					
	Multi_Family		Single_Family			
b6_d	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	5	12%	6	13%
2	1	20%	2	5%	3	6%
3	.	.	13	30%	13	27%
4	2	40%	6	14%	8	17%
5	1	20%	17	40%	18	38%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.173

	bName					
	Multi_Family		Single_Family			
b6_e	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	5	12%	6	13%
2	1	20%	2	5%	3	6%
3	.	.	10	23%	10	21%
4	1	20%	10	23%	11	23%
5	2	40%	16	37%	18	38%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.174

	bName					
	Multi_Family		Single_Family			
b6_f	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	6	14%	7	15%
2	1	20%	4	9%	5	10%
3	.	.	9	21%	9	19%
4	.	.	11	26%	11	23%
5	3	60%	13	30%	16	33%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.175

	bName					
	Multi_Family		Single_Family			
b7_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	2%	1	2%
1	.	.	8	19%	8	17%
2	1	20%	5	12%	6	13%
3	2	40%	15	36%	17	36%
4	.	.	8	19%	8	17%
5	2	40%	5	12%	7	15%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.176

	bName					
	Multi_Family		Single_Family			
b7_b	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	2%	1	2%
1	2	40%	8	19%	10	21%
2	1	20%	5	12%	6	13%
3	.	.	7	17%	7	15%
4	.	.	8	19%	8	17%
5	2	40%	13	31%	15	32%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.177

	bName					
	Multi_Family		Single_Family			
b7_c	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	2%	1	2%
1	.	.	34	81%	34	72%
2	.	.	1	2%	1	2%
3	1	20%	.	.	1	2%
4	.	.	1	2%	1	2%

	bName					
	Multi_Family		Single_Family			
b7_c	Frequency	Percent	Frequency	Percent	Frequency	Percent
5	4	80%	5	12%	9	19%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.178

	bName					
	Multi_Family		Single_Family			
b7_d	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	.	.	1	2%	1	2%
1	3	60%	14	34%	17	37%
2	1	20%	8	20%	9	20%
3	.	.	3	7%	3	7%
4	.	.	7	17%	7	15%
5	1	20%	8	20%	9	20%
	5	*100%*	*41*	*100%*	*46*	*100%*

Table B.2.179

	bName					
	Multi_Family		Single_Family			
b7_e	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
0	.	.	1	2%	1	2%
1	1	20%	28	67%	29	62%
2	1	20%	7	17%	8	17%
3	.	.	3	7%	3	6%
4	1	20%	2	5%	3	6%
5	2	40%	1	2%	3	6%
	5	*100%*	*42*	*100%*	*47*	*100%*

Table B.2.180

	bName					
	Multi_Family		Single_Family			
b8_a	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
A particular measure may not be be allowed in the building	1	25%	.	.	1	6%
No other barriers exist	1	25%	5	42%	6	38%
None	.	.	1	8%	1	6%
Old age and future	.	.	1	8%	1	6%
Renter	1	25%	.	.	1	6%
Renting	.	.	1	8%	1	6%
elderly residents - not sure will outlive new appliances or retrofits	.	.	1	8%	1	6%

	bName					
	Multi_Family		Single_Family			
b8_a	Frequency	Percent	Frequency	Percent	Frequency	Percent
new rental - works a lot and not home much	.	.	1	8%	1	6%
not inclined to replace certain appliances until they fail	.	.	1	8%	1	6%
since residents are elderly, installation of new appliances is more difficult	.	.	1	8%	1	6%
works a lot - not home that much	1	25%	.	.	1	6%
	4	*100%*	*12*	*100%*	*16*	*100%*

Table B.2.181

	bName					
	Multi_Family		Single_Family			
b6_g	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	.	.	9	21%	9	19%
2	2	40%	6	14%	8	17%
3	.	.	6	14%	6	13%
4	.	.	9	21%	9	19%
5	3	60%	13	30%	16	33%
	5	*100%*	*43*	*100%*	*48*	*100%*

Table B.2.182

	bName					
	Multi_Family		Single_Family			
lighting_total_num_rooms_in_hous	Frequency	Percent	Frequency	Percent	Frequency	Percent
10	.	.	2	6%	2	5%
11	.	.	2	6%	2	5%
13	.	.	2	6%	2	5%
19	.	.	1	3%	1	3%
4	2	50%	1	3%	3	8%
5	1	25%	4	12%	5	13%
6	.	.	4	12%	4	11%
7	1	25%	4	12%	5	13%
8	.	.	6	18%	6	16%
9	.	.	8	24%	8	21%
	4	*100%*	*34*	*100%*	*38*	*100%*

B.3 – Commercial On-Site

Table B.3.1

bName	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Education	9	12.68	9	12.68
Grocery	2	2.82	11	15.49
Health	6	8.45	17	23.94
Large_Office	6	8.45	23	32.39
Lodging	3	4.23	26	36.62
Miscellaneous	8	11.27	34	47.89
Restaurant	6	8.45	40	56.34
Retail	17	23.94	57	80.28
Small_Office	9	12.68	66	92.96
Warehouse	5	7.04	71	100.00

Table B.3.2

	RespType			
	Commercial On-Site			
Multiple Single Building (M,S) coding	**Frequency**	**Percent**	**Frequency**	**Percent**
Single building	53	75%	53	75%

	RespType			
	Commercial On-Site			
Multiple Single Building (M,S) coding	**Frequency**	**Percent**	**Frequency**	**Percent**
Multiple building	18	25%	18	25%
	71	*100%*	*71*	*100%*

Table B.3.3

	RespType			
	Commercial On-Site			
Gross Floor Area	**Frequency**	**Percent**	**Frequency**	**Percent**
500	1	1%	1	1%
750	1	1%	1	1%
800	1	1%	1	1%
900	1	1%	1	1%
1400	1	1%	1	1%
1500	4	6%	4	6%
2000	3	4%	3	4%
2100	2	3%	2	3%
2400	1	1%	1	1%
2500	1	1%	1	1%
3000	2	3%	2	3%
3500	1	1%	1	1%
3900	1	1%	1	1%
4000	2	3%	2	3%

	RespType			
	Commercial On-Site			
Gross Floor Area	Frequency	Percent	Frequency	Percent
4200	2	3%	2	3%
5000	3	4%	3	4%
5500	1	1%	1	1%
6000	1	1%	1	1%
7600	1	1%	1	1%
8650	1	1%	1	1%
9450	1	1%	1	1%
10000	1	1%	1	1%
10100	1	1%	1	1%
10608	1	1%	1	1%
11000	1	1%	1	1%
11500	1	1%	1	1%
12000	4	6%	4	6%
15000	1	1%	1	1%
17000	1	1%	1	1%
18000	1	1%	1	1%
20000	2	3%	2	3%
23000	2	3%	2	3%
25000	1	1%	1	1%
30000	1	1%	1	1%
30400	1	1%	1	1%
35000	1	1%	1	1%
38000	1	1%	1	1%
40000	3	4%	3	4%

	RespType			
	Commercial On-Site			
Gross Floor Area	Frequency	Percent	Frequency	Percent
50000	1	1%	1	1%
60000	1	1%	1	1%
65000	1	1%	1	1%
77000	1	1%	1	1%
100000	1	1%	1	1%
101500	1	1%	1	1%
108000	1	1%	1	1%
110000	1	1%	1	1%
130000	1	1%	1	1%
156816	1	1%	1	1%
170000	1	1%	1	1%
250000	1	1%	1	1%
348480	1	1%	1	1%
439000	2	3%	2	3%
	71	*100%*	*71*	*100%*

Table B.3.4

	RespType			
	Commercial On-Site			
Predominant Heating Fuel	Frequency	Percent	Frequency	Percent
Electricity	13	18%	13	18%
Natural Gas	57	80%	57	80%

	RespType			
	Commercial On-Site			
Predominant Heating Fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
Other	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.5

	RespType			
	Commercial On-Site			
Nbr of Floors Above Grade	**Frequency**	**Percent**	**Frequency**	**Percent**
1	49	70%	49	70%
2	10	14%	10	14%
3	8	11%	8	11%
4	2	3%	2	3%
5	1	1%	1	1%
	70	*100%*	*70*	*100%*

Table B.3.6

	RespType			
	Commercial On-Site			
Nbr of Floors Below Grade	**Frequency**	**Percent**	**Frequency**	**Percent**
0	52	74%	52	74%
1	17	24%	17	24%

	RespType			
	Commercial On-Site			
Nbr of Floors Below Grade	Frequency	Percent	Frequency	Percent
2	1	1%	1	1%
	70	*100%*	*70*	*100%*

Table B.3.7

	RespType			
	Commercial On-Site			
Primary Functional Use	Frequency	Percent	Frequency	Percent
1 FD S	3	5%	3	5%
10 OTH	9	16%	9	16%
3 OFF	12	21%	12	21%
4 RTL	10	17%	10	17%
6 EDU	7	12%	7	12%
9 WHS	17	29%	17	29%
	58	*100%*	*58*	*100%*

Table B.3.8

	RespType			
	Commercial On-Site			
Primary Functional Use % OF TOTAL SQFT	Frequency	Percent	Frequency	Percent
12	1	2%	1	2%

	RespType			
	Commercial On-Site			
Primary Functional Use % OF TOTAL SQFT	Frequency	Percent	Frequency	Percent
40	2	3%	2	3%
50	4	7%	4	7%
60	3	5%	3	5%
70	9	15%	9	15%
72	1	2%	1	2%
75	4	7%	4	7%
77	1	2%	1	2%
78	1	2%	1	2%
80	4	7%	4	7%
85	6	10%	6	10%
90	8	14%	8	14%
95	1	2%	1	2%
97.6	1	2%	1	2%
99	2	3%	2	3%
100	11	19%	11	19%
	59	*100%*	*59*	*100%*

Table B.3.9

	RespType			
	Commercial On-Site			
Secondary Functional Use	Frequency	Percent	Frequency	Percent
1 FD S	4	8%	4	8%

	RespType			
	Commercial On-Site			
Secondary Functional Use	Frequency	Percent	Frequency	Percent
10 OTH	7	15%	7	15%
3 OFF	18	38%	18	38%
4 RTL	8	17%	8	17%
9 WHS	11	23%	11	23%
	48	*100%*	*48*	*100%*

Table B.3.10

	RespType			
	Commercial On-Site			
Secondary Functional Use % OF TOTAL SQFT	Frequency	Percent	Frequency	Percent
1	2	4%	2	4%
2.4	1	2%	1	2%
4	1	2%	1	2%
5	1	2%	1	2%
6	3	6%	3	6%
10	10	21%	10	21%
11	1	2%	1	2%
12	1	2%	1	2%
13	2	4%	2	4%
15	6	13%	6	13%
20	4	8%	4	8%
22	1	2%	1	2%
25	3	6%	3	6%

	RespType			
	Commercial On-Site			
Secondary Functional Use % OF TOTAL SQFT	Frequency	Percent	Frequency	Percent
30	5	10%	5	10%
35	2	4%	2	4%
39	1	2%	1	2%
40	3	6%	3	6%
49	1	2%	1	2%
	48	*100%*	*48*	*100%*

Table B.3.11

	RespType			
	Commercial On-Site			
Tertiary Functional Use	Frequency	Percent	Frequency	Percent
1 FD S	6	27%	6	27%
3 OFF	13	59%	13	59%
4 RTL	1	5%	1	5%
9 WHS	2	9%	2	9%
	22	*100%*	*22*	*100%*

Table B.3.12

	RespType			
	Commercial On-Site			
Tertiary Functional Use % OF TOTAL SQFT	**Frequency**	**Percent**	**Frequency**	**Percent**
0	3	12%	3	12%
1	2	8%	2	8%
2	2	8%	2	8%
3	2	8%	2	8%
5	7	28%	7	28%
6	1	4%	1	4%
8	1	4%	1	4%
9	1	4%	1	4%
10	3	12%	3	12%
20	2	8%	2	8%
25	1	4%	1	4%
	25	*100%*	*25*	*100%*

Table B.3.13

	RespType			
	Commercial On-Site			
Common Area Functional Use	**Frequency**	**Percent**	**Frequency**	**Percent**
13 LOB	19	100%	19	100%
	19	*100%*	*19*	*100%*

Table B.3.14

	RespType			
	Commercial On-Site			
Common Area % OF TOTAL SQFT	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	11%	2	11%
1	2	11%	2	11%
2	1	5%	1	5%
3	1	5%	1	5%
4	1	5%	1	5%
5	5	26%	5	26%
7	1	5%	1	5%
10	3	16%	3	16%
20	2	11%	2	11%
82	1	5%	1	5%
	19	*100%*	*19*	*100%*

Table B.3.15

	RespType			
	Commercial On-Site			
Cooled Square Feet(% of sqft)	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	1%	1	1%
5	1	1%	1	1%

	RespType			
	Commercial On-Site			
Cooled Square Feet(% of sqft)	Frequency	Percent	Frequency	Percent
10	4	6%	4	6%
20	2	3%	2	3%
22	1	1%	1	1%
25	3	4%	3	4%
30	2	3%	2	3%
50	7	10%	7	10%
65	1	1%	1	1%
70	1	1%	1	1%
80	6	8%	6	8%
83	1	1%	1	1%
90	1	1%	1	1%
96	1	1%	1	1%
97	1	1%	1	1%
97.6	1	1%	1	1%
100	37	52%	37	52%
	71	*100%*	*71*	*100%*

Table B.3.16

	RespType			
	Commercial On-Site			
Heated Square Feet(% of sqft)	Frequency	Percent	Frequency	Percent
10	4	6%	4	6%

	RespType			
	Commercial On-Site			
Heated Square Feet(% of sqft)	**Frequency**	**Percent**	**Frequency**	**Percent**
20	2	3%	2	3%
22	1	1%	1	1%
25	1	1%	1	1%
30	2	3%	2	3%
50	5	7%	5	7%
65	1	1%	1	1%
70	1	1%	1	1%
80	2	3%	2	3%
90	1	1%	1	1%
95	3	4%	3	4%
97.6	1	1%	1	1%
100	47	66%	47	66%
	71	*100%*	*71*	*100%*

Table B.3.17

	RespType			
	Commercial On-Site			
Unconditioned Area(% of sqft)	**Frequency**	**Percent**	**Frequency**	**Percent**
0	48	68%	48	68%
2.4	1	1%	1	1%
5	3	4%	3	4%
20	2	3%	2	3%

	RespType			
	Commercial On-Site			
Unconditioned Area(% of sqft)	Frequency	Percent	Frequency	Percent
30	1	1%	1	1%
35	1	1%	1	1%
50	5	7%	5	7%
70	2	3%	2	3%
75	1	1%	1	1%
78	1	1%	1	1%
80	2	3%	2	3%
90	4	6%	4	6%
	71	*100%*	*71*	*100%*

Table B.3.18

	RespType			
	Commercial On-Site			
Vacant Area(% of sqft)	Frequency	Percent	Frequency	Percent
0	58	100%	58	100%
	58	*100%*	*58*	*100%*

Table B.3.19

	RespType			
	Commercial On-Site			
Primary wall surface type	**Frequency**	**Percent**	**Frequency**	**Percent**
B	40	56%	40	56%
C	8	11%	8	11%
CB	8	11%	8	11%
M	4	6%	4	6%
W	11	15%	11	15%
	71	*100%*	*71*	*100%*

Table B.3.20

	RespType			
	Commercial On-Site			
Average Layers of Glazing	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	1%	1	1%
1	23	32%	23	32%
1.25	1	1%	1	1%
1.3333333	1	1%	1	1%
1.5	1	1%	1	1%
1.6666667	1	1%	1	1%
2	43	61%	43	61%
	71	*100%*	*71*	*100%*

Table B.3.21

	RespType			
	Commercial On-Site			
Predominant Window Glaze Type	**Frequency**	**Percent**	**Frequency**	**Percent**
C	57	83%	57	83%
O	1	1%	1	1%
R	1	1%	1	1%
T	10	14%	10	14%
	69	*100%*	*69*	*100%*

Table B.3.22

	RespType			
	Commercial On-Site			
Predominant Frame Type	**Frequency**	**Percent**	**Frequency**	**Percent**
M	45	65%	45	65%
V	8	12%	8	12%
W	16	23%	16	23%
	69	*100%*	*69*	*100%*

Table B.3.23

	RespType			
	Commercial On-Site			
Primary Roof Surface Construction Code	**Frequency**	**Percent**	**Frequency**	**Percent**
Built-up	20	28%	20	28%
Membrane	18	25%	18	25%
Metal	10	14%	10	14%
Shingle	23	32%	23	32%
	71	*100%*	*71*	*100%*

Table B.3.24

	RespType			
	Commercial On-Site			
Are there skylights?	**Frequency**	**Percent**	**Frequency**	**Percent**
0	68	96%	68	96%
1	3	4%	3	4%
	71	*100%*	*71*	*100%*

Table B.3.25

	RespType			
	Commercial On-Site			
WINDAREA_PCT	Frequency	Percent	Frequency	Percent
0	1	1%	1	1%
0.25	1	1%	1	1%
0.75	1	1%	1	1%
1	1	1%	1	1%
1.5	1	1%	1	1%
1.75	1	1%	1	1%
2.5	4	6%	4	6%
3	1	1%	1	1%
3.75	2	3%	2	3%
4	1	1%	1	1%
5	3	4%	3	4%
5.5	1	1%	1	1%
5.75	1	1%	1	1%
6	1	1%	1	1%
7.5	2	3%	2	3%
10	5	7%	5	7%
11.25	1	1%	1	1%
12	1	1%	1	1%
12.5	6	8%	6	8%
13.875	1	1%	1	1%
14.5	1	1%	1	1%

	RespType			
	Commercial On-Site			
WINDAREA_PCT	Frequency	Percent	Frequency	Percent
15	5	7%	5	7%
17.5	4	6%	4	6%
17.75	1	1%	1	1%
18.75	1	1%	1	1%
20	5	7%	5	7%
21.25	2	3%	2	3%
22.5	4	6%	4	6%
25	4	6%	4	6%
26.25	1	1%	1	1%
30	3	4%	3	4%
35	1	1%	1	1%
42.5	1	1%	1	1%
50	2	3%	2	3%
	71	*100%*	*71*	*100%*

Table B.3.26

	RespType			
	Commercial On-Site			
Rf_Typ	Frequency	Percent	Frequency	Percent
Flat	43	61%	43	61%
Pitch	28	39%	28	39%
	71	*100%*	*71*	*100%*

Table B.3.27

	RespType			
	Commercial On-Site			
Fl_Typ	**Frequency**	**Percent**	**Frequency**	**Percent**
Basement	17	25%	17	25%
Crawl	3	4%	3	4%
Slab	46	69%	46	69%
Unconditioned	1	1%	1	1%
	67	*100%*	*67*	*100%*

Table B.3.28

	RespType			
	Commercial On-Site			
Central Air Handler age (Oldest Air Handler)	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	13%	1	13%
13	1	13%	1	13%
19	1	13%	1	13%
20	2	25%	2	25%
30	1	13%	1	13%
32	1	13%	1	13%

	RespType			
	Commercial On-Site			
Central Air Handler age (Oldest Air Handler)	Frequency	Percent	Frequency	Percent
40	1	13%	1	13%
	8	*100%*	*8*	*100%*

Table B.3.29

	RespType			
	Commercial On-Site			
Central Chiller Age (Oldest Chiller)	Frequency	Percent	Frequency	Percent
6	1	33%	1	33%
13	1	33%	1	33%
20	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.3.30

	RespType			
	Commercial On-Site			
Boiler Age (Oldest Boiler)	Frequency	Percent	Frequency	Percent
5	1	10%	1	10%
10	1	10%	1	10%
13	1	10%	1	10%

	RespType			
	Commercial On-Site			
Boiler Age (Oldest Boiler)	Frequency	Percent	Frequency	Percent
20	3	30%	3	30%
24	1	10%	1	10%
32	1	10%	1	10%
43	1	10%	1	10%
52	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.31

	RespType			
	Commercial On-Site			
Central Boiler Fuel	Frequency	Percent	Frequency	Percent
2 NG	11	100%	11	100%
	11	*100%*	*11*	*100%*

Table B.3.32

	RespType			
	Commercial On-Site			
Average Boiler Capacity	Frequency	Percent	Frequency	Percent
100	1	14%	1	14%
275	1	14%	1	14%

	RespType			
	Commercial On-Site			
Average Boiler Capacity	Frequency	Percent	Frequency	Percent
862.5	1	14%	1	14%
1000	1	14%	1	14%
1709	1	14%	1	14%
2750000	1	14%	1	14%
6431500	1	14%	1	14%
	7	*100%*	*7*	*100%*

Table B.3.33

	RespType			
	Commercial On-Site			
Average Packaged HVAC SYSTEM VINTAGE	Frequency	Percent	Frequency	Percent
0.1386139	1	2%	1	2%
1	2	4%	2	4%
1.7142857	1	2%	1	2%
2	3	6%	3	6%
3	3	6%	3	6%
3.5	1	2%	1	2%
3.9797297	1	2%	1	2%
5	3	6%	3	6%
5.1666667	1	2%	1	2%
6	1	2%	1	2%
6.2	1	2%	1	2%

	RespType			
	Commercial On-Site			
Average Packaged HVAC SYSTEM VINTAGE	Frequency	Percent	Frequency	Percent
6.5	1	2%	1	2%
7.3	1	2%	1	2%
7.3818182	1	2%	1	2%
7.5	1	2%	1	2%
7.6648045	1	2%	1	2%
8	3	6%	3	6%
10	1	2%	1	2%
10.352941	1	2%	1	2%
11	1	2%	1	2%
11.04712	1	2%	1	2%
11.217391	1	2%	1	2%
11.333333	1	2%	1	2%
11.5	1	2%	1	2%
12	3	6%	3	6%
13	1	2%	1	2%
13.333333	1	2%	1	2%
13.960784	1	2%	1	2%
14	1	2%	1	2%
14.961538	1	2%	1	2%
15	1	2%	1	2%
17	2	4%	2	4%
18	1	2%	1	2%
18.05	1	2%	1	2%
20	1	2%	1	2%

	RespType			
	Commercial On-Site			
Average Packaged HVAC SYSTEM VINTAGE	Frequency	Percent	Frequency	Percent
26	1	2%	1	2%
29.333333	1	2%	1	2%
30	2	4%	2	4%
31.837209	1	2%	1	2%
37	1	2%	1	2%
41.55	1	2%	1	2%
	54	*100%*	*54*	*100%*

Table B.3.34

	RespType			
	Commercial On-Site			
Average Packaged HVAC SYSTEM VINTAGE	Frequency	Percent	Frequency	Percent
1	2	4%	2	4%
1.4285714	1	2%	1	2%
1.7777778	1	2%	1	2%
2	3	7%	3	7%
3	4	9%	4	9%
4	1	2%	1	2%
4.5	1	2%	1	2%
5	2	4%	2	4%
5.2857143	1	2%	1	2%
6.5	1	2%	1	2%

	RespType			
	Commercial On-Site			
Average Packaged HVAC SYSTEM VINTAGE	Frequency	Percent	Frequency	Percent
6.75	1	2%	1	2%
6.967033	1	2%	1	2%
7.5	1	2%	1	2%
8	4	9%	4	9%
9	1	2%	1	2%
9.75	1	2%	1	2%
10	1	2%	1	2%
10.653846	1	2%	1	2%
11.285714	1	2%	1	2%
12	3	7%	3	7%
13.16513	1	2%	1	2%
14	2	4%	2	4%
15	2	4%	2	4%
16	1	2%	1	2%
17	2	4%	2	4%
18	1	2%	1	2%
26	1	2%	1	2%
28	1	2%	1	2%
34.307692	1	2%	1	2%
37	1	2%	1	2%
	45	*100%*	*45*	*100%*

Table B.3.35

	RespType			
	Commercial On-Site			
Primary HVAC system	**Frequency**	**Percent**	**Frequency**	**Percent**
BOILER/CHILLER	3	6%	3	6%
BOILER ONLY	7	13%	7	13%
PKG:HEAT/DX COOL	35	66%	35	66%
AIR-AIR HT PUMP	2	4%	2	4%
DX COOL ONLY	2	4%	2	4%
UNIT HEAT/AC	2	4%	2	4%
UNIT HT ONLY	1	2%	1	2%
UNIT CL ONLY	1	2%	1	2%
	53	*100%*	*53*	*100%*

Table B.3.36

	RespType			
	Commercial On-Site			
Pri HVAC sys: heat fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
1 ELEC	16	28%	16	28%
2 NG	40	69%	40	69%
5 Pur. HW or Steam	2	3%	2	3%
	58	*100%*	*58*	*100%*

Table B.3.37

	RespType			
	Commercial On-Site			
Pri HVAC sys: cool fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
1 ELEC	45	85%	45	85%
NOCOOL	8	15%	8	15%
	53	*100%*	*53*	*100%*

Table B.3.38

	RespType			
	Commercial On-Site			
Pri HVAC sys: heat eqpt	**Frequency**	**Percent**	**Frequency**	**Percent**
AIRS-HTPMP	2	4%	2	4%
FURNACE	35	67%	35	67%
H & C-WUNIT	2	4%	2	4%
HTW-BOIL	5	10%	5	10%
NOHEAT	2	4%	2	4%
STM-BOIL	5	10%	5	10%
UNIT-HEAT	1	2%	1	2%
	52	*100%*	*52*	*100%*

Table B.3.39

	RespType			
	Commercial On-Site			
Pri HVAC sys: cool eqpt	**Frequency**	**Percent**	**Frequency**	**Percent**
ABS-CHILL	1	2%	1	2%
AIRS-HTPMP	2	4%	2	4%
CENT-CHILL	2	4%	2	4%
DX-UNIT	37	71%	37	71%
H & C-WUNIT	2	4%	2	4%
NOCOOL	8	15%	8	15%
	52	*100%*	*52*	*100%*

Table B.3.40

	RespType			
	Commercial On-Site			
Pri HVAC sys: distribution system	**Frequency**	**Percent**	**Frequency**	**Percent**
MZS-CONVOL	1	1%	1	1%
SDS-CONVOL	57	84%	57	84%
SDS-VARVOL	3	4%	3	4%
UNITARY	7	10%	7	10%
	68	*100%*	*68*	*100%*

Table B.3.41

	RespType			
	Commercial On-Site			
Secondary HVAC system	**Frequency**	**Percent**	**Frequency**	**Percent**
PKG:HEAT/DX COOL	3	60%	3	60%
DX COOL ONLY	1	20%	1	20%
UNIT CL ONLY	1	20%	1	20%
	5	*100%*	*5*	*100%*

Table B.3.42

	RespType			
	Commercial On-Site			
Sec HVAC sys: cool fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
1 ELEC	5	100%	5	100%
	5	*100%*	*5*	*100%*

Table B.3.43

	RespType			
	Commercial On-Site			
Supplemental heat fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
1 ELEC	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.44

	RespType			
	Commercial On-Site			
Sqft with supplemental heat	**Frequency**	**Percent**	**Frequency**	**Percent**
3500	1	50%	1	50%
12000	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.45

	RespType			
	Commercial On-Site			
% Distribution with Economizers (Packaged)	**Frequency**	**Percent**	**Frequency**	**Percent**
0	42	88%	42	88%

	RespType			
	Commercial On-Site			
% Distribution with Economizers (Packaged)	Frequency	Percent	Frequency	Percent
11.111111	1	2%	1	2%
33.333333	1	2%	1	2%
40	1	2%	1	2%
50	1	2%	1	2%
91.666667	1	2%	1	2%
100	1	2%	1	2%
	48	*100%*	*48*	*100%*

Table B.3.46

	RespType			
	Commercial On-Site			
Yes No: 'Electric Baseboard'	Frequency	Percent	Frequency	Percent
0	66	93%	66	93%
1	5	7%	5	7%
	71	*100%*	*71*	*100%*

Table B.3.47

	RespType			
	Commercial On-Site			
Yes No: 'Water Boiler'	Frequency	Percent	Frequency	Percent
0	66	93%	66	93%
1	5	7%	5	7%
	71	*100%*	*71*	*100%*

Table B.3.48

	RespType			
	Commercial On-Site			
Yes No: 'Steam Boiler'	Frequency	Percent	Frequency	Percent
0	65	92%	65	92%
1	6	8%	6	8%
	71	*100%*	*71*	*100%*

Table B.3.49

	RespType			
	Commercial On-Site			
Yes No: 'Furnace'	Frequency	Percent	Frequency	Percent
1	59	100%	59	100%
	59	*100%*	*59*	*100%*

Table B.3.50

	RespType			
	Commercial On-Site			
Yes No Controls:'None'	Frequency	Percent	Frequency	Percent
0	64	100%	64	100%
	64	*100%*	*64*	*100%*

Table B.3.51

	RespType			
	Commercial On-Site			
Yes No Controls:'Thermostatic (Manual)'	Frequency	Percent	Frequency	Percent
0	19	30%	19	30%

	RespType			
	Commercial On-Site			
Yes No Controls:'Thermostatic (Manual)'	Frequency	Percent	Frequency	Percent
1	45	70%	45	70%
	64	*100%*	*64*	*100%*

Table B.3.52

	RespType			
	Commercial On-Site			
Yes No Controls:'Thermostatic (Programmable) w Night Set-Back'	Frequency	Percent	Frequency	Percent
0	44	69%	44	69%
1	20	31%	20	31%
	64	*100%*	*64*	*100%*

Table B.3.53

	RespType			
	Commercial On-Site			
Yes No Controls:'Timeclock (on off)'	Frequency	Percent	Frequency	Percent
0	64	100%	64	100%
	64	*100%*	*64*	*100%*

Table B.3.54

	RespType			
	Commercial On-Site			
Yes No Controls:'EMCS'	**Frequency**	**Percent**	**Frequency**	**Percent**
0	59	92%	59	92%
1	5	8%	5	8%
	64	*100%*	*64*	*100%*

Table B.3.55

	RespType			
	Commercial On-Site			
Yes No Controls:'On Off Switch'	**Frequency**	**Percent**	**Frequency**	**Percent**
0	56	88%	56	88%
1	8	13%	8	13%
	64	*100%*	*64*	*100%*

Table B.3.56

	RespType			
	Commercial On-Site			
Predominant Hot Water Eqpt Type	**Frequency**	**Percent**	**Frequency**	**Percent**
Self-Contained	52	84%	52	84%
Storage Tank (Central Boiler)	10	16%	10	16%
	62	*100%*	*62*	*100%*

Table B.3.57

	RespType			
	Commercial On-Site			
Predominant Hot Water Fuel	**Frequency**	**Percent**	**Frequency**	**Percent**
1 ELEC	33	55%	33	55%
2 NG	27	45%	27	45%
	60	*100%*	*60*	*100%*

Table B.3.58

	RespType			
	Commercial On-Site			
Tank Insulation	**Frequency**	**Percent**	**Frequency**	**Percent**
0	63	97%	63	97%

	RespType			
	Commercial On-Site			
Tank Insulation	Frequency	Percent	Frequency	Percent
1	2	3%	2	3%
	65	*100%*	*65*	*100%*

Table B.3.59

	RespType			
	Commercial On-Site			
WH_Count	Frequency	Percent	Frequency	Percent
0	3	4%	3	4%
1	39	57%	39	57%
2	13	19%	13	19%
3	6	9%	6	9%
4	2	3%	2	3%
6	1	1%	1	1%
8	1	1%	1	1%
13	2	3%	2	3%
19	1	1%	1	1%
60	1	1%	1	1%
	69	*100%*	*69*	*100%*

Table B.3.60

	RespType			
	Commercial On-Site			
WH_Age	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	4%	2	4%
2	4	7%	4	7%
3	3	5%	3	5%
4.3333333	1	2%	1	2%
5	6	11%	6	11%
6	3	5%	3	5%
7	4	7%	4	7%
8	2	4%	2	4%
8.5	1	2%	1	2%
10	6	11%	6	11%
12	4	7%	4	7%
12.5	1	2%	1	2%
13	1	2%	1	2%
14	3	5%	3	5%
15	6	11%	6	11%
17	2	4%	2	4%
18	1	2%	1	2%
19	1	2%	1	2%
21	1	2%	1	2%
25	2	4%	2	4%
27	1	2%	1	2%
	55	*100%*	*55*	*100%*

Table B.3.61

	RespType			
	Commercial On-Site			
WH_Capacity	Frequency	Percent	Frequency	Percent
2.75	1	2%	1	2%
6	3	5%	3	5%
10	1	2%	1	2%
12	1	2%	1	2%
15	1	2%	1	2%
17	1	2%	1	2%
20	1	2%	1	2%
22.5	1	2%	1	2%
23	1	2%	1	2%
23.5	1	2%	1	2%
27.5	1	2%	1	2%
28	1	2%	1	2%
30	12	18%	12	18%
32	1	2%	1	2%
34	1	2%	1	2%
40	11	17%	11	17%
45	1	2%	1	2%
50	7	11%	7	11%
52	1	2%	1	2%
53	1	2%	1	2%

	RespType			
	Commercial On-Site			
WH_Capacity	Frequency	Percent	Frequency	Percent
60	1	2%	1	2%
63.666667	1	2%	1	2%
66.666667	1	2%	1	2%
74.5	1	2%	1	2%
80	1	2%	1	2%
91	2	3%	2	3%
99.5	2	3%	2	3%
100	3	5%	3	5%
115	1	2%	1	2%
119	1	2%	1	2%
119.66667	1	2%	1	2%
277.5	1	2%	1	2%
	65	*100%*	*65*	*100%*

Table B.3.62

	RespType			
	Commercial On-Site			
Indoor Lighting Watts per Square Foot	Frequency	Percent	Frequency	Percent
0.0037879	1	1%	1	1%
0.0396667	1	1%	1	1%
0.0426667	1	1%	1	1%
0.048	1	1%	1	1%

	RespType			
	Commercial On-Site			
Indoor Lighting Watts per Square Foot	Frequency	Percent	Frequency	Percent
0.0560308	1	1%	1	1%
0.05866	1	1%	1	1%
0.164	1	1%	1	1%
0.1696833	1	1%	1	1%
0.1797138	1	1%	1	1%
0.2453333	1	1%	1	1%
0.2777778	1	1%	1	1%
0.3291429	1	1%	1	1%
0.34	2	3%	2	3%
0.3627778	1	1%	1	1%
0.3932673	1	1%	1	1%
0.4082005	2	3%	2	3%
0.4266667	1	1%	1	1%
0.4349412	1	1%	1	1%
0.4408	1	1%	1	1%
0.4568923	1	1%	1	1%
0.4570909	1	1%	1	1%
0.4734392	1	1%	1	1%
0.5128571	1	1%	1	1%
0.5398261	1	1%	1	1%
0.5547826	1	1%	1	1%
0.5918	1	1%	1	1%
0.692	1	1%	1	1%
0.7266995	1	1%	1	1%

	RespType			
	Commercial On-Site			
Indoor Lighting Watts per Square Foot	Frequency	Percent	Frequency	Percent
0.7270588	1	1%	1	1%
0.7447619	1	1%	1	1%
0.75	1	1%	1	1%
0.770625	1	1%	1	1%
0.7761538	1	1%	1	1%
0.82496	1	1%	1	1%
0.8285714	1	1%	1	1%
0.88	1	1%	1	1%
0.8861053	1	1%	1	1%
0.9336	1	1%	1	1%
0.9478333	1	1%	1	1%
0.9926087	1	1%	1	1%
1.078	1	1%	1	1%
1.1515	1	1%	1	1%
1.155	2	3%	2	3%
1.168	1	1%	1	1%
1.1809524	1	1%	1	1%
1.222	1	1%	1	1%
1.2342105	1	1%	1	1%
1.28	1	1%	1	1%
1.2816667	1	1%	1	1%
1.2958571	1	1%	1	1%
1.3326316	1	1%	1	1%
1.3352727	1	1%	1	1%

	RespType			
	Commercial On-Site			
Indoor Lighting Watts per Square Foot	Frequency	Percent	Frequency	Percent
1.4195376	1	1%	1	1%
1.5392	1	1%	1	1%
1.56	1	1%	1	1%
1.5706667	1	1%	1	1%
1.5742338	1	1%	1	1%
1.6	1	1%	1	1%
1.6253333	1	1%	1	1%
2.00512	1	1%	1	1%
2.1333333	1	1%	1	1%
2.2893333	1	1%	1	1%
2.56	1	1%	1	1%
2.7375	1	1%	1	1%
2.991	1	1%	1	1%
3.5567273	1	1%	1	1%
3.5568	1	1%	1	1%
4.1666667	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.63

	RespType			
	Commercial On-Site			
Total Indoor Lighting Wattage	**Frequency**	**Percent**	**Frequency**	**Percent**
272	1	1%	1	1%
476	1	1%	1	1%
800	1	1%	1	1%
820	1	1%	1	1%
1020	1	1%	1	1%
1038	1	1%	1	1%
1050	1	1%	1	1%
1152	1	1%	1	1%
1280	1	1%	1	1%
1320	1	1%	1	1%
1440	1	1%	1	1%
1564	1	1%	1	1%
1600	1	1%	1	1%
1760	1	1%	1	1%
1800	1	1%	1	1%
2154	1	1%	1	1%
2156	1	1%	1	1%
2204	1	1%	1	1%
2438	1	1%	1	1%
2480	1	1%	1	1%
2560	1	1%	1	1%
2920	1	1%	1	1%

	RespType			
	Commercial On-Site			
Total Indoor Lighting Wattage	Frequency	Percent	Frequency	Percent
2944	1	1%	1	1%
3027	1	1%	1	1%
3076	1	1%	1	1%
3434	1	1%	1	1%
3480	1	1%	1	1%
3750	1	1%	1	1%
3840	1	1%	1	1%
3972	1	1%	1	1%
4474	1	1%	1	1%
4606	1	1%	1	1%
4668	1	1%	1	1%
5000	1	1%	1	1%
5918	1	1%	1	1%
5982	1	1%	1	1%
6208	1	1%	1	1%
7284	1	1%	1	1%
7344	1	1%	1	1%
7394	1	1%	1	1%
9380	1	1%	1	1%
9424	1	1%	1	1%
10950	1	1%	1	1%
11374	1	1%	1	1%
12279	1	1%	1	1%
12760	1	1%	1	1%

	RespType			
	Commercial On-Site			
Total Indoor Lighting Wattage	Frequency	Percent	Frequency	Percent
14664	1	1%	1	1%
14665	1	1%	1	1%
22830	1	1%	1	1%
23088	1	1%	1	1%
28182	1	1%	1	1%
29698	1	1%	1	1%
30825	1	1%	1	1%
31200	1	1%	1	1%
32000	1	1%	1	1%
33672	1	1%	1	1%
39124	1	1%	1	1%
39180	1	1%	1	1%
40512	1	1%	1	1%
45355	1	1%	1	1%
46200	2	3%	2	3%
50280	1	1%	1	1%
71136	1	1%	1	1%
73760	1	1%	1	1%
82496	1	1%	1	1%
100256	1	1%	1	1%
121216	1	1%	1	1%
123600	1	1%	1	1%
179200	2	3%	2	3%
	71	*100%*	*71*	*100%*

Table B.3.64

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12	Frequency	Percent	Frequency	Percent
0	17	24%	17	24%
0.5824112	1	1%	1	1%
1.7701525	1	1%	1	1%
2.7173913	1	1%	1	1%
2.8677463	1	1%	1	1%
4.5045045	1	1%	1	1%
7.6726343	1	1%	1	1%
11.062907	1	1%	1	1%
13.160173	2	3%	2	3%
13.325886	1	1%	1	1%
13.334231	1	1%	1	1%
16.025641	1	1%	1	1%
16.237315	1	1%	1	1%
22.077922	1	1%	1	1%
27.576884	1	1%	1	1%
29.712163	1	1%	1	1%
36.243822	1	1%	1	1%
38.78866	1	1%	1	1%
40.436075	1	1%	1	1%
41.289023	1	1%	1	1%
50.914877	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12	Frequency	Percent	Frequency	Percent
50.948774	1	1%	1	1%
55	1	1%	1	1%
57.81866	1	1%	1	1%
63.846154	1	1%	1	1%
67.437875	1	1%	1	1%
68.292683	1	1%	1	1%
68.75	1	1%	1	1%
70	1	1%	1	1%
71.232877	1	1%	1	1%
77.139352	1	1%	1	1%
80.952381	1	1%	1	1%
85.266458	1	1%	1	1%
87.28466	1	1%	1	1%
90.666667	1	1%	1	1%
92.053843	1	1%	1	1%
92.087216	1	1%	1	1%
92.60274	1	1%	1	1%
93.755069	1	1%	1	1%
94.192377	1	1%	1	1%
95.172105	1	1%	1	1%
95.373514	1	1%	1	1%
95.486459	1	1%	1	1%
96.801706	1	1%	1	1%
97.701149	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12	Frequency	Percent	Frequency	Percent
100	9	13%	9	13%
	71	*100%*	*71*	*100%*

Table B.3.65

	RespType			
	Commercial On-Site			
% COUNT%: Fluorescent T12	Frequency	Percent	Frequency	Percent
0	17	24%	17	24%
0.9345794	1	1%	1	1%
1.6666667	1	1%	1	1%
3.4722222	1	1%	1	1%
4.8192771	1	1%	1	1%
8.1071797	1	1%	1	1%
8.6956522	1	1%	1	1%
11.794872	1	1%	1	1%
18.181818	1	1%	1	1%
21.428571	1	1%	1	1%
21.83908	1	1%	1	1%
25.938567	2	3%	2	3%
33.333333	1	1%	1	1%
33.870968	1	1%	1	1%
42.477876	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT%: Fluorescent T12	Frequency	Percent	Frequency	Percent
44.565217	1	1%	1	1%
48.708487	1	1%	1	1%
48.806366	1	1%	1	1%
53.067993	1	1%	1	1%
53.731343	1	1%	1	1%
57.142857	1	1%	1	1%
59.405941	1	1%	1	1%
61.363636	1	1%	1	1%
66.4	1	1%	1	1%
75	1	1%	1	1%
76.470588	1	1%	1	1%
77.777778	2	3%	2	3%
78.974895	1	1%	1	1%
80	1	1%	1	1%
84.615385	1	1%	1	1%
85.148515	1	1%	1	1%
85.217391	1	1%	1	1%
88.655462	1	1%	1	1%
90.659341	1	1%	1	1%
91.803279	1	1%	1	1%
92.145015	1	1%	1	1%
92.592593	1	1%	1	1%
93.548387	2	3%	2	3%
93.902439	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT%: Fluorescent T12	Frequency	Percent	Frequency	Percent
95.491803	1	1%	1	1%
95.604396	1	1%	1	1%
96.153846	1	1%	1	1%
97.844828	1	1%	1	1%
100	9	13%	9	13%
	71	*100%*	*71*	*100%*

Table B.3.66

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8 Energy Efficient	Frequency	Percent	Frequency	Percent
0	41	58%	41	58%
0.7197481	1	1%	1	1%
1.6632017	1	1%	1	1%
2.4850158	1	1%	1	1%
2.7164686	1	1%	1	1%
5.8076225	1	1%	1	1%
6.4267352	1	1%	1	1%
6.7886719	1	1%	1	1%
7.0136986	1	1%	1	1%
9.7493036	1	1%	1	1%
20.047733	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8 Energy Efficient	Frequency	Percent	Frequency	Percent
34.344617	1	1%	1	1%
35.370611	1	1%	1	1%
45.652174	1	1%	1	1%
46.259802	1	1%	1	1%
51.068434	1	1%	1	1%
52.271567	1	1%	1	1%
65.473146	1	1%	1	1%
76.609646	1	1%	1	1%
76.878613	1	1%	1	1%
80	1	1%	1	1%
82.133115	1	1%	1	1%
84.200447	1	1%	1	1%
86.800422	1	1%	1	1%
88.017429	1	1%	1	1%
98.423548	1	1%	1	1%
100	5	7%	5	7%
	71	*100%*	*71*	*100%*

Table B.3.67

	RespType			
	Commercial On-Site			
% COUNT%: Fluorescent T8 Energy Efficient	Frequency	Percent	Frequency	Percent
0	41	58%	41	58%
0.9259259	1	1%	1	1%
3.2786885	1	1%	1	1%
5.8441558	1	1%	1	1%
6.4516129	1	1%	1	1%
8.6820084	1	1%	1	1%
10	1	1%	1	1%
10.084034	1	1%	1	1%
11.290323	1	1%	1	1%
13.793103	1	1%	1	1%
29.850746	1	1%	1	1%
32.919255	1	1%	1	1%
43.542435	1	1%	1	1%
44.736842	1	1%	1	1%
50.60241	1	1%	1	1%
65.584416	1	1%	1	1%
69.565217	1	1%	1	1%
86.666667	2	3%	2	3%
90.656132	1	1%	1	1%
90.780142	1	1%	1	1%
93.735499	1	1%	1	1%
94.392523	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT%: Fluorescent T8 Energy Efficient	Frequency	Percent	Frequency	Percent
98.039216	1	1%	1	1%
98.207885	1	1%	1	1%
99.217639	1	1%	1	1%
100	5	7%	5	7%
	71	*100%*	*71*	*100%*

Table B.3.68

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent Other	Frequency	Percent	Frequency	Percent
0	47	66%	47	66%
0.2772003	1	1%	1	1%
0.3213368	1	1%	1	1%
0.3835616	1	1%	1	1%
0.4076878	1	1%	1	1%
0.5702067	1	1%	1	1%
0.7872245	1	1%	1	1%
0.9102731	1	1%	1	1%
0.973236	1	1%	1	1%
1.0994381	1	1%	1	1%
1.5151515	1	1%	1	1%
1.8181818	2	3%	2	3%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent Other	Frequency	Percent	Frequency	Percent
2.2988506	1	1%	1	1%
2.7355623	1	1%	1	1%
4.5135406	1	1%	1	1%
4.8278945	1	1%	1	1%
5.8408862	1	1%	1	1%
6.6852368	1	1%	1	1%
9.3333333	1	1%	1	1%
14.563107	1	1%	1	1%
15.151825	1	1%	1	1%
26.153846	1	1%	1	1%
36.590522	1	1%	1	1%
48.931566	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.69

	RespType			
	Commercial On-Site			
% COUNT % : Fluorescent Other	Frequency	Percent	Frequency	Percent
0	47	66%	47	66%
0.8101852	1	1%	1	1%
0.8333333	1	1%	1	1%
1.2605042	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT % : Fluorescent Other	Frequency	Percent	Frequency	Percent
1.3921114	1	1%	1	1%
1.6666667	1	1%	1	1%
1.8126888	1	1%	1	1%
2.2988506	1	1%	1	1%
2.3872679	1	1%	1	1%
2.6315789	1	1%	1	1%
3.8461538	1	1%	1	1%
4.3956044	1	1%	1	1%
6.0606061	1	1%	1	1%
7.1672355	2	3%	2	3%
8.1967213	1	1%	1	1%
8.9108911	1	1%	1	1%
11.924686	1	1%	1	1%
13.043478	1	1%	1	1%
13.157895	1	1%	1	1%
19.354839	1	1%	1	1%
20	1	1%	1	1%
27.2	1	1%	1	1%
56.457565	1	1%	1	1%
57.919255	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.70

	RespType			
	Commercial On-Site			
% WATTS: Incandescent	Frequency	Percent	Frequency	Percent
0	30	42%	30	42%
0.5345688	1	1%	1	1%
0.9201513	1	1%	1	1%
1.5764524	1	1%	1	1%
1.6366612	1	1%	1	1%
1.910017	1	1%	1	1%
2.4736674	1	1%	1	1%
3.1982942	1	1%	1	1%
3.6926323	1	1%	1	1%
5.2105949	1	1%	1	1%
5.2716951	1	1%	1	1%
5.3225463	1	1%	1	1%
5.7660626	1	1%	1	1%
10	1	1%	1	1%
12.225705	1	1%	1	1%
12.71534	1	1%	1	1%
17.899761	1	1%	1	1%
19.047619	1	1%	1	1%
23.121387	1	1%	1	1%
24.672709	1	1%	1	1%
25.814053	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: Incandescent	Frequency	Percent	Frequency	Percent
26.85422	1	1%	1	1%
28.767123	1	1%	1	1%
30	1	1%	1	1%
31.25	1	1%	1	1%
31.707317	1	1%	1	1%
42.049934	1	1%	1	1%
43.773992	1	1%	1	1%
45	1	1%	1	1%
45.623521	1	1%	1	1%
48	1	1%	1	1%
51.630435	1	1%	1	1%
53.853296	1	1%	1	1%
59.563925	1	1%	1	1%
61.21134	1	1%	1	1%
63.719116	1	1%	1	1%
77.922078	1	1%	1	1%
81.558442	2	3%	2	3%
92.020967	1	1%	1	1%
95.591543	1	1%	1	1%
100	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.71

	RespType			
	Commercial On-Site			
% COUNT %: Incandescent	Frequency	Percent	Frequency	Percent
0	30	42%	30	42%
0.3480278	1	1%	1	1%
0.41841	1	1%	1	1%
0.7823613	1	1%	1	1%
1.025641	1	1%	1	1%
1.2295082	1	1%	1	1%
1.2366884	1	1%	1	1%
1.7316017	1	1%	1	1%
2.1551724	1	1%	1	1%
2.5830258	1	1%	1	1%
2.8455285	1	1%	1	1%
3.776435	1	1%	1	1%
5.9405941	1	1%	1	1%
6.4	1	1%	1	1%
6.4516129	1	1%	1	1%
7.4074074	1	1%	1	1%
8.7912088	1	1%	1	1%
11.304348	1	1%	1	1%
11.956522	1	1%	1	1%
12.437811	1	1%	1	1%
13.333333	1	1%	1	1%
14.166667	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT %: Incandescent	Frequency	Percent	Frequency	Percent
15.217391	1	1%	1	1%
15.384615	1	1%	1	1%
15.929204	1	1%	1	1%
20.588235	1	1%	1	1%
22.222222	2	3%	2	3%
35.483871	1	1%	1	1%
38.636364	1	1%	1	1%
42.857143	1	1%	1	1%
44.578313	1	1%	1	1%
46.268657	1	1%	1	1%
49.019608	1	1%	1	1%
52.631579	1	1%	1	1%
59.74026	1	1%	1	1%
66.211604	2	3%	2	3%
66.666667	1	1%	1	1%
86.666667	1	1%	1	1%
94.444444	1	1%	1	1%
100	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.72

	RespType			
	Commercial On-Site			
% WATTS: Misc	**Frequency**	**Percent**	**Frequency**	**Percent**
0	64	90%	64	90%
0.0337382	1	1%	1	1%
0.131406	1	1%	1	1%
0.2045827	1	1%	1	1%
2.507837	1	1%	1	1%
10.212418	1	1%	1	1%
13.221957	1	1%	1	1%
52	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.73

	RespType			
	Commercial On-Site			
% COUNT %: Misc	**Frequency**	**Percent**	**Frequency**	**Percent**
0	60	85%	60	85%
0.3472222	1	1%	1	1%
0.5128205	1	1%	1	1%
0.5494505	1	1%	1	1%
0.5973716	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT %: Misc	Frequency	Percent	Frequency	Percent
1.9480519	1	1%	1	1%
2.9411765	1	1%	1	1%
3.4782609	1	1%	1	1%
4.6728972	1	1%	1	1%
6.3664596	1	1%	1	1%
6.5217391	1	1%	1	1%
50.980392	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.74

	RespType			
	Commercial On-Site			
% WATTS: HID	Frequency	Percent	Frequency	Percent
0	59	83%	59	83%
3.4632035	2	3%	2	3%
11.137629	1	1%	1	1%
13.199578	1	1%	1	1%
20	1	1%	1	1%
20.194821	1	1%	1	1%
40.406761	1	1%	1	1%
42.58037	1	1%	1	1%
47.728433	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: HID	Frequency	Percent	Frequency	Percent
57.990115	1	1%	1	1%
88.937093	1	1%	1	1%
93.555094	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.75

	RespType			
	Commercial On-Site			
% COUNT %: HID	Frequency	Percent	Frequency	Percent
0	58	82%	58	82%
0.6825939	2	3%	2	3%
1.1947431	1	1%	1	1%
1.9607843	1	1%	1	1%
1.9721578	1	1%	1	1%
2.265861	1	1%	1	1%
4.6434494	1	1%	1	1%
6.4935065	1	1%	1	1%
9.2198582	1	1%	1	1%
12.987013	1	1%	1	1%
40.594059	1	1%	1	1%
48.708487	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT %: HID	Frequency	Percent	Frequency	Percent
62.068966	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.76

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 4FT	Frequency	Percent	Frequency	Percent
0	7	13%	7	13%
1.6	1	2%	1	2%
4.7202797	1	2%	1	2%
11.976048	1	2%	1	2%
16.176471	1	2%	1	2%
18.181818	2	4%	2	4%
19.230769	1	2%	1	2%
28.74589	1	2%	1	2%
43.396226	1	2%	1	2%
45.182724	1	2%	1	2%
52.071006	1	2%	1	2%
61.276596	1	2%	1	2%
64.483483	1	2%	1	2%
66.666667	1	2%	1	2%
71.283355	1	2%	1	2%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 4FT	Frequency	Percent	Frequency	Percent
71.972318	1	2%	1	2%
72.630174	1	2%	1	2%
77.911647	1	2%	1	2%
83.082707	1	2%	1	2%
84.375	1	2%	1	2%
86.363636	1	2%	1	2%
88.439306	1	2%	1	2%
99.801193	1	2%	1	2%
100	24	44%	24	44%
	54	*100%*	*54*	*100%*

Table B.3.77

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 4FT	Frequency	Percent	Frequency	Percent
0	7	13%	7	13%
2.3809524	1	2%	1	2%
7.1428571	1	2%	1	2%
16.949153	1	2%	1	2%
18.181818	1	2%	1	2%
22.44898	1	2%	1	2%
25	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 4FT	Frequency	Percent	Frequency	Percent
26.315789	1	2%	1	2%
41.37931	1	2%	1	2%
50	1	2%	1	2%
53.488372	1	2%	1	2%
59.259259	1	2%	1	2%
62.559242	1	2%	1	2%
73.160173	1	2%	1	2%
73.333333	1	2%	1	2%
77.911647	1	2%	1	2%
78.26087	1	2%	1	2%
82.403433	1	2%	1	2%
85.245902	1	2%	1	2%
85.714286	1	2%	1	2%
89.655172	1	2%	1	2%
90.47619	1	2%	1	2%
93.103448	1	2%	1	2%
99.735099	1	2%	1	2%
100	24	44%	24	44%
	54	*100%*	*54*	*100%*

Table B.3.78

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 8FT	Frequency	Percent	Frequency	Percent
0	35	65%	35	65%
9.375	1	2%	1	2%
11.560694	1	2%	1	2%
13.636364	1	2%	1	2%
16.917293	1	2%	1	2%
27.369826	1	2%	1	2%
28.027682	1	2%	1	2%
35.516517	1	2%	1	2%
38.723404	1	2%	1	2%
47.928994	1	2%	1	2%
54.817276	1	2%	1	2%
56.603774	1	2%	1	2%
70.455613	1	2%	1	2%
80.769231	1	2%	1	2%
83.823529	1	2%	1	2%
91.783217	1	2%	1	2%
98.4	1	2%	1	2%
100	3	6%	3	6%
	54	*100%*	*54*	*100%*

Table B.3.79

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 8FT	Frequency	Percent	Frequency	Percent
0	35	65%	35	65%
4.7619048	1	2%	1	2%
6.8965517	1	2%	1	2%
9.5238095	1	2%	1	2%
10.344828	1	2%	1	2%
14.754098	1	2%	1	2%
17.596567	1	2%	1	2%
21.73913	1	2%	1	2%
26.839827	1	2%	1	2%
37.440758	1	2%	1	2%
40.740741	1	2%	1	2%
46.511628	1	2%	1	2%
57.471264	1	2%	1	2%
73.684211	1	2%	1	2%
77.55102	1	2%	1	2%
83.333333	1	2%	1	2%
97.619048	1	2%	1	2%
100	3	6%	3	6%
	54	*100%*	*54*	*100%*

Table B.3.80

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 1 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	40	74%	40	74%
0.1325381	1	2%	1	2%
0.5988024	1	2%	1	2%
0.7984969	1	2%	1	2%
2.0026702	1	2%	1	2%
4.845815	1	2%	1	2%
5.3254438	1	2%	1	2%
5.6711858	1	2%	1	2%
15.625	1	2%	1	2%
20	1	2%	1	2%
30.30303	1	2%	1	2%
73.076923	1	2%	1	2%
100	3	6%	3	6%
	54	*100%*	*54*	*100%*

Table B.3.81

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 1 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	40	74%	40	74%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 1 lamp	Frequency	Percent	Frequency	Percent
0.1324503	1	2%	1	2%
0.8474576	1	2%	1	2%
1.1494253	1	2%	1	2%
1.2875536	1	2%	1	2%
4.845815	1	2%	1	2%
5.2132701	1	2%	1	2%
6.4935065	1	2%	1	2%
14.285714	1	2%	1	2%
20	1	2%	1	2%
30.30303	1	2%	1	2%
68.421053	1	2%	1	2%
100	3	6%	3	6%
	54	*100%*	*54*	*100%*

Table B.3.82

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 2 lamp	Frequency	Percent	Frequency	Percent
0	12	22%	12	22%
13.595934	1	2%	1	2%
14.950166	1	2%	1	2%
16.917293	1	2%	1	2%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 2 lamp	Frequency	Percent	Frequency	Percent
18.181818	1	2%	1	2%
22.088353	1	2%	1	2%
25.367156	1	2%	1	2%
26.060606	1	2%	1	2%
26.923077	1	2%	1	2%
28.027682	1	2%	1	2%
41.935484	1	2%	1	2%
45.445866	1	2%	1	2%
57.142857	1	2%	1	2%
58.490566	1	2%	1	2%
58.515573	1	2%	1	2%
60	1	2%	1	2%
66.666667	2	4%	2	4%
69.69697	1	2%	1	2%
70.455613	1	2%	1	2%
80	1	2%	1	2%
84.375	1	2%	1	2%
92.215569	1	2%	1	2%
93.191489	1	2%	1	2%
94.674556	1	2%	1	2%
100	18	33%	18	33%
	54	*100%*	*54*	*100%*

Table B.3.83

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 2 lamp	Frequency	Percent	Frequency	Percent
0	12	22%	12	22%
10.344828	1	2%	1	2%
11.111111	2	4%	2	4%
14.285714	1	2%	1	2%
14.754098	1	2%	1	2%
16.309013	1	2%	1	2%
22.088353	1	2%	1	2%
26.060606	1	2%	1	2%
31.578947	1	2%	1	2%
38.095238	1	2%	1	2%
41.935484	1	2%	1	2%
48.837209	1	2%	1	2%
57.142857	1	2%	1	2%
57.471264	1	2%	1	2%
58.543046	1	2%	1	2%
60	1	2%	1	2%
66.666667	2	4%	2	4%
69.69697	1	2%	1	2%
80	1	2%	1	2%
85.714286	1	2%	1	2%
88.983051	1	2%	1	2%
91.304348	1	2%	1	2%
94.78673	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 2 lamp	Frequency	Percent	Frequency	Percent
100	18	33%	18	33%
	54	*100%*	*54*	*100%*

Table B.3.84

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 3 lamp	Frequency	Percent	Frequency	Percent
0	52	96%	52	96%
20	1	2%	1	2%
21.95122	1	2%	1	2%
	54	*100%*	*54*	*100%*

Table B.3.85

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 3 lamp	Frequency	Percent	Frequency	Percent
0	52	96%	52	96%
20	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 3 lamp	Frequency	Percent	Frequency	Percent
21.95122	1	2%	1	2%
	54	*100%*	*54*	*100%*

Table B.3.86

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 4 lamp	Frequency	Percent	Frequency	Percent
0	27	50%	27	50%
6.8085106	1	2%	1	2%
7.1856287	1	2%	1	2%
20	1	2%	1	2%
28.74589	1	2%	1	2%
33.333333	2	4%	2	4%
41.351889	1	2%	1	2%
41.509434	1	2%	1	2%
42.857143	1	2%	1	2%
48.882948	1	2%	1	2%
58.064516	1	2%	1	2%
71.972318	1	2%	1	2%
72.630174	1	2%	1	2%
73.939394	1	2%	1	2%
77.911647	1	2%	1	2%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T12: 4 lamp	Frequency	Percent	Frequency	Percent
78.04878	1	2%	1	2%
81.818182	1	2%	1	2%
83.082707	1	2%	1	2%
85.049834	1	2%	1	2%
86.404066	1	2%	1	2%
95.154185	1	2%	1	2%
100	6	11%	6	11%
	54	*100%*	*54*	*100%*

Table B.3.87

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 4 lamp	Frequency	Percent	Frequency	Percent
0	27	50%	27	50%
8.6956522	1	2%	1	2%
10.169492	1	2%	1	2%
20	1	2%	1	2%
33.333333	2	4%	2	4%
41.324503	1	2%	1	2%
41.37931	1	2%	1	2%
42.857143	1	2%	1	2%
51.162791	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T12: 4 lamp	Frequency	Percent	Frequency	Percent
55.411255	1	2%	1	2%
58.064516	1	2%	1	2%
73.939394	1	2%	1	2%
77.911647	1	2%	1	2%
78.04878	1	2%	1	2%
82.403433	1	2%	1	2%
85.245902	1	2%	1	2%
85.714286	1	2%	1	2%
88.888889	2	4%	2	4%
89.655172	1	2%	1	2%
95.154185	1	2%	1	2%
100	6	11%	6	11%
	54	*100%*	*54*	*100%*

Table B.3.88

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 1 lamp	Frequency	Percent	Frequency	Percent
0	23	77%	23	77%
0.1216545	1	3%	1	3%
0.1549747	1	3%	1	3%
1.2048193	1	3%	1	3%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 1 lamp	Frequency	Percent	Frequency	Percent
1.2405024	1	3%	1	3%
1.2509477	1	3%	1	3%
76.190476	1	3%	1	3%
100	1	3%	1	3%
	30	*100%*	*30*	*100%*

Table B.3.89

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T8: 1 lamp	Frequency	Percent	Frequency	Percent
0	23	77%	23	77%
0.1216545	1	3%	1	3%
0.330033	1	3%	1	3%
1.2048193	1	3%	1	3%
1.2376238	1	3%	1	3%
1.2504737	1	3%	1	3%
71.428571	1	3%	1	3%
100	1	3%	1	3%
	30	*100%*	*30*	*100%*

Table B.3.90

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 2 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	6	20%	6	20%
0.729927	1	3%	1	3%
4.7619048	1	3%	1	3%
5.0426687	1	3%	1	3%
5.8451817	1	3%	1	3%
15.09434	1	3%	1	3%
23.809524	1	3%	1	3%
66.101695	1	3%	1	3%
69.879518	1	3%	1	3%
69.939348	1	3%	1	3%
86.850675	1	3%	1	3%
88.235294	1	3%	1	3%
99.845025	1	3%	1	3%
100	12	40%	12	40%
	30	*100%*	*30*	*100%*

Table B.3.91

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T8: 2 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	6	20%	6	20%
0.729927	1	3%	1	3%
4.7619048	1	3%	1	3%
5.0426687	1	3%	1	3%
5.8451817	1	3%	1	3%
15.09434	1	3%	1	3%
28.571429	1	3%	1	3%
66.101695	1	3%	1	3%
69.879518	1	3%	1	3%
69.950739	1	3%	1	3%
86.881188	1	3%	1	3%
88.235294	1	3%	1	3%
99.669967	1	3%	1	3%
100	12	40%	12	40%
	30	*100%*	*30*	*100%*

Table B.3.92

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 3 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	28	93%	28	93%
3.649635	1	3%	1	3%
84.516129	1	3%	1	3%
	30	*100%*	*30*	*100%*

Table B.3.93

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T8: 3 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	28	93%	28	93%
3.649635	1	3%	1	3%
84.516129	1	3%	1	3%
	30	*100%*	*30*	*100%*

Table B.3.94

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 4 lamp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	16	53%	16	53%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent T8: 4 lamp	Frequency	Percent	Frequency	Percent
11.764706	1	3%	1	3%
11.908823	1	3%	1	3%
15.483871	1	3%	1	3%
28.809704	1	3%	1	3%
28.915663	1	3%	1	3%
33.898305	1	3%	1	3%
76.461295	1	3%	1	3%
83.785881	1	3%	1	3%
84.90566	1	3%	1	3%
95.238095	1	3%	1	3%
95.498783	1	3%	1	3%
100	3	10%	3	10%
	30	*100%*	*30*	*100%*

Table B.3.95

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T8: 4 lamp	Frequency	Percent	Frequency	Percent
0	16	53%	16	53%
11.764706	1	3%	1	3%
11.881188	1	3%	1	3%
15.483871	1	3%	1	3%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent T8: 4 lamp	Frequency	Percent	Frequency	Percent
28.798787	1	3%	1	3%
28.915663	1	3%	1	3%
33.898305	1	3%	1	3%
76.461295	1	3%	1	3%
83.785881	1	3%	1	3%
84.90566	1	3%	1	3%
95.238095	1	3%	1	3%
95.498783	1	3%	1	3%
100	3	10%	3	10%
	30	*100%*	*30*	*100%*

Table B.3.96

	RespType			
	Commercial On-Site			
% WATTS: Solid State Ballast measure	Frequency	Percent	Frequency	Percent
0	28	42%	28	42%
2.2988506	1	1%	1	1%
4.8278945	1	1%	1	1%
5.8076225	1	1%	1	1%
7.3972603	1	1%	1	1%
9.3333333	1	1%	1	1%
12.408759	1	1%	1	1%
15.708812	1	1%	1	1%

	RespType			
	Commercial On-Site			
% WATTS: Solid State Ballast measure	Frequency	Percent	Frequency	Percent
21.950967	1	1%	1	1%
26.966292	1	1%	1	1%
27.434011	1	1%	1	1%
28.251121	1	1%	1	1%
34.447301	1	1%	1	1%
49.051226	1	1%	1	1%
49.704142	1	1%	1	1%
67.898983	1	1%	1	1%
80	1	1%	1	1%
83.673753	1	1%	1	1%
86.336115	1	1%	1	1%
89.51049	1	1%	1	1%
98.028511	1	1%	1	1%
99.56685	1	1%	1	1%
100	18	27%	18	27%
	67	*100%*	*67*	*100%*

Table B.3.97

	RespType			
	Commercial On-Site			
% COUNT %: Solid State Ballast measure	Frequency	Percent	Frequency	Percent
0	28	42%	28	42%
3.8461538	1	1%	1	1%

	RespType			
	Commercial On-Site			
% COUNT %: Solid State Ballast measure	Frequency	Percent	Frequency	Percent
4.3956044	1	1%	1	1%
6.4516129	1	1%	1	1%
11.344538	1	1%	1	1%
19.087137	1	1%	1	1%
20	1	1%	1	1%
20.190275	1	1%	1	1%
21.428571	1	1%	1	1%
25	1	1%	1	1%
33.333333	1	1%	1	1%
36	1	1%	1	1%
38.709677	1	1%	1	1%
51.193634	1	1%	1	1%
53.846154	1	1%	1	1%
78.294574	1	1%	1	1%
88.020833	1	1%	1	1%
88.888889	1	1%	1	1%
91.791304	1	1%	1	1%
98.039216	1	1%	1	1%
99.019608	1	1%	1	1%
99.029126	1	1%	1	1%
100	18	27%	18	27%
	67	*100%*	*67*	*100%*

Table B.3.98

	RespType			
	Commercial On-Site			
%MAIN HID TYPE TYPE (MV,MH,PS,H,L,N)(% COUNT)	Frequency	Percent	Frequency	Percent
H	1	8%	1	8%
MH	12	92%	12	92%
	13	*100%*	*13*	*100%*

Table B.3.99

	RespType			
	Commercial On-Site			
Yes No: Timeclock (on off)	Frequency	Percent	Frequency	Percent
0	68	96%	68	96%
1	3	4%	3	4%
	71	*100%*	*71*	*100%*

Table B.3.100

	RespType			
	Commercial On-Site			
Yes No: EMCS	Frequency	Percent	Frequency	Percent
0	67	94%	67	94%
1	4	6%	4	6%
	71	*100%*	*71*	*100%*

Table B.3.101

	RespType			
	Commercial On-Site			
Yes No: Photocell	Frequency	Percent	Frequency	Percent
0	70	99%	70	99%
1	1	1%	1	1%
	71	*100%*	*71*	*100%*

Table B.3.102

	RespType			
	Commercial On-Site			
Yes No: Occupancy Sensors	**Frequency**	**Percent**	**Frequency**	**Percent**
0	69	97%	69	97%
1	2	3%	2	3%
	71	*100%*	*71*	*100%*

Table B.3.103

	RespType			
	Commercial On-Site			
Yes No: On Off Switch	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	3%	2	3%
1	69	97%	69	97%
	71	*100%*	*71*	*100%*

Table B.3.104

	RespType			
	Commercial On-Site			
Yes No: Dimmer Switch Daylighting Controls	**Frequency**	**Percent**	**Frequency**	**Percent**
0	69	97%	69	97%
1	2	3%	2	3%
	71	*100%*	*71*	*100%*

Table B.3.105

	RespType			
	Commercial On-Site			
Yes No: No Controls	**Frequency**	**Percent**	**Frequency**	**Percent**
0	71	100%	71	100%
	71	*100%*	*71*	*100%*

Table B.3.106

	RespType			
	Commercial On-Site			
Total Kilowatts Outdoor Lighting	**Frequency**	**Percent**	**Frequency**	**Percent**
100	1	2%	1	2%

	RespType			
	Commercial On-Site			
Total Kilowatts Outdoor Lighting	Frequency	Percent	Frequency	Percent
120	1	2%	1	2%
150	1	2%	1	2%
160	1	2%	1	2%
180	1	2%	1	2%
195	1	2%	1	2%
200	1	2%	1	2%
220	1	2%	1	2%
240	1	2%	1	2%
250	1	2%	1	2%
300	1	2%	1	2%
350	1	2%	1	2%
360	1	2%	1	2%
370	1	2%	1	2%
400	1	2%	1	2%
450	2	4%	2	4%
480	1	2%	1	2%
500	1	2%	1	2%
600	1	2%	1	2%
618	1	2%	1	2%
640	1	2%	1	2%
645	1	2%	1	2%
676	1	2%	1	2%
754	1	2%	1	2%
1190	1	2%	1	2%

	RespType			
	Commercial On-Site			
Total Kilowatts Outdoor Lighting	Frequency	Percent	Frequency	Percent
1200	2	4%	2	4%
1220	1	2%	1	2%
1300	2	4%	2	4%
1344	1	2%	1	2%
1500	1	2%	1	2%
1900	1	2%	1	2%
1950	1	2%	1	2%
2000	3	5%	3	5%
2120	1	2%	1	2%
2225	1	2%	1	2%
2500	1	2%	1	2%
2840	1	2%	1	2%
3200	1	2%	1	2%
4050	1	2%	1	2%
4375	1	2%	1	2%
4750	1	2%	1	2%
5110	2	4%	2	4%
6724	1	2%	1	2%
8000	1	2%	1	2%
11000	1	2%	1	2%
14100	1	2%	1	2%
15000	2	4%	2	4%
23975	1	2%	1	2%

	RespType			
	Commercial On-Site			
Total Kilowatts Outdoor Lighting	**Frequency**	**Percent**	**Frequency**	**Percent**
124620	1	2%	1	2%
	56	*100%*	*56*	*100%*

Table B.3.107

	RespType			
	Commercial On-Site			
Building has Outdoor Lighting?	**Frequency**	**Percent**	**Frequency**	**Percent**
1	53	100%	53	100%
	53	*100%*	*53*	*100%*

Table B.3.108

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent	**Frequency**	**Percent**	**Frequency**	**Percent**
0	42	75%	42	75%
2.9354207	2	4%	2	4%
3.3613445	1	2%	1	2%
33.07555	1	2%	1	2%

	RespType			
	Commercial On-Site			
% WATTS: Fluorescent	Frequency	Percent	Frequency	Percent
33.687003	1	2%	1	2%
40.47619	1	2%	1	2%
44.444444	1	2%	1	2%
50.819672	1	2%	1	2%
62.5	1	2%	1	2%
85.207101	1	2%	1	2%
96.763754	1	2%	1	2%
100	3	5%	3	5%
	56	*100%*	*56*	*100%*

Table B.3.109

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent	Frequency	Percent	Frequency	Percent
0	41	73%	41	73%
15.384615	1	2%	1	2%
20.833333	2	4%	2	4%
33.333333	1	2%	1	2%
56.521739	1	2%	1	2%
57.142857	1	2%	1	2%
68.75	1	2%	1	2%
77.777778	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: Fluorescent	Frequency	Percent	Frequency	Percent
85.714286	2	4%	2	4%
90.909091	1	2%	1	2%
92.857143	1	2%	1	2%
100	3	5%	3	5%
	56	*100%*	*56*	*100%*

Table B.3.110

	RespType			
	Commercial On-Site			
% WATTS: Incandescent	Frequency	Percent	Frequency	Percent
0	40	71%	40	71%
5.2631579	1	2%	1	2%
5.6603774	1	2%	1	2%
14.792899	1	2%	1	2%
23.076923	1	2%	1	2%
32.432432	1	2%	1	2%
37.5	1	2%	1	2%
49.180328	1	2%	1	2%
61.538462	1	2%	1	2%
77.52809	1	2%	1	2%
100	7	13%	7	13%
	56	*100%*	*56*	*100%*

Table B.3.111

	RespType			
	Commercial On-Site			
% COUNT %: Incandescent	Frequency	Percent	Frequency	Percent
0	40	71%	40	71%
10	1	2%	1	2%
14.285714	2	4%	2	4%
42.857143	1	2%	1	2%
43.478261	1	2%	1	2%
50	1	2%	1	2%
54.545455	1	2%	1	2%
66.666667	2	4%	2	4%
91.304348	1	2%	1	2%
100	6	11%	6	11%
	56	*100%*	*56*	*100%*

Table B.3.112

	RespType			
	Commercial On-Site			
% WATTS: Neon	Frequency	Percent	Frequency	Percent
0	55	98%	55	98%
3.236246	1	2%	1	2%
	56	*100%*	*56*	*100%*

Table B.3.113

	RespType			
	Commercial On-Site			
% COUNT %: Neon	Frequency	Percent	Frequency	Percent
0	55	98%	55	98%
7.1428571	1	2%	1	2%
	56	*100%*	*56*	*100%*

Table B.3.114

	RespType			
	Commercial On-Site			
% WATTS: HID	Frequency	Percent	Frequency	Percent
0	18	32%	18	32%
38.461538	1	2%	1	2%
55.555556	1	2%	1	2%
59.52381	1	2%	1	2%
66.312997	1	2%	1	2%
66.92445	1	2%	1	2%
67.567568	1	2%	1	2%
76.923077	1	2%	1	2%
94.339623	1	2%	1	2%
94.736842	1	2%	1	2%

	RespType			
	Commercial On-Site			
% WATTS: HID	Frequency	Percent	Frequency	Percent
96.638655	1	2%	1	2%
97.064579	2	4%	2	4%
100	26	46%	26	46%
	56	*100%*	*56*	*100%*

Table B.3.115

	RespType			
	Commercial On-Site			
% COUNT %: HID	Frequency	Percent	Frequency	Percent
0	16	29%	16	29%
9.0909091	1	2%	1	2%
14.285714	1	2%	1	2%
16.666667	1	2%	1	2%
22.222222	1	2%	1	2%
31.25	1	2%	1	2%
33.333333	2	4%	2	4%
42.857143	1	2%	1	2%
45.454545	1	2%	1	2%
57.142857	1	2%	1	2%
79.166667	2	4%	2	4%
84.615385	1	2%	1	2%
85.714286	1	2%	1	2%

	RespType			
	Commercial On-Site			
% COUNT %: HID	Frequency	Percent	Frequency	Percent
90	1	2%	1	2%
100	25	45%	25	45%
	56	*100%*	*56*	*100%*

Table B.3.116

	RespType			
	Commercial On-Site			
% WATTS: Other	Frequency	Percent	Frequency	Percent
0	55	98%	55	98%
100	1	2%	1	2%
	56	*100%*	*56*	*100%*

Table B.3.117

	RespType			
	Commercial On-Site			
% COUNT %: Other	Frequency	Percent	Frequency	Percent
0	55	98%	55	98%
100	1	2%	1	2%
	56	*100%*	*56*	*100%*

Table B.3.118

	RespType			
	Commercial On-Site			
Yes No: Timeclock (on off)	**Frequency**	**Percent**	**Frequency**	**Percent**
0	33	63%	33	63%
1	19	37%	19	37%
	52	*100%*	*52*	*100%*

Table B.3.119

	RespType			
	Commercial On-Site			
Yes No: EMCS	**Frequency**	**Percent**	**Frequency**	**Percent**
0	49	94%	49	94%
1	3	6%	3	6%
	52	*100%*	*52*	*100%*

Table B.3.120

	RespType			
	Commercial On-Site			
Yes No: Photocell	**Frequency**	**Percent**	**Frequency**	**Percent**
0	22	42%	22	42%
1	30	58%	30	58%
	52	*100%*	*52*	*100%*

Table B.3.121

	RespType			
	Commercial On-Site			
Yes No: Timeclock Photocell	**Frequency**	**Percent**	**Frequency**	**Percent**
0	45	87%	45	87%
1	7	13%	7	13%
	52	*100%*	*52*	*100%*

Table B.3.122

	RespType			
	Commercial On-Site			
Yes No: Occupancy Sensors	Frequency	Percent	Frequency	Percent
0	52	100%	52	100%
	52	*100%*	*52*	*100%*

Table B.3.123

	RespType			
	Commercial On-Site			
Yes No: On Off Switch	Frequency	Percent	Frequency	Percent
0	34	65%	34	65%
1	18	35%	18	35%
	52	*100%*	*52*	*100%*

Table B.3.124

	RespType			
	Commercial On-Site			
Yes No: No Controls	Frequency	Percent	Frequency	Percent
0	51	98%	51	98%
1	1	2%	1	2%
	52	*100%*	*52*	*100%*

Table B.3.125

	RespType			
	Commercial On-Site			
School: # PC's	Frequency	Percent	Frequency	Percent
12	1	13%	1	13%
185	1	13%	1	13%
300	1	13%	1	13%
55	1	13%	1	13%
60	1	13%	1	13%
74	1	13%	1	13%
79	1	13%	1	13%
98	1	13%	1	13%
	8	*100%*	*8*	*100%*

Table B.3.126

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Broiler Fryer Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	50%	2	50%
3	2	50%	2	50%
	4	*100%*	*4*	*100%*

Table B.3.127

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Broiler Fryer Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	33%	2	33%
2	2	33%	2	33%
3	1	17%	1	17%
5	1	17%	1	17%
	6	*100%*	*6*	*100%*

Table B.3.128

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Griddle Grill Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	50%	3	50%
3	3	50%	3	50%
	6	*100%*	*6*	*100%*

Table B.3.129

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Griddle Grill Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.130

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Oven Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	50%	5	50%

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Oven Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
136	1	10%	1	10%
2	1	10%	1	10%
3	1	10%	1	10%
4	2	20%	2	20%
	10	*100%*	*10*	*100%*

Table B.3.131

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Oven Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	43%	3	43%
2	1	14%	1	14%
3	2	29%	2	29%
4	1	14%	1	14%
	7	*100%*	*7*	*100%*

Table B.3.132

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Range Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	33%	2	33%
1	3	50%	3	50%
136	1	17%	1	17%
	6	*100%*	*6*	*100%*

Table B.3.133

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Range Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
1	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.134

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Hot Box Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	40%	2	40%
2	1	20%	1	20%

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Hot Box Elec	Frequency	Percent	Frequency	Percent
4	2	40%	2	40%
	5	*100%*	*5*	*100%*

Table B.3.135

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Hot Box Gas	Frequency	Percent	Frequency	Percent
1	1	50%	1	50%
2	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.136

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Convey Toast Elec	Frequency	Percent	Frequency	Percent
1	2	67%	2	67%
3	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.3.137

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Heat Lamp Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	20%	1	20%
4	2	40%	2	40%
5	2	40%	2	40%
	5	*100%*	*5*	*100%*

Table B.3.138

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Heat Lamp Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.139

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Door Dishwash Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	40%	2	40%

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Door Dishwash Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	60%	3	60%
	5	*100%*	*5*	*100%*

Table B.3.140

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Door Dishwash Gas	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.141

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Convey Dishwash Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	100%	5	100%
	5	*100%*	*5*	*100%*

Table B.3.142

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Flight Dishwash Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.143

	RespType			
	Commercial On-Site			
Kitchen – Full Serv: Dishwasher Booster Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	100%	5	100%
	5	*100%*	*5*	*100%*

Table B.3.144

	RespType			
	Commercial On-Site			
Laundry- Com - Elec	**Frequency**	**Percent**	**Frequency**	**Percent**
1	2	50%	2	50%
4	1	25%	1	25%

	RespType			
	Commercial On-Site			
Laundry- Com - Elec	Frequency	Percent	Frequency	Percent
8	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.3.145

	RespType			
	Commercial On-Site			
Laundry- Com - Gas	Frequency	Percent	Frequency	Percent
1	1	20%	1	20%
2	3	60%	3	60%
4	1	20%	1	20%
	5	*100%*	*5*	*100%*

Table B.3.146

	RespType			
	Commercial On-Site			
Laundry - Res - Elec	Frequency	Percent	Frequency	Percent
1	5	50%	5	50%
2	3	30%	3	30%
8	1	10%	1	10%

	RespType			
	Commercial On-Site			
Laundry - Res - Elec	Frequency	Percent	Frequency	Percent
80	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.147

	RespType			
	Commercial On-Site			
Laundry - Res - Gas	Frequency	Percent	Frequency	Percent
2	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.148

	RespType			
	Commercial On-Site			
Grocery: Point Of Use Terminals #	Frequency	Percent	Frequency	Percent
1	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.149

	RespType			
	Commercial On-Site			
Grocery: Food Prep - Meat Department (1=yes, 2=no)	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.150

	RespType			
	Commercial On-Site			
Grocery: Misc Equip Specify	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	50%	1	50%
3	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.151

	RespType			
	Commercial On-Site			
Hotel Motel: Number of Rooms	**Frequency**	**Percent**	**Frequency**	**Percent**
1	8	100%	8	100%
	8	*100%*	*8*	*100%*

Table B.3.152

	RespType			
	Commercial On-Site			
Hotel Motel: Annual Average Occupancy	**Frequency**	**Percent**	**Frequency**	**Percent**
2	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.153

	RespType			
	Commercial On-Site			
Hotel Motel: Kitchen - Full Service	**Frequency**	**Percent**	**Frequency**	**Percent**
3	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.154

	RespType			
	Commercial On-Site			
Hotel Motel: Kitchen - Warming	**Frequency**	**Percent**	**Frequency**	**Percent**
4	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.155

	RespType			
	Commercial On-Site			
Hotel Motel: Laundry Facility	**Frequency**	**Percent**	**Frequency**	**Percent**
5	9	100%	9	100%
	9	*100%*	*9*	*100%*

Table B.3.156

	RespType			
	Commercial On-Site			
Hotel Motel: Specify 1	**Frequency**	**Percent**	**Frequency**	**Percent**
4	1	10%	1	10%
26	1	10%	1	10%
39	1	10%	1	10%
40	1	10%	1	10%
61	2	20%	2	20%
132	1	10%	1	10%
136	1	10%	1	10%
150	1	10%	1	10%
504	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.157

	RespType			
	Commercial On-Site			
Hotel Motel: Specify 2	**Frequency**	**Percent**	**Frequency**	**Percent**
30	2	22%	2	22%
35	1	11%	1	11%
65	1	11%	1	11%
80	1	11%	1	11%
95	1	11%	1	11%
99	1	11%	1	11%
100	2	22%	2	22%
	9	*100%*	*9*	*100%*

Table B.3.158

	RespType			
	Commercial On-Site			
Office PCs	**Frequency**	**Percent**	**Frequency**	**Percent**
1	39	100%	39	100%
	39	*100%*	*39*	*100%*

Table B.3.159

	RespType			
	Commercial On-Site			
Office PCs specify	**Frequency**	**Percent**	**Frequency**	**Percent**
1	6	14%	6	14%
2	8	19%	8	19%
3	5	12%	5	12%
4	3	7%	3	7%
5	2	5%	2	5%
6	2	5%	2	5%
8	3	7%	3	7%
10	3	7%	3	7%
12	1	2%	1	2%
15	1	2%	1	2%
17	1	2%	1	2%
40	2	5%	2	5%
137	1	2%	1	2%
150	1	2%	1	2%
160	1	2%	1	2%
575	1	2%	1	2%
1900	2	5%	2	5%
	43	*100%*	*43*	*100%*

Table B.3.160

	RespType			
	Commercial On-Site			
Restaurant: Meals Per Day	**Frequency**	**Percent**	**Frequency**	**Percent**
1	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.161

	RespType			
	Commercial On-Site			
Restaurant: Kitchen Full Service	**Frequency**	**Percent**	**Frequency**	**Percent**
2	7	100%	7	100%
	7	*100%*	*7*	*100%*

Table B.3.162

	RespType			
	Commercial On-Site			
Restaurant: Kitchen Warming	**Frequency**	**Percent**	**Frequency**	**Percent**
3	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.163

	RespType			
	Commercial On-Site			
Restaurant: Specify	**Frequency**	**Percent**	**Frequency**	**Percent**
2	2	40%	2	40%
100	1	20%	1	20%
700	1	20%	1	20%
1000	1	20%	1	20%
	5	*100%*	*5*	*100%*

Table B.3.164

	RespType			
	Commercial On-Site			
Retail: Point Of Use Terminals	**Frequency**	**Percent**	**Frequency**	**Percent**
1	12	100%	12	100%
	12	*100%*	*12*	*100%*

Table B.3.165

	RespType			
	Commercial On-Site			
Retail: Misc Equip Specify	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	9%	1	9%
1	3	27%	3	27%

	RespType			
	Commercial On-Site			
Retail: Misc Equip Specify	Frequency	Percent	Frequency	Percent
2	5	45%	5	45%
4	1	9%	1	9%
11	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.166

	RespType			
	Commercial On-Site			
School: Number of Classrooms	Frequency	Percent	Frequency	Percent
1	8	100%	8	100%
	8	*100%*	*8*	*100%*

Table B.3.167

	RespType			
	Commercial On-Site			
School: Kitchen Full Service	Frequency	Percent	Frequency	Percent
2	7	100%	7	100%
	7	*100%*	*7*	*100%*

Table B.3.168

	RespType			
	Commercial On-Site			
School: Kitchen Warming	**Frequency**	**Percent**	**Frequency**	**Percent**
3	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.169

	RespType			
	Commercial On-Site			
School: Laundry	**Frequency**	**Percent**	**Frequency**	**Percent**
4	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.170

	RespType			
	Commercial On-Site			
School: PC's	**Frequency**	**Percent**	**Frequency**	**Percent**
5	7	100%	7	100%
	7	*100%*	*7*	*100%*

Table B.3.171

	RespType			
	Commercial On-Site			
School: Specify	**Frequency**	**Percent**	**Frequency**	**Percent**
7	1	11%	1	11%
10	1	11%	1	11%
15	2	22%	2	22%
17	1	11%	1	11%
19	1	11%	1	11%
33	1	11%	1	11%
36	1	11%	1	11%
40	1	11%	1	11%
	9	*100%*	*9*	*100%*

Table B.3.172

	RespType			
	Commercial On-Site			
Warehouse: Forklifts	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.173

	RespType			
	Commercial On-Site			
Warehouse: Specify	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.174

	RespType			
	Commercial On-Site			
% Compressors Low Temp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	36%	4	36%
25	3	27%	3	27%
50	2	18%	2	18%
100	2	18%	2	18%
	11	*100%*	*11*	*100%*

Table B.3.175

	RespType			
	Commercial On-Site			
% Compressors High Temp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	18%	2	18%
50	2	18%	2	18%

	RespType			
	Commercial On-Site			
% Compressors High Temp	Frequency	Percent	Frequency	Percent
75	3	27%	3	27%
100	4	36%	4	36%
	11	*100%*	*11*	*100%*

Table B.3.176

	RespType			
	Commercial On-Site			
% Compressors Med Temp	Frequency	Percent	Frequency	Percent
0	11	100%	11	100%
	11	*100%*	*11*	*100%*

Table B.3.177

	RespType			
	Commercial On-Site			
Predominant Condenser type	Frequency	Percent	Frequency	Percent
A	8	100%	8	100%
	8	*100%*	*8*	*100%*

Table B.3.178

	RespType			
	Commercial On-Site			
Display Case Yes No	**Frequency**	**Percent**	**Frequency**	**Percent**
0	11	100%	11	100%
	11	*100%*	*11*	*100%*

Table B.3.179

	RespType			
	Commercial On-Site			
Space ID: Ref System 1	**Frequency**	**Percent**	**Frequency**	**Percent**
1	5	63%	5	63%
2	2	25%	2	25%
3	1	13%	1	13%
	8	*100%*	*8*	*100%*

Table B.3.180

	RespType			
	Commercial On-Site			
Space ID: Ref System 2	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	75%	3	75%

	RespType			
	Commercial On-Site			
Space ID: Ref System 2	Frequency	Percent	Frequency	Percent
2	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.3.181

	RespType			
	Commercial On-Site			
Space ID: Ref System 3	Frequency	Percent	Frequency	Percent
1	1	50%	1	50%
2	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.182

	RespType			
	Commercial On-Site			
Space ID: Ref System 4	Frequency	Percent	Frequency	Percent
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.183

	RespType			
	Commercial On-Site			
Space ID: Ref System 5	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.184

	RespType			
	Commercial On-Site			
Compressor System Type: Ref System 1	**Frequency**	**Percent**	**Frequency**	**Percent**
Reciprocating	9	90%	9	90%
Screw	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.185

	RespType			
	Commercial On-Site			
Compressor System Type: Ref System 2	**Frequency**	**Percent**	**Frequency**	**Percent**
Reciprocating	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.186

	RespType			
	Commercial On-Site			
Compressor System Type: Ref System 3	**Frequency**	**Percent**	**Frequency**	**Percent**
Reciprocating	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.187

	RespType			
	Commercial On-Site			
Compressor System Type: Ref System 4	**Frequency**	**Percent**	**Frequency**	**Percent**
Reciprocating	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.188

	RespType			
	Commercial On-Site			
Compressor System Type: Ref System 5	**Frequency**	**Percent**	**Frequency**	**Percent**
Reciprocating	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.189

	RespType			
	Commercial On-Site			
Compressor Temperature: Ref System 1	**Frequency**	**Percent**	**Frequency**	**Percent**
Low: (0 to -10 F)	4	36%	4	36%
Medium: (30 to 40 F)	7	64%	7	64%
	11	*100%*	*11*	*100%*

Table B.3.190

	RespType			
	Commercial On-Site			
Compressor Temperature: Ref System 2	**Frequency**	**Percent**	**Frequency**	**Percent**
Low: (0 to -10 F)	2	33%	2	33%
Medium: (30 to 40 F)	4	67%	4	67%
	6	*100%*	*6*	*100%*

Table B.3.191

	RespType			
	Commercial On-Site			
Compressor Temperature: Ref System 3	**Frequency**	**Percent**	**Frequency**	**Percent**
Medium: (30 to 40 F)	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.192

	RespType			
	Commercial On-Site			
Compressor Temperature: Ref System 4	**Frequency**	**Percent**	**Frequency**	**Percent**
Low: (0 to -10 F)	2	67%	2	67%
Medium: (30 to 40 F)	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.3.193

	RespType			
	Commercial On-Site			
Compressor Temperature: Ref System 5	**Frequency**	**Percent**	**Frequency**	**Percent**
Medium: (30 to 40 F)	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.194

	RespType			
	Commercial On-Site			
CondensersType: Condenser 1	**Frequency**	**Percent**	**Frequency**	**Percent**
Air-cooled	8	100%	8	100%
	8	*100%*	*8*	*100%*

Table B.3.195

	RespType			
	Commercial On-Site			
CondensersType: Condenser 2	**Frequency**	**Percent**	**Frequency**	**Percent**
Air-cooled	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.196

	RespType			
	Commercial On-Site			
CondensersType: Condenser 3	**Frequency**	**Percent**	**Frequency**	**Percent**
Air-cooled	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.197

	RespType			
	Commercial On-Site			
Fan VSD? : Condenser 1	**Frequency**	**Percent**	**Frequency**	**Percent**
No	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.198

	RespType			
	Commercial On-Site			
Fan VSD? : Condenser 2	**Frequency**	**Percent**	**Frequency**	**Percent**
No	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.199

	RespType			
	Commercial On-Site			
Fan VSD? : Condenser 3	**Frequency**	**Percent**	**Frequency**	**Percent**
No	2	100%	2	100%
	2	*100%*	*2*	*100%*

Table B.3.200

	RespType			
	Commercial On-Site			
Pump VSD? Condenser 1	**Frequency**	**Percent**	**Frequency**	**Percent**
No	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.201

	RespType			
	Commercial On-Site			
Lighting: Display Case 1	**Frequency**	**Percent**	**Frequency**	**Percent**
T8	7	70%	7	70%
T10	3	30%	3	30%
	10	*100%*	*10*	*100%*

Table B.3.202

	RespType			
	Commercial On-Site			
Lighting: Display Case 2	**Frequency**	**Percent**	**Frequency**	**Percent**
T8	1	50%	1	50%
T10	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.203

	RespType			
	Commercial On-Site			
Lighting: Display Case 3	**Frequency**	**Percent**	**Frequency**	**Percent**
T8	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.204

	RespType			
	Commercial On-Site			
Anti-sweat heater control? Display Case 1	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	8	80%	8	80%
No	2	20%	2	20%
	10	*100%*	*10*	*100%*

Table B.3.205

	RespType			
	Commercial On-Site			
Display Case - Enclosed Lamp Length	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	10%	1	10%
3	1	10%	1	10%
4	6	60%	6	60%
5	1	10%	1	10%
6	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.206

	RespType			
	Commercial On-Site			
Display Case - Open Lamp Length	**Frequency**	**Percent**	**Frequency**	**Percent**
4	1	50%	1	50%
6	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.207

	RespType			
	Commercial On-Site			
Display Case - Enclosed Lamps	**Frequency**	**Percent**	**Frequency**	**Percent**
1	4	40%	4	40%
2	3	30%	3	30%
24	1	10%	1	10%
3	1	10%	1	10%
4	1	10%	1	10%
	10	*100%*	*10*	*100%*

Table B.3.208

	RespType			
	Commercial On-Site			
Display Case - Open Lamps	**Frequency**	**Percent**	**Frequency**	**Percent**
28	1	50%	1	50%
3	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.209

	RespType			
	Commercial On-Site			
Vending	**Frequency**	**Percent**	**Frequency**	**Percent**
1	16	57%	16	57%
14	2	7%	2	7%
2	5	18%	5	18%
3	2	7%	2	7%
4	1	4%	1	4%
7	2	7%	2	7%
	28	*100%*	*28*	*100%*

Table B.3.210

	RespType			
	Commercial On-Site			
Bvg Merchandiz	**Frequency**	**Percent**	**Frequency**	**Percent**
1	10	40%	10	40%
2	9	36%	9	36%
3	3	12%	3	12%
4	1	4%	1	4%
6	1	4%	1	4%
9	1	4%	1	4%
	25	*100%*	*25*	*100%*

Table B.3.211

	RespType			
	Commercial On-Site			
Ice Mach	**Frequency**	**Percent**	**Frequency**	**Percent**
1	14	67%	14	67%
14	2	10%	2	10%
2	2	10%	2	10%
3	2	10%	2	10%
4	1	5%	1	5%
	21	*100%*	*21*	*100%*

Table B.3.212

	RespType			
	Commercial On-Site			
Rch-in uprt Refrig	**Frequency**	**Percent**	**Frequency**	**Percent**
1	23	52%	23	52%
2	7	16%	7	16%
3	6	14%	6	14%
4	2	5%	2	5%
5	3	7%	3	7%
50	1	2%	1	2%
6	2	5%	2	5%
	44	*100%*	*44*	*100%*

Table B.3.213

	RespType			
	Commercial On-Site			
Rch-in uprt Freez	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	17%	2	17%
1	6	50%	6	50%
2	1	8%	1	8%
3	2	17%	2	17%

	RespType			
	Commercial On-Site			
Rch-in uprt Freez	Frequency	Percent	Frequency	Percent
4	1	8%	1	8%
	12	*100%*	*12*	*100%*

Table B.3.214

	RespType			
	Commercial On-Site			
Rch-in u-cntr Refrig	Frequency	Percent	Frequency	Percent
1	17	65%	17	65%
136	1	4%	1	4%
2	2	8%	2	8%
28	1	4%	1	4%
3	3	12%	3	12%
5	1	4%	1	4%
7	1	4%	1	4%
	26	*100%*	*26*	*100%*

Table B.3.215

	RespType			
	Commercial On-Site			
Rch-in u-cntr Freez	Frequency	Percent	Frequency	Percent
0	2	18%	2	18%

	RespType			
	Commercial On-Site			
Rch-in u-cntr Freez	Frequency	Percent	Frequency	Percent
1	5	45%	5	45%
2	3	27%	3	27%
3	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.216

	RespType			
	Commercial On-Site			
Walk-in Cool	Frequency	Percent	Frequency	Percent
1	10	77%	10	77%
3	3	23%	3	23%
	13	*100%*	*13*	*100%*

Table B.3.217

	RespType			
	Commercial On-Site			
Walk-in Freez	Frequency	Percent	Frequency	Percent
1	10	100%	10	100%
	10	*100%*	*10*	*100%*

Table B.3.218

	RespType			
	Commercial On-Site			
Compressor Total HP: Ref System 1	**Frequency**	**Percent**	**Frequency**	**Percent**
0.06	2	33%	2	33%
1.5	1	17%	1	17%
2	1	17%	1	17%
3	1	17%	1	17%
7.5	1	17%	1	17%
	6	*100%*	*6*	*100%*

Table B.3.219

	RespType			
	Commercial On-Site			
Compressor Total HP: Ref System 2	**Frequency**	**Percent**	**Frequency**	**Percent**
0.75	1	33%	1	33%
2	1	33%	1	33%
5	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.3.220

	RespType			
	Commercial On-Site			
Compressor Total HP: Ref System 3	**Frequency**	**Percent**	**Frequency**	**Percent**
0.5	1	50%	1	50%
3	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.221

	RespType			
	Commercial On-Site			
Compressor Total HP: Ref System 4	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.222

	RespType			
	Commercial On-Site			
Compressor Total HP: Ref System 5	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.223

	RespType			
	Commercial On-Site			
Compressor Quantity: Ref System 1	**Frequency**	**Percent**	**Frequency**	**Percent**
1	10	91%	10	91%
2	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.224

	RespType			
	Commercial On-Site			
Compressor Quantity: Ref System 2	**Frequency**	**Percent**	**Frequency**	**Percent**
1	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.225

	RespType			
	Commercial On-Site			
Compressor Quantity: Ref System 3	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	75%	3	75%
2	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.3.226

	RespType			
	Commercial On-Site			
Compressor Quantity: Ref System 4	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	100%	3	100%
	3	*100%*	*3*	*100%*

Table B.3.227

	RespType			
	Commercial On-Site			
Compressor Quantity: Ref System 5	**Frequency**	**Percent**	**Frequency**	**Percent**
4	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.228

	RespType			
	Commercial On-Site			
Total Fan HP: Condenser 1	**Frequency**	**Percent**	**Frequency**	**Percent**
0.16	1	25%	1	25%
0.33	1	25%	1	25%
0.5	1	25%	1	25%

	RespType			
	Commercial On-Site			
Total Fan HP: Condenser 1	**Frequency**	**Percent**	**Frequency**	**Percent**
2	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.3.229

	RespType			
	Commercial On-Site			
Total Fan HP: Condenser 2	**Frequency**	**Percent**	**Frequency**	**Percent**
0.1	1	33%	1	33%
0.5	1	33%	1	33%
5	1	33%	1	33%
	3	*100%*	*3*	*100%*

Table B.3.230

	RespType			
	Commercial On-Site			
Total Fan HP: Condenser 3	**Frequency**	**Percent**	**Frequency**	**Percent**
0.1	1	50%	1	50%
2	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.231

	RespType			
	Commercial On-Site			
Case Length: Display Case 1	**Frequency**	**Percent**	**Frequency**	**Percent**
3	1	9%	1	9%
4	2	18%	2	18%
5	1	9%	1	9%
6	4	36%	4	36%
10	1	9%	1	9%
12	1	9%	1	9%
110	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.232

	RespType			
	Commercial On-Site			
Case Length: Display Case 2	**Frequency**	**Percent**	**Frequency**	**Percent**
12	1	50%	1	50%
180	1	50%	1	50%
	2	*100%*	*2*	*100%*

Table B.3.233

	RespType			
	Commercial On-Site			
Case Length: Display Case 3	**Frequency**	**Percent**	**Frequency**	**Percent**
3	1	100%	1	100%
	1	*100%*	*1*	*100%*

Table B.3.234

	RespType			
	Commercial On-Site			
lowtemp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	4	36%	4	36%
1	6	55%	6	55%
2	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.235

	RespType			
	Commercial On-Site			
medtemp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	18%	2	18%
1	4	36%	4	36%
2	1	9%	1	9%

	RespType			
	Commercial On-Site			
medtemp	**Frequency**	**Percent**	**Frequency**	**Percent**
3	2	18%	2	18%
4	1	9%	1	9%
6	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.236

	RespType			
	Commercial On-Site			
hitemp	**Frequency**	**Percent**	**Frequency**	**Percent**
0	11	100%	11	100%
	11	*100%*	*11*	*100%*

Table B.3.237

	RespType			
	Commercial On-Site			
totcomp	**Frequency**	**Percent**	**Frequency**	**Percent**
1	4	36%	4	36%
2	3	27%	3	27%
4	3	27%	3	27%

	RespType			
	Commercial On-Site			
totcomp	Frequency	Percent	Frequency	Percent
8	1	9%	1	9%
	11	*100%*	*11*	*100%*

Table B.3.238

	RespType			
	Commercial On-Site			
Total # Refrigerators	Frequency	Percent	Frequency	Percent
0	55	83%	55	83%
1	11	17%	11	17%
	66	*100%*	*66*	*100%*

Table B.3.239

	RespType			
	Commercial On-Site			
totdoors	Frequency	Percent	Frequency	Percent
0	66	100%	66	100%
	66	*100%*	*66*	*100%*

Table B.3.240

	RespType			
	Commercial On-Site			
dcdoors	**Frequency**	**Percent**	**Frequency**	**Percent**
0	66	100%	66	100%
	66	*100%*	*66*	*100%*

Table B.3.241

	RespType			
	Commercial On-Site			
SRVR_Meter	**Frequency**	**Percent**	**Frequency**	**Percent**
2	18	100%	18	100%
	18	*100%*	*18*	*100%*

Table B.3.242

	RespType			
	Commercial On-Site			
SRVR_PMgnmtActive	**Frequency**	**Percent**	**Frequency**	**Percent**
1	1	6%	1	6%
2	16	94%	16	94%
	17	*100%*	*17*	*100%*

Table B.3.243

	RespType			
	Commercial On-Site			
SRVR_Conditioning	**Frequency**	**Percent**	**Frequency**	**Percent**
1	3	16%	3	16%
2	16	84%	16	84%
	19	*100%*	*19*	*100%*

Table B.3.244

	RespType			
	Commercial On-Site			
SRVR_FloorArea	**Frequency**	**Percent**	**Frequency**	**Percent**
0	1	6%	1	6%
20	1	6%	1	6%
50	3	19%	3	19%
72	1	6%	1	6%
100	2	13%	2	13%
120	1	6%	1	6%
150	1	6%	1	6%
250	1	6%	1	6%
280	1	6%	1	6%

	RespType			
	Commercial On-Site			
SRVR_FloorArea	Frequency	Percent	Frequency	Percent
500	1	6%	1	6%
1500	2	13%	2	13%
15000	1	6%	1	6%
	16	*100%*	*16*	*100%*

Table B.3.245

	RespType			
	Commercial On-Site			
SRVR_CoolCapacity	Frequency	Percent	Frequency	Percent
1.5	1	25%	1	25%
5	2	50%	2	50%
25	1	25%	1	25%
	4	*100%*	*4*	*100%*

Table B.3.246

	RespType			
	Commercial On-Site			
kitchen1	Frequency	Percent	Frequency	Percent
0	11	100%	11	100%
	11	*100%*	*11*	*100%*

Table B.3.247

	RespType			
	Commercial On-Site			
kitchen2	**Frequency**	**Percent**	**Frequency**	**Percent**
1	6	100%	6	100%
	6	*100%*	*6*	*100%*

Table B.3.248

	RespType			
	Commercial On-Site			
kitchen3	**Frequency**	**Percent**	**Frequency**	**Percent**
1	10	100%	10	100%
	10	*100%*	*10*	*100%*

Table B.3.249

	RespType			
	Commercial On-Site			
kitchen4	**Frequency**	**Percent**	**Frequency**	**Percent**
1	4	100%	4	100%
	4	*100%*	*4*	*100%*

Table B.3.250

	RespType			
	Commercial On-Site			
dryer1	**Frequency**	**Percent**	**Frequency**	**Percent**
0	2	50%	2	50%
0.5	2	50%	2	50%
	4	*100%*	*4*	*100%*

Table B.3.251

	RespType			
	Commercial On-Site			
dryer2	**Frequency**	**Percent**	**Frequency**	**Percent**
0	9	90%	9	90%
0.5	1	10%	1	10%
	10	*100%*	*10*	*100%*

Appendix C: Measure Descriptions

C.1 – Residential Electric Measure Descriptions 1
Electric Non-Equipment Measures 1
Electric Equipment Measures 15

C.2 – Residential Gas Measure Descriptions 17
Gas Non-Equipment Measures 17
Gas Equipment Measures 23

C.3 – Commercial Electric Measure Descriptions 25
Electric Non-Equipment Measures 25
Electric Equipment Measures 39

C.4 – Commercial Gas Measure Descriptions 42
Gas Non-Equipment Measures 42
Gas Equipment Measures 46

C.5 – Industrial Measure Descriptions 48
Electric Non-Equipment Measures 48
Gas Non-Equipment Measures 49

C.1 – Residential Electric Measure Descriptions

Electric Non-Equipment Measures

Cooking

Combination Oven – High Efficiency Range and Oven. Energy efficient stovetop and oven in one appliance featuring multi sized heating elements and an oven door window.

Convection Oven. Operates at lower temperatures and achieves quicker cook times than a standard oven, due to fans that circulate heat evenly throughout the oven by moving hot air past the food. The baseline is a standard commercial oven.

Induction Stovetop. Induction cooktop elements work by generating a high frequency electromagnetic field that induces a circulating electric current within ferromagnetic cookware. The current heats up the cooking vessel (rather than the stovetop, as in other stove types) and the heat is then transferred directly to the food. Induction cooking maximizes heat transfer to the cooking vessel, reducing losses to the air and other surrounding matter.

Dryer

Clothes Dryer Duct Heat Recovery. Using an air-to-air heat exchanger, dryer inlet air is preheated with heat from the exhaust air. Depending on the location of the dryer in the home, this measure will produce 20% to 26% energy savings.

HVAC Aux

Motor – ECM Motor. Electronically commutated motors (ECM) consume less power than a standard motor. The cost difference for operating the ECM motor ranges from about 30% lower during high flow rate conditions to about 70% lower during turndown. For existing construction, ECM motors have a technical feasibility of 65% for cooling and varying amounts for HVAC auxiliary (gas or electric heating as the primary fuel). This 65% feasibility for cooling (Central AC) could be underestimating the total potential for this specific application. One reason for the lower feasibility for HVAC auxiliary measures is to account for the percentage of homes that currently use this type of equipment to heat their homes. Typically this is taken into account in equipment fuel shares and saturations, but because of the HVAC auxiliary end use these factors had to be taken into account in the technical feasibility.

VSD Motor – ECM. Controls the rotational speed of a piece of motor-driven equipment, through adjusting the frequency of the voltage applied to the motor. Baseline for this measure is a constant speed fan motor.

HVAC & Envelope

Advanced Cold Climate Heat Pump. Cold-climate heat pumps are air-to-air heat pumps that have been optimized for colder climates. The performance of these heat pumps is expected to be approximately the same as ground-source heat pumps (GSHP).

Air Conditioner – Central, Early Replacement. Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older models, resulting in excessive energy consumption. Existing units are replaced with SEER 13 models.

Air Conditioner – Central, Ductless Variable Refrigerant Flow. This system has the ability to control the amount of refrigerant flowing to each of the evaporators, enabling use of many evaporators of differing capacities and configurations. The VRF eliminates duct losses, which are often between 10% to 20% of total airflow in a ducted system. Additionally, the VRF yields high part-load efficiency, which translates into higher seasonal energy efficiency since HVAC systems typically spend most operating hours under part load conditions.[1]

Room Air Conditioner – (Individual Rooms) (10,000 BTU/HR). Replace existing models with one that has a minimum efficiency level of 11 EER. These units often include controls for minimizing the amount of energy used to cool the room, larger coils and/or smaller fans, and more efficient motors.

Air Conditioner – Removal of Room AC (10,000 BTU/HR) This refers to the environmentally-friendly disposal of unneeded appliances such room air conditioners.

Air-to-Air Heat Exchangers. An air-to-air heat exchanger mechanically ventilates and dehumidifies homes in colder climates. During the winter it transfers heat from the air being exhausted, to the fresh, outside air entering the home. Fifty to eighty percent of the heat normally lost in exhausted air is returned to the house. Air-to-air heat exchangers can be installed as part of a central heating and cooling system or in walls or windows. Wall and window-mounted units resemble air conditioners and will ventilate one room or area.[2]

Attic Fan. Forced attic fan ventilation reduces residential heat gains from the ceiling. The baseline uses passive ventilation without a fan.

Blinds – Fixed Angle/Automatic. A covering for a window or door, usually attached to the interior side of a window that reduces sunlight, thus blocking unwanted heat from the summer sun and holding in heat in cold weather. Automatic blinds adjust to the appropriate angle at the appropriate time, and make hard to reach blinds accessible for adjustment. The baseline for this measure is no interior blinds.

Canned Lighting Air-Tight Sealing. Proper sealing around recessed lighting fixtures prevents unwanted heat loss through these air spaces due to air pressure differentials in conditioned and unconditioned spaces in homes. The baseline is no sealing.

Ceiling Fan. ENERGY STAR®-qualified ceiling fans use improved motors and blade designs, allowing the user to decrease the thermostat a couple of degrees yet still feel at least 5° cooler. The fans do not create cooler temperatures. The kit does not include light fixtures; all savings are associated with the improved fan design.

Construction – ICF. Building a concrete home with insulating concrete forms (ICFs) saves energy and money. The greater insulation, tighter construction, and temperature-moderating mass of the walls conserve heating and cooling energy much better than conventional wood-frame walls.

---

[1] http://www.ashrae.org/doclib/20070327_goetzler.pdf
[2] http://www.blueflame.org/datasheets/humidity.html

Construction – SIP. Structural insulated panels use continuous foam insulation throughout the panel that provides excellent energy efficiency and low levels of air infiltration. Baseline is standard wood framing.

Cool Roof. ENERGY STAR-qualified cool roofs can lower roof surface temperature by up to 100ºF, thereby decreasing the amount of heat transferred into a building. Cool roofs can help reduce the amount of air conditioning needed in buildings, and can reduce peak cooling demand by 20%.[3] This measure could be considered as a passive measure.

Deciduous Trees. Provide shading and effectively reduce the overall solar heat gain during summer months, which reduces the cooling load on the HVAC system. Baseline for this measure is no trees.

Doors – R-5. Composite doors with a foam core increase overall insulation, which slows heat loss. This measure includes adding a thermal door with a resistance value of R-5 to houses with neither thermal nor storm doors.

Doors – Weatherization. To minimize infiltration door sweep, weather stripping mounts to the bottom of the door. It consists of an extruded aluminum strip that holds a flexible vinyl strip to block the air space between the door frame and the door. The baseline for this measure is no weather stripping.

Duct Location. In many homes, ducts are run through unconditioned areas such as attics, garages, crawlspaces, and basements for convenience and practical reasons. Ducts in unconditioned areas lose energy because of large temperature differences between conditioned air in the ducts and the surrounding space. Locating ducts in conditioned spaces helps to reduce wasted heat loss.[4]

Duct Sealing. Duct sealing cost effectively saves energy, improves air and thermal distribution (comfort and ventilation), and reduces cross contamination between different zones in the building (i.e., smoking vs. non-smoking, bio-aerosols, localized indoor air pollutants).

Duct Sealing – Aerosol Based. A significant amount of energy use in residential buildings is associated with duct losses due to leakage. This is an aerosol duct-sealing technology that seals holes in ducts up to ¼" in diameter from the inside by spraying atomized latex aerosol into a pressurized duct system.

Duct: Increase duct size or addition of new ducts. Properly sized ducts to ensure the pressure drop across air handler is within manufacturer and design specifications. Baseline is standard small ducts.

Evaporative Space Cooling. A direct evaporative cooler is a low-energy system that evaporates water into the air stream, thus reducing the temperature of the air, but increasing the humidity. An indirect evaporative cooler uses a secondary air stream that is cooled by water and goes through a heat exchanger with the primary air stream, cooling it but not affecting the humidity. A direct/indirect system will cool the air stream first through an indirect cooler, then cool it further through a direct cooler.

---

[3] http://www.aceee.org/pubs/a042_s5.pdf
[4] http://www.toolbase.org/pdf/techinv/ductsinconditionedspace_techspec.pdf

Green Roof. The added mass and thermal resistance of green roofs reduces the heating and cooling loads of the building. These systems reduce the ambient temperature around the roof, decreasing the building's urban heat island effect; reduce the ambient temperature of the roof's surface; and slow the transfer of heat into the building, reducing cooling costs. They also provide added insulation to the roof structure, reducing heating requirements in the winter.[5]

Heat Pump – Ground or Water-Source – Open Loop. Ground-source heat pumps use the natural heat storage capacity of the earth or ground water to provide energy efficient heating and cooling. In an open loop application, the system draws well water for use as the heat source or heat sink and, after use, returns the well water to a drainage field or another well. This measure compares an efficient model with a Energy Efficient Ratio (EER) of 16.2 and a Coefficient of Performance (COP) of 3.6 to the baseline model air-source heat pump with a 11.3 EER and 3.2 COP. [6]

Heat Pump – Ground or Water-Source – Closed Loop. In a closed-loop or earth-coupled loop, the system uses a water and antifreeze solution that is circulated in a ground loop of pipes to extract heat from the earth. Ground loops can be installed in a vertical well or a horizontal loop. Vertical wells are usually more expensive and used where space is limited. This measure compares several models to the baseline systems and is summarized in Table C.1.[7]

Table C.1. Closed Loop Heat Pump Comparison

Measure EER/COP	Baseline EER/COP
14.1 EER/3.3 COP	11.3 EER/3.2 COP

Infiltration Control (Caulk, Weather Strip, etc.) Blower – Door Test. Sealing air leaks in windows, doors, roof, crawlspaces, and outside walls decreases overall heating and cooling losses. Filling gaps in windows with synthetic filler prevents drafts and heating/cooling loss.

Insulation (Basement – Wall) 2x4. Adding insulation to the basement or crawlspace walls increases the thermal performance of the concrete foundation. Only for existing homes. Table C.2 summarizes the different resistance values compared in the measure.

Table C.2. Wall R-Value Comparison

Measure Insulation	Baseline Insulation
R-13 (state code)	R-0
R-13 (state code)	R-7 existing wall
R-13 + R-5	R-13

5 http://www.toolbase.org/Technology-Inventory/Roofs/green-roofs
6 http://www.toolbase.org/Technology-Inventory/HVAC/geothermal-heat-pumps
7 http://www.toolbase.org/Technology-Inventory/HVAC/geothermal-heat-pumps

Insulation (Ceiling/Attic). This measure represents an increase in R-value. Adding insulation in existing buildings increases the thermal performance and brings the resistance value up to and past code, depending on vintage. Table C.3 summarizes the different resistance values compared in the measure.

Table C.3. Ceiling R-Value Comparison

Measure Insulation	Baseline Insulation
R-38	R-0
R-38	R-11
R-49	R-38

Insulation (Duct). Adding insulation around the ducts in the heating system reduces heat loss to unconditioned spaces. Table C.4 summarizes the different resistance values compared in the measure.

Table C.4. Duct R-Value Comparison

Measure Insulation	Baseline Insulation
R-6 (state code)	R-0

Insulation (Floor). Adding insulation to the floor increases the overall resistance value and slow heat transfer from the basement to the upper levels. Table C.5 summarizes the different resistance values compared in the measure.

Table C.5.Floor R-Value Comparison

Measure Insulation	Baseline Insulation
R-19 (state code)	R-0
R-19 (state code)	R-13 existing floor
R-30	R-19 (state code)

Insulation (Rim and Band Joist). An un-insulated band joist can account for a significant portion of a building's heat loss, as the only thing separating inside from outside is 2 inches of wood and the siding material covering it. The heat loss through an un-insulated band joist increases when the basement is kept warmer, or contains heating or water heating equipment. Insulating a band joist is an easy way to improve a building's energy efficiency. The baseline is no insulation.

Insulation (Slab). A substantial amount of heat is lost through an un-insulated slab, resulting in cold, uncomfortable floors. Even if the foundation wall is insulated vertically under the slab, significant heat is still lost from the slab edge that is closest to the cold outside air. Table C.6 compares the different slab insulations for this measure.

Table C.6. Slab Insulation Measures

Measure Insulation	Baseline Insulation
R-10 (state code)	R-0
R-15	R-10 (state code)

Insulation (Wall) 2x4. Wall insulation can help slow the transfer of heat and reduce both the heating and cooling loads in houses. Table C.7 compares the different insulations for 2x4 framing.

Table C.7. 2x4 Wall Insulation Measures

Measure Insulation	Baseline Insulation
R-13	R-0
R-13 + R-5 Sheathing	R-13

Insulation (Wall) 2x6. Wall insulation can help slow the transfer of heat and reduce both the heating and cooling loads in houses. Table C.8 compares the different insulations for 2x6 framing.

Table C.8. 2x6 Wall Insulation Measures

Measure Insulation	Baseline Insulation
R-20	R-0
R-20 + R-5 Sheathing	R-20 (State Code)

Leak Proof Duct Fittings. A system of mechanically fastened fittings (couplings, boots, plenums, wyes) for flex and hard ducts that snap together to create a long-lasting seal.

Natural Ventilation. Natural ventilation systems rely on pressure differences to move fresh air through buildings. Natural ventilation, unlike fan-forced ventilation, uses the natural forces of wind and buoyancy to deliver fresh air into buildings. The specific approach and design of natural ventilation systems varies based on building type and local climate. However, the amount of ventilation depends on the careful design of internal spaces and the size and placement of openings in the building. Natural ventilation offsets the energy required to run forced air ventilation systems. [8]

O&M Tune Up. Proper system tune-up/maintenance ensures that both refrigerant charge and airflow through the evaporator coil are properly tested and correctly adjusted – two factors that

[8] Description source: National Renewable Energy Laboratory

affect system efficiency. Maintenance includes changing filters and cleaning coils to maintain the overall performance and efficiency of the unit.

Outlet Gasket. Provide sealing around electrical outlets to reduce drafts and heat loss through small air spaces.

Proper Sizing – Central Air Conditioner. Properly sized central air conditioners operate for long periods of time (rather than frequently cycling on and off), resulting in optimum equipment operating efficiency and better control.[9]

Proper Sizing – Heat Pump. Properly sized heat pumps operate for long periods of time (rather than frequently cycling on and off), resulting in optimum equipment operating efficiency and better control.

Radiant Barrier (ceiling). Radiant barriers generally consist of a thin piece of aluminum that are installed in buildings to help reduce the solar heat gain from the sun during the summer, as well as helping to trap heat in during winter. They work by reducing heat transfer between the air space of the roof deck and the attic floor.

Radiant Electric Ceiling Panels. Radiant heating systems rely on infrared radiation to heat objects, people, and surfaces. The effect is that radiant energy as received by people (directly from the heater and indirectly from other surfaces) allows them to perceive a comfort condition temperature that is 4° to 5° higher than the actual air temperature. This allows a radiant heater to operate at lower air temperatures thus decreasing the use of heating fuel by reducing air stratification within the space, side-wall and ceiling as well as building heat losses.

Radiant Electric Floor Heating. Radiant heating systems rely on infra red radiation to heat objects, people, and surfaces. The effect is that radiant energy as received by people (directly from the heater and indirectly from other surfaces) allows them to perceive a comfort condition temperature that is 4° to 5° higher than the actual air temperature. This allows a radiant heater to operate at lower air temperatures thus decreasing the use of heating fuel by reducing air stratification within the space, side-wall and ceiling as well as building heat losses.

Solar Attic Fan. Forced attic fan ventilation reduces residential heat gains from the ceiling. The baseline uses passive ventilation without a fan.

Spray in Insulation, 2x4 and 2x6 Wall. Unlike traditional insulation materials like fiberglass or cellulose, spray foam insulation seals and fills tiny cracks and seams, which virtually eliminates energy-wasting air infiltration. This measure increases the resistance value of 2 x 4 wall to R-23, compared to the baseline of R-13, and increases 2 x 6 wall resistance to R-37 from a baseline of R-20.

Thermostat – Clock/Programmable. A programmable thermostat controls the set point temperatures automatically, ensuring the HVAC system is not running during low-occupancy hours.

Thermostat – Multi-Zone. A multi-zone programmable thermostat controls the set point temperatures automatically for multiple areas (rooms or zones), ensuring the HVAC system is not running during low-occupancy hours.

[9] http://www.toolbase.org/Technology-Inventory/HVAC/hvac-sizing-practice

Whole-House Dehumidifier. A high capacity whole-house dehumidifier can be run standalone in a basement or ducted into an existing central air conditioning system. These units remove moisture content from the air and prevent mold, mildew and damp conditions.

Whole-House Fan. Draws cool outdoor air inside through open windows and exhausts hot indoor air through the attic to the outside. A whole house fan is a simple and inexpensive method of cooling a house when outdoor temperatures are lower than indoor temperatures.

Window Film. Solar control window films applied to existing windows reduce peak demand during hot months and conserve energy when air conditioning might be required. In addition to the energy management benefits, the use of these films also reduces exposure to ultraviolet radiation and glare.[10]

Window Overhang. Overhangs shade windows, reducing solar heat gains and the overall cooling load on the home.

Windows. This measure represents an increase in building performance by reducing the U-value in existing construction and new construction windows, as shown in Table C.9. The cost for all increments of windows does not include any labor costs associated with installing the windows. If this value was included, it will only be included in the cost associated with going from Existing windows to a lower more efficiency window. Adding this additional labor for a single family home would increase the cost by approximately $2000 and would decrease the overall total resource cost effectiveness.

Table C.9. High Efficiency Window Measures

Measure U-Value	Baseline U-Value
0.35 (state code)	Existing Windows 0.65
0.35 (state code)	Existing Windows 0.40
0.30	0.35 (state code)
0.19	0.35 (state code)

The code for either new construction or window replacement states the customer must go to code (U=0.35) at a minimum when installing new windows.

Lighting

CFL Lighting – 3-Way. Three-way lights allow for different stages of illumination using different input Wattages. This measure compares a 3-way CFL lamp with 13 Watt, 20 Watt, and 25 Watt increments to a three-way incandescent lamp using 30 Watts, 75 Watts, and 100 Watts.

[10] http://www.iwfa.com/iwfa/Consumer_Info/windowfilmbenefits.html

Compact Fluorescent Lamps & Fixtures. Combining the energy efficiency of fluorescent lighting with the convenience and popularity of incandescent fixtures, CFLs: (1) save up to 75% of the initial lighting energy by replacing incandescent that are roughly 3 – 4 times their Wattage, and (2) create further savings by lasting 6–15 times longer (6,000–15,000 hours). The incandescent lamp baselines and their equivalent CFL wattages are shown in Table C.10 below. The CFL fixtures are assumed to use two lamps per fixture.

Table C.10. CFL Lamp and Fixture Wattages

Measure Wattage	Baseline Wattage
15 W	60 W
20 W	75W
25 W	100 W

CFL Torchieres. A compact fluorescent torchiere is a table or floor lamp designed to direct light upward for indirect illumination. Most of the light is thrown against the ceiling and reflected back. This measure compares a standard 180 Watt halogen lamp to a 55 Watt CFL.

Daylighting Controls (Photocell) – Indoor/Outdoors. Photocells are used to adjust lighting levels according to the level of daylight the room is receiving. Baseline is no daylighting controls.

Fluorescent Lamps and Fixtures. This measure includes replacement of T12 lamps with T8 lamps and replacement of T8 lamps with T5 or super T8 lamps and fixtures, as shown in Table C.11.

Table C.11. Fluorescent Lamp and Fixture Wattages

Measure Wattage	Baseline Wattage
32 W	40 W
28 W	32 W

High Pressure Sodium Lamps, Outdoor. High pressure sodium lamps consuming 70 watts provide approximately equivalent light to mercury vapor lamps at 175 watts, but with considerable energy savings due to reduced wattage.

LED Christmas Lighting. Typical Christmas tree lighting uses incandescent bulbs that can be costly, as well as a fire hazard. LED lights use a low wattage bulb and can save up to 90% of holiday lighting costs.

LED Interior Lighting (White). Light emitting diodes (LEDs) are solid-state devices that convert electricity to light, potentially with very high efficiency and long life. Recently, lighting manufacturers have been able to produce "cool" white LED lighting indirectly, using ultraviolet LEDs to excite phosphors that emit a white-appearing light. These lights are viewed as a replacement for compact fluorescent lamps and their equivalent wattages are found in Table C.12 below.

Table C.12. LED Lamps

Measure Wattage	Baseline Wattage
7 W	15 W
9 W	20W
13 W	25 W

LED Outdoor Lighting (White). Replace a 75 W incandescent light with a 9 W LED.

Low Pressure Sodium Lamps, Outdoor. 55 W low pressure sodium lamp replaces a 75W incandescent.

Metal Halide, Outdoor. 70 W metal halide replaces a 90W incandescent flood lamp.

Occupancy Sensors. If a space is unoccupied for a designated amount of time, an occupancy sensor will turn off the lights. The lights will turn on again once the sensor detects a person has entered the space.

Outdoor Lighting – Photovoltaic, Installation. Solar recharging system collects energy during the day to power outdoor path lights overnight. Baseline is wired outdoor lighting at 75 watts.

Photosensor Control – Lighting, Outdoor. A photocell is used to control an outdoor 100W lamp. Baseline is no controls.

Time Clocks (Exterior Lighting). Allows the user to program times to automatically turn lights on and off outside the residence. Programmed exterior lighting saves energy by ensuring that lights are not accidentally left on during the daytime.

Plug Load

1-watt Standby Power. Standby power is the electricity used by electrical equipment when it is switched off, or not performing its main function. Minimizing this loss to one watt or less can reduce this standby energy consumption by more than 50%.

ENERGY STAR Battery Chargers. Battery charging systems recharge a wide variety of cordless products, including power tools, small household appliances, and personal care products like electric shavers. Conventional battery chargers — even when not actively charging a product – draw as much as 5 to 20 times more energy than actually stored in the battery. Advanced energy-saving designs are now available that, on average, use 35% less energy. The baseline is a standard battery charger.[11]

ENERGY STAR Dehumidifiers. ENERGY STAR® qualified models have more efficient refrigeration coils, compressors, and fans than conventional models, which means they use less

[11] http://www.energystar.gov/index.cfm?c=battery_chargers.pr_battery_chargers

energy to remove moisture. These qualified models remove the same amount of moisture as a similarly-sized standard unit, but uses 10% – 20% less energy. The baseline for this measure is a standard dehumidifier.[12]

ENERGY STAR Digital Set Top Receiver. Set-top boxes that have earned the ENERGY STAR are at least 30 percent more efficient than conventional models[13]. ENERGY STAR receivers must consume less than 7 Watts for satellite and 5 Watts for Low Noise Blockers to qualify. The baseline measure is a standard receiver.

ENERGY STAR DVD System. ENERGY STAR® qualified DVD products that meet the new requirements use up to 60% less energy than standard models[14]. ENERGY STAR® DVD players use as little as one fourth of the energy used by standard models in the "off" mode. Baseline measure is a standard DVD player.

ENERGY STAR Flat Screen HDTV. Short for High-Definition Televisions, ENERGY STAR qualified TVs use about 30% less energy than standard units[15]. ENERGY STAR models are required to consume less than 1 Watt when switched to the off position. The baseline is a standard television, generally consuming more than 3 Watts when off.

ENERGY STAR Home Audio System. According to ENERGY STAR products, a 6% energy savings can be achieved over standard home audio systems.[16]

ENERGY STAR Office Computers. ENERGY STAR® computers consume less power in "idle", "sleep", and "off" mode than conventional units.

ENERGY STAR Home Office Copiers. ENERGY STAR copy machines enter sleep mode after inactivity for at least 30 minutes. This reduces their total power consumption.[17]

ENERGY STAR Home Office Monitor. ENERGY STAR® monitors feature: (1) "on" mode, where the maximum allowed power varies based on the computer monitor's resolution; (2) "sleep" mode, where computer monitor models must consume 2 Watts or less; and, (3) "off" mode, where computer monitor models must consume 1 Watt or less. The baseline equipment does not include these features.[18]

ENERGY STAR Office Printer. Printers are required by ENERGY STAR standards to deploy a maximum time delay to sleep depending upon the size of the equipment. This reduces power consumption during periods of inactivity.[19]

ENERGY STAR Box TV. ENERGY STAR® certified televisions use approximately 30% less energy than standard models and consume less than 1 Watt when idle.

ENERGY STAR VCR. ENERGY STAR® certified VCRs use approximately 30% less energy than standard models and consume less than 1 Watt when idle.

---

12 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DE
13 http://www.energystar.gov/index.cfm?c=settop_boxes.settop_boxes
14 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=DP
15 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TV
16 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=HA
17 http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf
18 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.ShowProductGroup&pgw_code=MO
19 http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf

Power Supply Transformer/Converter - External Power Adapters. Energy Star power adapters provide more efficient electricity conversion for a variety of devices.

Smart Strip/Powerstrip with Occupancy Sensor. Energy-saving products such as power strips with an occupancy sensor are found in workstations where power strips are commonly used. The sensor will turn on and off the power to all devices such as computers, desk lights, and audio equipment that are plugged into the power strip based on occupancy within the work area.

Pool Pumps

Pool Pump Timers. Setting a pool pump to run during off-peak times (starting after 8 p.m. and cycling off before 10 a.m.) reduces energy costs. Cycling pumps further reduce monthly costs. Baseline is a continuously running pump.

Pool Pumps – VSD. Enables the pool pump motor to run at variable speeds as opposed to constantly running at full power.

Refrigeration / Freezer

1 kWh per day Refrigerator. Reducing the energy use of a refrigerator to less than 1 kWh/day will result in over 25% reduction in energy use from a baseline refrigerator.

Freezer, Compact. Larger freezers use more energy than smaller freezers. By switching to a small energy efficient freezer, energy use is minimized.

Refrigerator eCube. The eCube is placed in a refrigerated area and monitors the temperature of the product and not the temperature of the air. The thermostat is connected to the compressor, which cycles on and off to maintain the set point, based on the product temperature. The cycles of the compressor are reduced because the temperature is now based on the product and not the air.[20]

Refrigerator//Freezer – Early Replacement. Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older refrigerator/freezers, resulting in excessive energy consumption. Existing units are replaced with standard (code) models.

Refrigerator//Freezer – Removal of Secondary. This refers to the environmentally friendly disposal of unneeded appliances such as secondary refrigerators or stand-alone freezers.

Stand-Alone Freezer –Early Replacement Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older freezers, resulting in excessive energy consumption. Existing units are replaced with standard (code) models.

Stand-Alone Freezer – Removal. Removal of stand-alone freezers is beneficial due to their inefficient use of energy. Proper disposal is required, as they use hazardous materials such as Freon & CFCs.

[20] http://www.fypower.org/news/?p=1033

Water Heat

Clothes Washer. Several Modified Energy Factor (MEF) models were compared in this measure, as shown in Table C.13.

Table C.13. Clothes Washer Modified Energy Factor Comparisons

Measure MEF	Baseline MEF
1.66 (standard)	1.26 (average existing)
1.83 ENERGY STAR	1.66 (standard)
2.07	1.66 (standard)

Dishwasher. Due to the large implementation of ENERGY STAR dishwashers, this measure compares a high efficiency dishwasher (EF = 0.77) to the baseline of an ENERGY STAR dishwasher (EF = 0.65). Table C.14 shows the following energy factors compared in this measure.

Table C.14. Dishwasher Energy Factor Comparisons

Measure Energy Factor	Baseline Energy Factor
0.65 ENERGY STAR	0.50 Existing Unit
0.72	0.65 ENERGY STAR

Drain Water Heat Recovery. Drain water heat recovery devices recover heat energy from domestic drain water and are used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the entering water temperature.

Faucet Aerators. Faucet aerators, by mixing water and air, reduce the amount of water that flows through the faucet. The faucet aerator creates a fine water spray with a screen that is inserted in the faucet head. Flow rate requirements for this measure are presented in Table C.15.

Table C.15. Faucet Aerator Flow Rates

Measure Flow Rate (GPM*)	Baseline Flow Rate (GPM)
2.2	3.0 (existing)
1.5	2.2
0.5	2.2

* Gallons per minute

Heat Pump Water Heater. The water-heating heat pump moves heat from a warm reservoir (such as air) into the hot water system. The system employs an evaporator, compressor, condenser, expansion valve, hot water circulating pump and controls to accomplish this function.[21]

Heat_Pump - Ground or Water-Source (Desuperheater). Desuperheaters are heat recovery devices that transfer heat from the air conditioning unit to the domestic water heater, that would

[21] Description source: U.S. Department of Energy

normally be transferred to the ground. A desuperheater provides supplemental water heating only when the heat pump operates in the cooling mode.[22]

Hot Water Pipe Insulation. Adding R-4 insulation around the pipes will decrease heat loss.

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. Flow rate requirements for this measure are presented in Table C.16.

Table C.16. Low-Flow Showerhead Flow Rates

Measure Flow Rate (GPM)	Baseline Flow Rate (GPM)
2.5 Federal code	3.0 (Existing)
2.0	2.5 Federal code

Solar Water Heater. Solar water heating systems include storage tanks and solar collectors. There are two types of solar water heating systems: active, which have circulating pumps and controls, and passive, which don't. Either system actively increases the entering water temperature to the storage tank, reducing the amount of energy required by the hot water heater to achieve the set point temperature.[23]

Tankless Water Heater. Tankless water heaters produce the majority of energy savings by avoiding standby losses that occur when a normal storage tank is not in use. Tankless water heaters provide hot water at a preset temperature when needed without storage, thereby reducing or eliminating standby losses. A tankless system has an EF of 0.95, compared to a standard electric water heater with an 0.92 EF.[24]

Water Heater – Early Retirement. Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older water heaters, resulting in excessive energy consumption. Existing units are replaced with more efficient models.

Water Heater Timer. A time clock turns the water heater off during periods when the household does not typically use hot water.

Water Heating, Heat Trap. Heat traps are specially designed valves that allow water to flow into the water heater tank but prevent unwanted hot water flow out of the tank. Balls inside the chamber either float or sink into a seat, halting heat transfer by convection.[25]

Water Heater Tank Blanket. Install R-5 insulation on older models with no insulation, which helps reduce stand-by losses.

Water Heater Thermostat Setback. This measure generates savings by reducing the set point temperature from 135° to 120°. Often, the set point temperature on a hot water system is set higher than necessary.

---

22 http://www1.eere.energy.gov/femp/procurement/eep_groundsource_heatpumps.html
23 http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12850
24 http://www.toolbase.org/Technology-Inventory/Plumbing/tankless-water-heaters
25 http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13100

Electric Equipment Measures

Air Conditioner – Central (2.5 ton unit). This unit has a 30,000 BTU/hr cooling capacity. This measure compares several different SEER models, which are summarized in **Error! Reference source not found.** below.

Air Conditioner – Central (3.0 ton unit). This unit has a 36,000 BTU/hr cooling capacity. This measure compares several different SEER models, as summarized below in Table C.17.

Table C.17. Central AC SEER Comparison

Measure SEER	Baseline SEER
14 SEER 16 SEER 18 SEER	13 SEER (federal code)

Air Conditioner – Room (Individual Rooms) (10,000 BTU/HR). ENERGY STAR® qualified room air conditioners use less energy than conventional models through improved energy performance as well as timers for better temperature control. ENERGY STAR® qualified room air conditioners have a 10.8 EER value compared to a standard model that has 9.8 EER.

Air Source Heat Pump. Electric air-source heat pumps use the difference between outdoor air temperatures and indoor air temperatures to cool and heat the home. Table C.18 displays the different models compared in this measure.

Table C.18. Heat Pump SEER/HSPF Comparisons

Measure SEER & HSPF	Baseline SEER & HSPF
14 SEER, 8.5 HSPF 16 SEER, 8.8 HSPF 18 SEER, 9.0 HSPF	13 SEER, 7.7 HSPF

Clothes Dryer with Moisture Sensor. High efficiency dryers have a moisture sensor that stops the drying cycle when the humidity in the drum falls below a certain level. Conventional drying equipment uses thermostats or timers that do not determine when clothes are dry, thereby causing excessive energy consumption due to extended run time.

Freezer – Stand-Alone. ENERGY STAR® qualified freezer models use at least 10% less energy than required by current federal standards from the National Appliance Energy Conservation Act (NAECA).

Refrigerator/Freezer. ENERGY STAR® residential grade refrigerators use at least 10% less energy than required by current federal standards and 40% less energy than conventional models sold in 2001.

Water Heater (40 gallon). High efficiency water heaters are more efficient than standard electric water heaters due to reduced standby losses. This measure assumes an energy factor (EF) for the high efficiency water heaters of 0.95, an increase from the code minimum of 0.92.

C.2 – Residential Gas Measure Descriptions

Gas Non-Equipment Measures

Cooking

Combination Oven – High Efficiency Range and Oven. Energy efficient stovetop and oven in one appliance featuring multi sized heating elements and an oven door window.

Convection Oven. Operates at lower temperatures and achieves quicker cook times than a standard oven, due to fans that circulate heat evenly throughout the oven by moving hot air past the food. The baseline is a standard commercial oven.

Dryer

Clothes Dryer Duct Heat Recovery

HVAC & Envelope

Air-to-Air Heat Exchangers. An air-to-air heat exchanger mechanically ventilates and dehumidifies homes in colder climates. During the winter it transfers heat from the air being exhausted, to the fresh, outside air entering the home. Fifty to eighty percent of the heat normally lost in exhausted air is returned to the house. Air-to-air heat exchangers can be installed as part of a central heating and cooling system or in walls or windows. Wall and window-mounted units resemble air conditioners and will ventilate one room or area.[26]

Canned Lighting Air-Tight Sealing. Proper sealing around recessed lighting fixtures prevents unwanted heat loss through these air spaces due to air pressure differentials in conditioned and unconditioned spaces in homes. The baseline is no sealing.

Construction – ICF. Building a concrete home with insulating concrete forms (ICFs) saves energy and money. The greater insulation, tighter construction, and temperature-moderating mass of the walls conserve heating and cooling energy much better than conventional wood-frame walls.

Construction – SIP. Structural insulated panels use continuous foam insulation throughout the panel that provides excellent energy efficiency and low levels of air infiltration. Baseline is standard wood framing.

Doors – R-5. Composite doors with a foam core increase overall insulation, which slows heat loss. This measure includes adding a thermal door with a resistance value of R-5 to houses with neither thermal nor storm doors.

Doors – Weatherization. To minimize infiltration door sweep, weather stripping mounts to the bottom of the door. It consists of an extruded aluminum strip that holds a flexible vinyl strip to block the air space between the door frame and the door. The baseline for this measure is no weather stripping.

[26] http://www.blueflame.org/datasheets/humidity.html

Duct Location. In many homes, ducts are run through unconditioned areas such as attics, garages, crawlspaces, and basements for convenience and practical reasons. Ducts in unconditioned areas lose energy because of large temperature differences between conditioned air in the ducts and the surrounding space. Locating ducts in conditioned spaces helps to reduce wasted heat loss.[27]

Duct Sealing. Duct sealing cost effectively saves energy, improves air and thermal distribution (comfort and ventilation), and reduces cross contamination between different zones in the building (i.e., smoking vs. non-smoking, bio-aerosols, localized indoor air pollutants).

Duct Sealing – Aerosol Based. A significant amount of energy use in residential buildings is associated with duct losses due to leakage. This is an aerosol duct-sealing technology that seals holes in ducts up to ¼" in diameter from the inside by spraying atomized latex aerosol into a pressurized duct system.

Gas Boiler – Early Retirement. Early replacement of an existing, inefficient boiler with one that has an AFUE of 80%.

Gas Boiler – Proper Sizing. Replacement of an oversized boiler with one that is properly sized, eliminating unnecessary energy consumption. This measure is typically performed for new construction or on replacement of an existing boiler.

Gas Furnace – Early Retirement. Early replacement of an existing, inefficient furnace with one that has an AFUE of 78%.

Gas Furnace – Proper Sizing. Replacement of an oversized furnace with one that is properly sized, eliminating unnecessary energy consumption. This measure is typically performed for new construction or on replacement of an existing furnace.

Green Roof. The added mass and thermal resistance of green roofs reduces the heating and cooling loads of the building. These systems reduce the ambient temperature around the roof, decreasing the building's urban heat island effect; reduce the ambient temperature of the roof's surface; and slow the transfer of heat into the building, reducing cooling costs. They also provide added insulation to the roof structure, reducing heating requirements in the winter.[28]

Duct: Increase duct size or addition of new ducts. Properly sized ducts to ensure the pressure drop across air handler is within manufacturer and design specifications. Baseline is standard small ducts.

Infiltration Control (Caulk, Weather Strip, etc.) Blower – Door Test. Sealing air leaks in windows, doors, roof, crawlspaces, and outside walls decreases overall heating and cooling losses. Filling gaps in windows with synthetic filler prevents drafts and heating/cooling loss.

---

[27] http://www.toolbase.org/pdf/techinv/ductsinconditionedspace_techspec.pdf

[28] http://www.toolbase.org/Technology-Inventory/Roofs/green-roofs

Insulation (Basement – Wall) 2x4. Adding insulation to the basement or crawlspace walls increases the thermal performance of the concrete foundation. Only applies to existing homes. Table C.19 summarizes the different resistance values compared in the measure.

Table C.19. Wall R-Value Comparison

Measure Insulation	Baseline Insulation
R-13 (state code)	R-0
R-13 (state code)	R-7 existing wall
R-13 + R-5	R-13

Insulation (Ceiling/Attic). This measure represents an increase in R-value. Adding insulation in existing buildings increases the thermal performance and brings the resistance value up to and past code, depending on vintage. Table C.20 summarizes the different resistance values compared in the measure.

Table C.20. Ceiling R-Value Comparison

Measure Insulation	Baseline Insulation
R-38	R-0
R-38	R-11
R-49	R-38

Insulation (Duct). Adding insulation around the ducts in the heating system reduces heat loss to unconditioned spaces. Table C.21 summarizes the different resistance values compared in the measure.

Table C.21. Duct R-Value Comparison

Measure Insulation	Baseline Insulation
R-6 (state code)	R-0

Insulation (Floor). Adding insulation to the floor increases the overall resistance value and slow heat transfer from the basement to the upper levels. Table C.22 summarizes the different resistance values compared in the measure.

Table C.22. Floor R-Value Comparison

Measure Insulation	Baseline Insulation
R-19 (state code)	R-0
R-19 (state code)	R-13 existing floor
R-30	R-19 (state code)

Insulation (Rim and Band Joist). An un-insulated band joist can account for a significant portion of a building's heat loss, as the only thing separating inside from outside is 2 inches of wood and the siding material covering it. The heat loss through an un-insulated band joist increases when the basement is kept warmer, or contains heating or water heating equipment. Insulating a band joist is an easy way to improve a building's energy efficiency. The baseline is no insulation.

Insulation (Slab). A substantial amount of heat is lost through an un-insulated slab, resulting in cold, uncomfortable floors. Even if the foundation wall is insulated vertically under the slab, significant heat is still lost from the slab edge that is closest to the cold outside air. Table C.23 compares the different slab insulations for this measure.

Table C.23. Slab Insulation Measures

Measure Insulation	Baseline Insulation
R-10 (state code)	R-0
R-15	R-10 (state code)

Insulation (Wall) 2x4. Wall insulation can help slow the transfer of heat and reduce both the heating and cooling loads in houses. Table C.24 compares the different insulations for 2x4 framing.

Table C.24. 2x4 Wall Insulation Measures

Measure Insulation	Baseline Insulation
R-13	R-0
R-13 + R-5 Sheathing	R-13

Insulation (Wall) 2x6. Wall insulation can help slow the transfer of heat and reduce both the heating and cooling loads in houses. Table C.25 compares the different insulations for 2x6 framing.

Table C.25. 2x6 Wall Insulation Measures

Measure Insulation	Baseline Insulation
R-20	R-0
R-20 + R-5 Sheathing	R-20 (State Code)

Integrated Space and Water Heating. This measure combines space and water heating functions into a single appliance, which reduces system installation costs and increases efficiency when paired with the proper equipment (high efficiency boiler).

Leak Proof Duct Fittings. A system of mechanically fastened fittings (couplings, boots, plenums, wyes) for flex and hard ducts that snap together to create a long-lasting seal.

O&M Tune Up. Proper system tune-up/maintenance ensures that both refrigerant charge and airflow through the evaporator coil are properly tested and correctly adjusted – two factors that

affect system efficiency. Maintenance includes changing filters and cleaning coils to maintain the overall performance and efficiency of the unit.

Outlet Gasket. Provide sealing around electrical outlets to reduce drafts and heat loss through small air spaces.

Radiant Barrier (ceiling). Radiant barriers generally consist of a thin piece of aluminum that are installed in buildings to help reduce the solar heat gain from the sun during the summer, as well as helping to trap heat in during winter. They work by reducing heat transfer between the air space of the roof deck and the attic floor.

Spray in Insulation, 2x4 and 2x6 Wall. Unlike traditional insulation materials like fiberglass or cellulose, spray foam insulation seals and fills tiny cracks and seams, which virtually eliminates energy-wasting air infiltration. This measure increases the resistance value of 2 x 4 wall to R-23, compared to the baseline of R-13, and increases 2 x 6 wall resistance to R-37 from a baseline of R-20.

Thermostat – Clock/Programmable. A programmable thermostat controls the set point temperatures automatically, ensuring the HVAC system is not running during low-occupancy hours.

Thermostat – Multi-Zone. A multi-zone programmable thermostat controls the set point temperatures automatically for multiple areas (rooms or zones), ensuring the HVAC system is not running during low-occupancy hours.

Windows. This measure represents an increase in building performance by reducing the U-value in existing construction and new construction windows, as shown in **Error! Reference source not found.**. The cost for all increments of windows does not include any labor costs associated with installing the windows. If this value was included, it will only be included in the cost associated with going from Existing windows to a lower more efficiency window. Adding this additional labor for a single family home would increase the cost by approximately $2000 and would decrease the overall total resource cost effectiveness. Efficiency levels are included in Table C.26.

Table C.26. High Efficiency Window Measures

Measure U-Value	Baseline U-Value
0.35 (state code)	Existing Windows 0.65
0.35 (state code)	Existing Windows 0.40
0.30	0.35 (state code)
0.19	0.35 (state code)

The code for either new construction or window replacement states the customer must go to code (U=0.35) at a minimum when installing new windows.

Water Heat

Clothes Washer. Several Modified Energy Factor (MEF) models were compared in this measure, as shown in Table C.27.

Table C.27. Clothes Washer Modified Energy Factor Comparisons

Measure MEF	Baseline MEF
1.66 (standard)	1.26 (average existing)
1.83 ENERGY STAR	1.66 (standard)
2.07	1.66 (standard)

Dishwasher. Due to the large implementation of ENERGY STAR dishwashers, this measure compares a high efficiency dishwasher (EF = 0.77) to the baseline of an ENERGY STAR dishwasher (EF = 0.65). Table C.28 shows the following energy factors compared in this measure.

Table C.28. Dishwasher Energy Factor Comparisons

Measure Energy Factor	Baseline Energy Factor
0.65 ENERGY STAR	0.46 Existing Unit
0.72	0.65 ENERGY STAR

Drain Water Heat Recovery. Drain water heat recovery devices recover heat energy from domestic drain water and are used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the entering water temperature.

Faucet Aerators. Faucet aerators, by mixing water and air, reduce the amount of water that flows through the faucet. The faucet aerator creates a fine water spray with a screen that is inserted in the faucet head. Flow rate requirements for this measure are presented in Table C.29.

Table C.29. Faucet Aerator Flow Rates

Measure Flow Rate (GPM*)	Baseline Flow Rate (GPM)
2.2	3.0 (existing)
1.5	2.2
0.5	2.2

* Gallons per minute

Heat_Pump - Ground or Water-Source (Desuperheater). Desuperheaters are heat recovery devices that transfer heat from the air conditioning unit to the domestic water heater, that would normally be transferred to the ground. A desuperheater provides supplemental water heating only when the heat pump operates in the cooling mode.[29]

Hot Water Pipe Insulation. Adding R-4 insulation around the pipes will decrease heat loss.

[29] http://www1.eere.energy.gov/femp/procurement/eep_groundsource_heatpumps.html

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. Flow rate requirements for this measure are presented in Table C.30.

Table C.30. Low-Flow Showerhead Flow Rates

Measure Flow Rate (GPM)	Baseline Flow Rate (GPM)
2.5 Federal code	3.0 (Existing)
2.0	2.5 Federal code

Pool Heaters. Pumps circulate pool water through a filter and then to the heater. Gas burns in the combustion chamber, generating heat that is then transferred to the water returning to the pool. This measure involves installing more efficient pool heaters.[30]

Tankless Water Heater. Tankless water heaters produce the majority of energy savings by avoiding standby losses that occur when a normal storage tank is not in use. Tankless water heaters provide hot water at a preset temperature when needed without storage, thereby reducing or eliminating standby losses. An energy factor of 0.95 was used for the tankless system and compared to a standard electric water heater with an 0.92 EF.[31]

Water Heater – Early Retirement. Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older water heater resulting in excessive energy consumption. Existing units are replaced with more efficient models.

Water Heater Timer. A time clock turns the water heater off during periods when the household does not typically use hot water.

Water Heating, Heat Trap. Heat traps are specially designed valves that allow water to flow into the water heater tank but prevent unwanted hot water flow out of the tank. Balls inside the chamber either float or sink into a seat, halting heat transfer by convection.[32]

Water Heater Tank Blanket. Install R-5 insulation on older models with no insulation, which helps reduce stand-by losses.

Water Heater Thermostat Setback. This measure generates savings by reducing the set point temperature from 135° to 120°. Often, the set point temperature on a hot water system is set higher than necessary.

Gas Equipment Measures

Clothes Dryer with Moisture Sensor. High efficiency dryers have a moisture sensor that stops the drying cycle when the humidity in the drum falls below a certain level. Conventional drying equipment uses thermostats or timers that do not determine when clothes are dry, thereby causing excessive energy consumption due to extended run time.

[30] http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13160
[31] http://www.toolbase.org/Technology-Inventory/Plumbing/tankless-water-heaters
[32] http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13100

Gas Boiler. The National Energy Policy Act of 1992 mandates that all boiler manufacturers must meet the requirements of ASHRAE Standard 90.1. Boilers less than 300 kBtuh are rated using an Annual Fuel Utilization Efficiency (AFUE). AFUE measures the amount of heat actually delivered to the amount of fuel consumed during the heating season; sometimes referred to as the seasonal efficiency. Table C.31 displays the different AFUE values compared in this measure.

Table C.31. AFUE Gas Boiler Comparison

Measure AFUE	Baseline AFUE
AFUE 82% AFUE 90% AFUE 94%	AFUE 80% (state code)

Gas Furnace. This furnace measure also compares several different AFUE values amongst different units. Table C.32 displays the different AFUE values compared and their baselines.

Table C.32. AFUE Gas Furnace Comparison

Measure AFUE	Baseline AFUE
AFUE 80% AFUE 90% (condensing) AFUE 96% (condensing)	AFUE 78% (state code)

Water Heater. High efficiency gas water heaters have better insulation, heat traps and more efficient burners. The thermal efficiencies in Table C.33 were considered.

Table C.33. Commercial Gas Water Heater Comparison

Measure Efficiency	Baseline Efficiency
0.62 EF 0.80 EF	0.59 EF

C.3 – Commercial Electric Measure Descriptions

Electric Non-Equipment Measures

Cooking

Cooking Fryers – Commercial. Commercial ENERGY STAR® electric fryers have a heavy load cooking efficiency of 80% or better, and when idle, uses less than 1,000 Watt.[33] The baseline efficiency is 70% for an non-ENERGY STAR commercial fryer.

Hot Food Holding Cabinets – Commercial. ENERGY STAR® hot food-holding cabinets use a maximum of 40Watts/cubic foot, less than the baseline measure, a conventional holding cabinet.[34] The baseline efficiency is 67% for an non-ENERGY STAR commercial hot food holding cabinet.

Oven – Convection – Commercial. Commercial ENERGY STAR® electric convection ovens have a cooking efficiency of 70% or better, with idle energy rates that vary depending upon size.[35] Standard electric convection ovens have a 65 percent cooking energy efficiency and an idle energy rate of 2 kW; whereas ENERGY STAR® qualified electric convection ovens must meet the specification requirements of 70 percent cooking energy efficiency and an idle energy rate of 1.6 kW.

Steam Cookers – Commercial. Commercial ENERGY STAR® electric steam cookers have a cooking efficiency of 50%, with idle energy rates that vary depending upon pan size.[36] The baseline efficiency is 35% for an non-ENERGY STAR commercial steam cooker.

HVAC Aux

Automated Exhaust VFD Control – Parking Garage CO Sensor. This measure allows the ventilation system to run only when CO levels are above a specified level. The ventilation system would run constantly without this measure.

Compressed Air Optimization. Audit the compressed air system for leaks, in order to replace inefficient compressors and improve controls. The baseline measure assumes no audit, no new compressors, and no improved controls.

Cooking Hood Controls. Utilizing sensors and two-speed or variable speed fans, hood controls reduce exhaust (and makeup) airflow when appliances are not at capacity (or have been turned off). The baseline for this measure is no hood controls.

HVAC Motors – Premium Efficiency. Premium efficiency motors are more efficient than standard efficiency motors. This measure specifically relates to HVAC motors, ranging from 1 HP to 200 HP, depending on the building size.

---

33 http://www.energystar.gov/index.cfm?c=fryers.pr_fryers
34 http://www.energystar.gov/index.cfm?c=hfhc.pr_hfhc
35 http://www.energystar.gov/index.cfm?c=ovens.pr_comm_ovens
36 http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers

Motors – Pump and Fan System – Variable Speed Control. Variable speed controls allow for pump and fan motors to operate at a lower speed while still maintaining the set points during partial load conditions. Energy is reduced when motor operation can vary with load rather than run at a constant speed.

Motors – Variable Air Volume (VAV) Box High Efficiency. High efficiency fan-powered boxes prevent hot and cold spots by maintaining room air circulation while supply-air temperature is modulated to match load. Energy is saved by re-circulating warm air from zones that have less heating requirements to zones with greater heating requirements. This measure applies to the motor efficiency as an upgrade. An electronically commutated motor (ECM) powers the fan in each VAV box. An ECM is a brushless DC motor with all of its speed and torque controls built in electronically, which allows the motor to adjust its speed to ensure the optimal airflow at all times. The baseline assumes a standard VAV with induction motors including silicon controlled rectifier (SCR) speed control. [37]

Variable Speed Drive Furnace Fan. Enables the fan motor of a furnace to run at variable speeds as opposed to constantly running at full power.

HVAC & Envelope

Air Conditioner - Packaged, Ductless Variable Refrigerant Flow. Modified ductless packaged terminal air conditioning system with variable refrigerant flow, delivering improved part load performance and zoned temperature control.

Attic Fan – Photovoltaic. Using solar powered fans, draws cool outdoor air inside through open windows and exhausts hot indoor air through the attic to the outside. An attic fan is a simple and inexpensive method of cooling a house when outdoor temperatures are lower than indoor temperatures.

Automatic Ventilation VFD Control (occupancy/CO_2 sensors). The ventilation system automatically adjusts air flow when CO_2 levels are above a specified level. When using CO_2 control, a minimum ventilation rate is maintained at all times to control non-occupant contaminants like off-gassing from furniture, equipment and building components. Without it, as a baseline, the ventilation system would run constantly.

Building Commissioning and Retro-Commissioning. Commissioning ensures that energy-using systems that have been installed are operating in an optimal fashion in order to maximize energy efficiency. The commissioning process can be applied to existing buildings to restore them to optimal performance. Retro-commissioning is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and brings the buildings up to the design intentions of its current operation.[38,39] The baseline measure is no commissioning. The cost for this measure is derived by taking the cost of the initial commissioning for the first year and then taking a 40% commissioning cost in each year for the life of the measure (10 years). It is feasible to only perform retro-commissioning every three

[37] LEED qualified Justice Center reported by DCJ.com and Minnesota Power Incentive Program
[38] http://www.green.ca.gov/CommissioningGuidelines/default.htm
[39] http://cbs.lbl.gov/BPA/cct.html

years. If this step is performed the total cost of the measure would go down, which would make the measure more cost effective than shown in this study. This change could potentially make the measure pass a cost effectiveness screen and would raise the total estimate for the total economic potential.

Chilled Water / Condenser Water Settings-Optimization. Adjustments made to the chilled and condenser water system settings to better match the building load and reduce unnecessary use of the compressor and pumps.

Chilled Water Piping Loop with Variable speed drive (VSD) Control. A VSD controller, with two-way valves at the cooling coils, controls the chilled water pump to vary pump speed and chilled water flow to match the varying cooling load, thus reducing pumping energy requirements. The baseline is a constant speed pump with three-way valves.

Chilled Water Reset. Varies the temperature of the chilled water in a loop, allowing for an increase of water temperature as the cooling requirement decreases. The baseline measure is no chilled water reset.

Chiller Water-Side Economizer. Consists of a heat exchanger attached to a condenser water piping loop that operates when outdoor conditions can produce condenser water colder than the mixed air temperature. A water side economizer is used if an outdoor-air economizer is not practical. The baseline measure is no economizer.

Cool Roof. ENERGY STAR-qualified cool roofs can lower roof surface temperature by up to 100ºF, thereby decreasing the amount of heat transferred into a building. Cool roofs can help reduce the amount of air conditioning needed in buildings, and can reduce peak cooling demand by 10%–15%.[40] This measure could be considered as a passive measure.

Cooling Tower – Decrease Approach Temperature. An oversized cooling tower allows a reduced approach temperature, which saves energy. The approach temperature is the difference between the tower water leaving and the wet-bulb temperature. This measure assumes a 6 degree delta compared to the baseline of a 10 degree temperature delta.

Cooling Tower – Two-Speed Fan Motor. A two-speed fan cycles between off, low, and high speed to maintain the tower set point. The low-speed setting option uses less energy than a single, high speed fan. The baseline measure is a single-speed fan motor.

Cooling Tower – VSD Fan Control. One step more sophisticated than the two-speed fan motor is the variable speed drive (VSD). A VSD drive modulates the air flow so that the heat rejection exactly matches the load at the desired set point. The baseline measure is a single-speed fan motor.

Cold Climate Heat Pump. Cold-climate heat pumps are air-to-air heat pumps that have been optimized for colder climates. The performance of these heat pumps is expected to be approximately the same as ground-source heat pumps (GSHP).

Cooling DX Package Air-Side Economizer. An air-side economizer uses already cooled air (return air) mixed with a proportion of outside air to cool indoor spaces. Using the return air results in energy savings, as less air needs to be cooled.

---

[40] ENERGY STAR

Direct/Indirect Evaporative Cooling, Pre-Cooling. A direct evaporative cooler is a low-energy system that evaporates water into the air stream, thus reducing the temperature of the air, but increasing the humidity. An indirect evaporative cooler uses a secondary air stream that is cooled by water and goes through a heat exchanger with the primary air stream, cooling the air but not affecting the humidity. A direct/indirect system cools the air stream first through an indirect cooler, and then cools it further through a direct cooler. Including an evaporative cooler before the DX system will reduce the overall cooling load.

Direct Digital Control System – Install. Direct digitally controlled (DDC) systems allow for both HVAC and lighting to be controlled and monitored using an electronic or digital system. For lighting, replacing the manually operated wall switches with a digital interface allows for direct control of lights at a remote location at anytime. For HVAC, the entire system, including pumps, motors, fans, and set points, can be digitally programmed for each unit to further increase tighter control of the system.

Direct Digital Control System – Optimization. Allows for digital monitoring and control of HVAC and lighting systems. The optimization of the control system is upgrading a high-efficiency energy management system to a premium efficiency system.

Direct Digital Control System – Wireless Performance Monitoring. These are second-generation building automation systems that allow for wireless optimization and operation of building systems such as HVAC through computerized monitoring and control software and interfaces.

Duct Repair and Sealing. The repair and sealing of leaky ducts creates significant energy savings by ensuring conditioned air only goes to occupied spaces, thereby reducing an excessive runtime/load on the HVAC system.

DX Tune-Up/Diagnostics. Regular maintenance of direct expansion (DX) air-conditioning systems including activities such as checking controls, replacing filters, cleaning coils and blowers, and checking refrigerant levels.

Exhaust Air to Ventilation Air Heat Recovery. Captures air that is exhausted out of a building during the heating season, which is warmer than the air outside. Transferring this heat to the incoming air lowers the overall heating load.

Exhaust Hood Makeup Air. Provides exhaust air at the hood instead of allowing the hood to exhaust the conditioned air in the room. The baseline measure is for conditioned air to be expelled through exhaust hoods.

Green Roof. A green roof is a living roof that supports soil and plant growth. A series of carefully engineered layers are applied to the roof deck. These layers are watertight, lightweight, and long lasting. Green roofs can be incorporated into new buildings as long as load requirements are met. They are suited for roofs that have slopes ranging up to 20° and are most successful when sufficient attention has been paid to selecting plants that will thrive in the local climate and conditions. One of the most significant advantages is that a green roof can last up to three times longer than a standard roof. A green roof can also buffer temperature extremes, which improves a building's energy performance by dropping the temperatures on the roof 3° – 7°, resulting in approximately 10 to 12% reduction in cooling loads.

Heat Pump – Ground Source. Geothermal or ground source heat pumps (GSHP) utilize the constant temperature of the earth as the exchange medium instead of the outside air temperature

that is used by Air Source Heat Pumps (ASHP). This allows higher efficiencies on the coldest nights, compared to air-source heat pumps.[41] The measure efficiency level is 13.4 EER while the baseline is at 11 EER.

Heat Pump – Water Source (closed loop). Groundwater source heat pumps use natural wells or man-made lakes as heat sources or sinks. A closed recirculating loop of refrigerant is immersed in the groundwater where it exchanges heat with the body of groundwater. The fluid is then pumped into the building to provide heating or cooling.

Infiltration Control (Caulking, Weather Stripping, etc.). Sealing air leaks in windows, doors, roof, crawlspaces, and outside walls decreases overall heating and cooling losses. Baseline and measure values are presented in Table C.34.

Table C.34. Infiltration Reduction Measures

Measure (ACH)	Baseline (ACH)
0.65	1.00

Insulation – Floor (Non-Slab). These measures represent an increase in R-value to current code levels of R-19 for the floor space (non-slab) and better. Baseline and measure values are presented in Table C.35.

Table C.35. Floor Insulation Measures

Measure	Baseline
R-10	R-0
R-19	R-10

Insulation – Ceiling. These measures represent an increase in R-value to current code values of R-20 or better. Baseline and measure values are presented in Table C.36.

Table C.36. Ceiling Insulation Measures

Measure	Baseline
R-20	Existing ceiling insulation (R-9)
R-38	R-20

Insulation – Duct. Packaged Direct Expansion (DX) and heat-pump equipment are generally coupled with a ducting system inside the building. Insulating the ducts reduces energy loss in the unoccupied plenum space. This measure assumes that R-5 or R-8 insulation will be installed, or R-5 insulation will be replaced with R-8.

Insulation – Wall. Wall insulation installed with a current code R-value of R-13 + R-7.5 or better. Baseline and measure values are presented in Table C.37.

[41] Description source: EERE

Table C.37. Wall Insulation Measures

Measure	Baseline
R-13 + R-7.5 (Code)	R-11
R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)

Natural Ventilation. Natural ventilation systems rely on pressure differences to move fresh air through buildings. Natural ventilation, unlike fan-forced ventilation, uses the natural forces of wind and buoyancy to deliver fresh air into buildings. The specific approach and design of natural ventilation systems varies based on building type and local climate. However, the amount of ventilation depends on the careful design of internal spaces and the size and placement of openings in the building. Natural ventilation offsets the energy required to run forced air ventilation systems. [42]

Passive Solar Design. A home's windows, walls, and floors can be designed to collect, store, and distribute solar energy in the form of heat in the winter and reject solar heat in the summer. Passive solar design techniques are most easily integrated when designing a new home. Other measures include deciduous trees for shade, window eaves, and proper building orientation.

Pipe Insulation. Adding R-4 insulation around the pipes decreases temperature losses, thereby reducing demand on water heaters and chilled water systems.

Proper Sizing – Central Air Conditioner. Properly sized central air conditioners operate for long periods of time (rather than frequently cycling on and off), resulting in optimum equipment operating efficiency and better control. [43]

Radiant Barrier (Ceiling) Radiant Barrier. Radiant barriers generally consist of a thin piece of aluminum that are installed in buildings to help reduce the solar heat gain from the sun during the summer, as well as helping to trap heat in during winter. They work by reducing heat transfer between the air space of the roof deck and the attic floor.

Radiant Heating Radiant Electric Floor Heating. Radiant heating systems rely on infrared radiation to heat objects, people, and surfaces. The effect is that radiant energy as received by people (directly from the heater and indirectly from other surfaces) allows them to perceive a comfort condition temperature that is 4° to 5° higher than the actual air temperature. This allows a radiant heater to operate at lower air temperatures thus decreasing the use of heating fuel by reducing air stratification within the space, side-wall and ceiling as well as building heat losses.

Room Air Conditioner. Replace existing models with one that has a minimum efficiency level of 11 EER. These units often include controls for minimizing the amount of energy used to cool the room, larger coils and/or smaller fans, and more efficient motors.

Room Heat Pump. Existing heat pump is replaced by new model with minimum efficiency of 3.2 COP and 11 EER (code). These units often include controls for minimizing the amount of energy used to cool the room, larger coils and/or smaller fans, and more efficient motors.

Scheduled AHU. Reduced AHU runtime decreases energy consumption by 3%.

---

[42] Description source: National Renewable Energy Laboratory

[43] http://www.toolbase.org/Technology-Inventory/HVAC/hvac-sizing-practice

Sensible and Total Heat Recovery Devices. Sensible heat recovery devices transfer energy (heat) from the return air stream back into the supply air stream, which avoids heat losses in exhausted air. This raises the incoming outdoor air temperature in the winter and cools it in the summer. Energy savings results from reduced needs for mechanical heating or cooling. Total heat devices, also called enthalpy recovery, transfer both sensible and latent heat. Latent heat significantly raises the humidity of the outdoor air in the winter and reduces it in the summer. Dehumidification in the summer can be costly and total recovery devices help reduce this.[44]

Thermostat – Programmable. A programmable thermostat controls the set point temperature automatically, ensuring the HVAC system is not running during low-occupancy hours.

Variable Air-Volume System. Allows the airflow volume of a HVAC system to vary with the heating or cooling load rather than over-cooling (or heating) and short-cycling. The baseline in this case is a constant volume system.

Window Overhang. Overhangs shade windows, reducing solar heat gains and the overall cooling load on the home.

Windows – High-Efficiency. This measure represents an increase in building performance by reducing the U-value in existing construction and new construction windows, as shown in Table C.38.

Table C.38. High-efficiency Window Measures

Measure U-Value	Baseline U-Value
0.29	0.45 (Code)
0.35	0.45 (Code)

Lighting

Bi-Level Control, Stairwell Lighting. An occupancy sensor that reduces the light load by 50% when a stairwell is unoccupied for a set amount of time. The baseline is continuous operation at full power.

Daylighting (Exterior lighting). Exterior lighting controls via photocell turn on and off exterior light fixtures when sunlight levels reach the desired set points. The measure achieves savings over time-clock or manual controls through changes in seasonal and site conditions by improving night time durations.

Daylighting Controls – Dimming-Continuous, Fluorescent Fixtures. A dimming switch allows light levels to vary from 0% – 100% brightness. A continuously dimming switch permits variation throughout the range, increasing electricity savings. The baseline measure is operating fluorescent fixtures at full power.

Daylighting Controls – Dimming-Stepped, Fluorescent Fixtures. Allows the user to vary the light level by a number of specified tiers to adjust for the amount of outside daylight. The baseline measure is operating fluorescent fixtures at full power.

[44] http://www.mcquay.com/mcquaybiz/marketing_tools/mt_corporate/EngNews/0701.pdf

HE Fixtures/Design. This measure is a generic way to indicate improved lighting efficiency. The baseline lighting technology is representative of all available technologies that make up the total Watts per square foot for that particular building type. This includes all overhead lighting such as T12, T8, T5 tubes, canned CFLs, etc. The lighting reduction package measures reduce the lighting power density (W/sqft) by installing higher efficiency technologies such as high performance T8 or T5 tubes, high-efficiency ballasts, reflective lighting fixtures, etc. A low reduction package results in a 15% decrease in power density and high reduction results in a 25% decrease in lighting power density. Lighting reduction packages such as T5HO (High Output) for high bay applications, in warehouse and grocery, can reduce the power density by 35%.

High Pressure Sodium High pressure sodium lamps consuming 70 watts provide equivalent light to mercury vapor lamps at 175 watts, but with considerable energy savings due to reduced wattage.

Hotel Key Card Energy Control System. This is a key card system used to control room HVAC and lighting during non-occupied periods. Occupancy is determined by the presence of a key card and/or additional sensors. The central system sets heating and cooling to a minimum, and turns off lighting when the key card is removed. Once the guest returns and inserts the key card, the guest has full control of the room systems.

Induction Lighting. An induction lamp has an induction coil at its center powered by an electronic unit, which produces a magnetic field that energizes a mercury electron-ion plasma material in the glass assembly surrounding the coil. A 150 W metal halide lamp can be replaced by a 55 W induction lamp, giving a 63% energy savings per bulb.

Integrated Lighting, Classrooms and other buildings. Integrated lighting includes daylighting control, super T8 lights, reflective lighting fixtures, and occupancy sensors.

Lighting Improvements (CFL and High Bay). Replace lamps or fixtures with more efficient lighting. CFL measures include: hard-wired 2-lamp CFL fixtures and single lamp 15 watt CFLs. The baseline consisted of 60 watt incandescent lamps and fixtures. High Bay measures include: 4-lamp T-5 HO (High Output), 6-lamp T-5 HO (High Output), 6-lamp 4 foot T-8 32 watt lamp, and 2-lamp 8 foot T-8 HO 86 watt lamp. The baseline consisted of 400 or 250 watt HID (High Intensity Discharge) metal halide lamps.

Light-Emitting Diodes (LED) Exit Lighting. LED exit signs use a fraction of the wattage that incandescent and compact fluorescent (CFL) signs use while lasting over 50,000 hours. The baseline measure is incandescent and CFL signs.

LED Refrigeration Case Lights. Light-emitting diodes (LEDs) are highly efficient bulbs that can be used for refrigeration case lights, a 55% energy savings over a standard 60 W fluorescent refrigeration case light.

LED Solid State White Lighting Package. Light emitting diodes (LEDs) are solid-state devices that convert electricity to light, with very high efficiency and long life. Recently, lighting manufacturers have been able to produce "cool" white LED lighting indirectly, using ultraviolet LEDs to excite phosphors that emit a white-appearing light. This measure applies to exterior lighting and includes: landscape, merchandise, signage, and structure lighting. Replacement for incandescent lamps.

LED Traffic Lights. LEDs are highly efficient bulbs that can be used for traffic signals, replacing less efficient incandescent lamps. LEDs are available in all colors, including turn arrows and pedestrian signals.

Lighting Retrocommissioning. Retrocommissioning ensures that previously installed lighting systems are still operating in an optimal fashion in order to maximize energy efficiency. This process identifies and performs low-cost operational and maintenance improvements while meeting building activity lighting needs.

Low Pressure Sodium Lamps, Outdoor. 55W Low Pressure Sodium lamps replace 75W incandescent.

Occupancy Sensor or Sweep Control. Turns off lighting in areas where activity is not detected. Occupancy and sweep measures can control single or multiple lighting zones. Sweep control can be integrated into an EMS (Energy Management System). The controlled lighting wattage varies depending on application. This measure applies to wattage ranges from 100 watts to over 3,000 watts. The baseline assumes no lighting controls.

Streetlight – LED. Replace metal halide (typically high-pressure sodium) street lighting with more efficient LED lighting.

Task Lighting. This measure includes de-lamping existing fixtures and installing individual task lights at work stations. Task lights reduce energy consumption by (1) using a lower wattage bulb than overhead lighting, and (2) providing direct light where it is needed rather than in an entire area.

Time Clocks and Timers (Lighting). Includes an integrated time-clock that automatically switches lighting and other loads on and off on a time schedule, or in response to an occupancy sensor or a building automation system.

Plug Load

Battery Charging System. Used to recharge a wide variety of cordless products, including power tools, small household appliances, and personal care products like electric shavers. An ENERGY STAR® charging system uses 35% less energy than the baseline, non-ENERGY STAR battery charger.[45]

Computers. ENERGY STAR® computers feature: (1) "on" mode, where the maximum allowed power varies based on the computer monitor's resolution; (2) "sleep" mode, where computer monitor models must consume 2 Watts or less; and, (3) "off" mode, where computer monitor models must consume 1 Watt or less. The baseline measure does not include these features.[46]

Copiers. ENERGY STAR® copiers deliver the same performance as conventional equipment and are, on average, 25% more efficient. They power down when not in use. The baseline measure is non-ENERGY STAR copiers.[47]

---

45 http://www.energystar.gov/index.cfm?c=battery_chargers.pr_battery_chargers

46 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.ShowProductGroup&pgw_code=MO

47 http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CP

Fax. ENERGY STAR® fax machines enter sleep mode after inactivity for at least 5 minutes. This reduces their total power consumption.[48]

Monitors. ENERGY STAR® monitors enter in "sleep" mode, the monitor consumes less than 2 Watts. The "sleep" mode needs to be enabled in order to de-energize the monitor when not in use.

Office Computer Network Energy Management. On an individual basis, the energy wasted by a computer that remains in the full-power "on" state no matter how long it remains idle is almost insignificant. But for a corporation with hundreds or thousands of workstations operating on a local area network (LAN) or a wide area network (WAN), that wasted energy can be quite significant, easily translating to tens of thousands of dollars in unnecessary electricity expenditures each year. The energy-savings potential of implementing a PC power-management policy across a LAN will vary depending on the equipment attached to the network and how that equipment is being used.

Pool Pump Timers. Setting a pool pump to run during off-peak times (starting after 8 p.m. and cycling off before 10 a.m.) reduces energy costs. Cycling pumps further reduce monthly costs. Baseline is a continuously running pump.

Pool Pumps – VSD. Enables the pool pump motor to run at variable speeds as opposed to constantly running at full power.

Printers. ENERGY STAR® printers deploy a maximum time delay to sleep depending upon the size of the equipment. This reduces power consumption during periods of inactivity.[49]

Residential-Size Refrigerator/Freezer. ENERGY STAR® residential grade refrigerators use at least 10% less energy than required by current federal standards and 40% less energy than conventional models sold in 2001.

Residential-Size Refrigerator/Freezer – Early Replacement. Replacing equipment before the end of its useful life is advantageous because of the significant inefficiencies in older refrigerator/freezers, resulting in excessive energy consumption. Existing units are replaced with standard (code) models.

Scanners. ENERGY STAR® enabled scanners enter a low power "sleep" mode of less than 12 Watts within 15 minutes of inactivity.[50]

Vending Machines – High Efficiency. ENERGY STAR® new and rebuilt refrigerated beverage vending machines are up to 40% more energy efficient than the standard model, through more efficient compressors, fan motors, lighting systems, and low-power mode options during non-use periods.[51]

Vending Miser. Senses occupancy and cycles off the cooling of the vending machine when no occupancy is detected.

---

48 http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf
49 http://www.energystar.gov/ia/products/fap/IE_Prog_Req.pdf
50 http://www.energystar.gov.au/products/scanners.html
51 ENERGY STAR

Water Coolers. ENERGY STAR® coolers providing only cold water consume less than 0.16 kWh per day; a unit providing both hot and cold water consumes less than 1.20 kWh per day.[52]

Water Fountain. High efficiency water fountains are more energy efficient, consume less water and uses less refrigerant than other designs on the market.

Refrigeration

Air-cooled multiplex system with extensive refrigeration equipment maintenance. Proper maintenance of multiplex system to bring control back to normal set points. Baseline is typically a saturated suction temperature set point reduced 3 °F and a saturated condensation temperature set point raised 3 °F.

Ambient following SCT setpoint, 70 °F minimum. Control the SCT to ambient + 12 °F with a backflood setpoint of 68 °F. Optional VSD condenser fan.

Anti-Sweat (Humidistat) Controls. Enables the user to turn refrigeration display case anti-sweat heaters off when ambient relative humidity is low enough that sweating will not occur. Without the control, the heaters generally run continuously.

Compressor Multiplex. A multiplex-compressor system consists of multiple compressors drawing from a common suction header, serving any number of refrigerated display fixtures. The suction group is controlled to satisfy the lowest temperature required by any of the attached display fixtures and for this reason, the fixtures served by a given suction group usually have similar temperature requirements (low versus medium temperature groups). Baseline is a single dedicated compressor system for each refrigeration load.

Commercial Reach-in Refrigerator (Solid Door ENERGY STAR Refrigerators/Freezers). ENERGY STAR labeled commercial solid door refrigerators and freezers are designed with high efficiency components such as ECM evaporator and condenser fan motors, hot gas anti-sweat heaters, or high-efficiency compressors. Compared to standard models, ENERGY STAR labeled commercial solid door refrigerators and freezers save energy.[53]

Compressor VSD Retrofit. Modulates motor speed in response to changes in load. When low-load conditions exist, the current to the compressor motor is decreased, slowing the compressor motor down. Baseline is a constant-speed compressor.

Cycle fan off with thermostat. Evaporator fan cycles with thermostat. When the thermostat is off, the fan cycles on periodically. Baseline is the evaporator fan runs continuously.

Demand Control Defrost – Hot Gas. When frost collects on the evaporator, it reduces coil capacity by acting as a layer of insulation and reducing the airflow between the fins. In hot gas defrost, refrigerant vapor from either the compressor discharge or the high pressure receiver is used to warm the evaporator coil and melt the frost that has collected there.[54]

Display Cases. Refrigerated display cases achieve a higher performance efficiency and reduce overall energy consumption by incorporating hot gas defrost, anti-sweat controls, high

---

52 http://www.energystar.gov/index.cfm?c=water_coolers.pr_water_coolers

53 ENERGY STAR

54 Parker Refrigeration Specialists

performance evaporative fans, defrost control, improved insulation and liquid suction heat exchangers.[55]

Evaporative Condenser – High-Efficiency. In the refrigeration cycle, the condenser consumes all the input electricity to the system in order to produce cooling. A high efficiency condenser can perform the refrigeration cycle using less energy than a standard system.

Floating Head Pressure Controls. This measure adds controls to float the head pressure down to a lower temperature during periods of low load. The base case is a standard multiplex system having a fixed condensing setpoint.

Floating SCT controlled to 70 °F. The saturation condensation temperature is set to 70 °F. Baseline is the SCT controlled to 80 °F.

Reduce design SCT by ~5 °F. Same capacity condenser but ~5 °F lower saturated condensation temperature, improving efficiency.

Floating Saturated Suction Temperature control on Low and Medium Temperature Suction Groups. This measure adds floating suction head controls to both the MT and LT suction groups, the minimum suction setpoint is the same as the base case setpoint; the maximum is 5 °F above the design temperature, allowing the suction temperature to increase during periods of low fixture loads.

Wetbulb following SCT Setpoint, 70 °F minimum. This measure applies to an evaporative condenser and resets the head pressure setpoint down to 70 °F SCT minimum, using an ambient following setpoint (temperature of wetbulb + 17 °F).

High Efficiency Case Fans The case fans used for circulating cool air in a refrigerated space can be upgraded to a higher efficiency.

High Efficiency Compressors. A component of refrigeration systems, high efficiency compressors operate up to 15% more efficiently than standard-efficiency compressors.

High-Efficiency Evaporator Fans, Walk-in Refrigerators. A component of refrigeration systems, high-efficiency evaporator fan motors release less heat into the refrigerated room than conventional induction motors, reducing the energy draw by the fan motor and the compressor.

Ice Makers. High efficiency commercial ice makers use high efficiency compressors and fan motors, thicker insulation, and other measures to achieve 15% more efficiency than the baseline measure, which is a conventional automatic commercial ice maker.[56]

Motors – Case Fans with ECM Motors. The case fan is one of the components of the refrigeration system. ECM are smaller variable speed motors that operate from a single-phase power source with an electronic controller mounted in or on the motor. The baseline measure is a High-Efficiency Case Fan Motor.

Night Covers for Display Cases. Night covers help to eliminate wasted refrigeration cooling by insulating display cases. In addition, they reduce the heating load of buildings through less escaped refrigerated air needing to be reheated.

---

[55] OakRidge National Laboratory for the US DOE-1996

[56] Consortium for Energy Efficiency (CEE)

Parallel Unequal Compressor. This measure would be most applicable to facilities using multiple compressors to satisfy a large cooling/refrigeration load. The idea is vary the size of each compressor that can be run in parallel to match the exact load of the system. Compressors can save energy and run more efficiently when they are close to their full load capacity. Multiple size compressors can best mix and match their sizes to meet the cooling load.

Reduced Speed or Cycling of Evaporator Fans. Allowing the evaporator fans to run less frequently or at a lower speed permits the evaporator to fit the system need, rather than run continuously at high speed. Only for new construction.

Refrigeration Commissioning or Retro-Commissioning. Commissioning ensures that refrigeration systems that have been installed are operating in an optimal fashion in order to maximize energy efficiency. Retro-commissioning is checking previously commissioned equipment to ensure that it is continuing to run efficiently. The baseline measure is no commissioning.[57] The cost for this measure is derived by taking the cost of the initial commissioning for the first year and then on a yearly basis taking a 40% commissioning cost in each year for the life of the measure (10 years). It is feasible to only perform retro-commissioning every three years and will still only involve 40% of the initial cost for commissioning. If this step is performed, the total cost of the measure would go down making the measure cost effective than it is shown in this study.

Refrigeration with Heat Recovery. Refrigeration waste heat is used for water heating.

Refrigerator eCube. Refrigerator units usually monitor circulating air temperatures to determine when to switch on and off. However, when the refrigerator door is opened, the circulating air temperature increases more rapidly than the food temperature, which causes the equipment to work harder than necessary to maintain food at the set point. Instead of measuring air temperature, the eCube, a device used to simulate the heat transfer characteristics of food, allows the refrigerator to monitor the more stable food temperature, resulting in less frequent cycling of the compressor.

Special Glass Doors for Refrigerated Reach-In Cases. "Low-E," double pane thermal glass doors reduce cooling loses in refrigerated reach-in cases.

Strip Curtains for Walk-Ins. Strip curtains on walk-in refrigerators reduce the infiltration of warm air into the refrigerated space by improving the barrier between the cold space and the ambient air.

Water Heat

Clothes Washer Commercial. ENERGY STAR® qualified commercial washers have more capacity than conventional top-load models with an agitator. Some front-loaders can wash over 20 pounds of laundry at once, compared to 10–15 pounds for a standard top-loader. This means residents can do fewer loads and avoid having to bring big, bulky items to the laundromat.[58]

---

[57] http://cbs.lbl.gov/BPA/cct.html

[58] http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers_comm

Demand-Controlled Circulating Systems. A demand-controlled circulating system only circulates hot water when required. The baseline measure is a continuously circulating hot water system, resulting in energy loss through pipes.

Dishwashing – Commercial – High Efficiency. Dishwashers with a minimal idle rate as well as a minimal amount of water consumption per rack of loaded dishes depending upon size and type.

Dishwashing – Residential Sized System. Residential sized ENERGY STAR® dishwashing systems are often more appropriate for smaller commercial buildings. The smaller size leads to energy savings.

Drain Water Heat Recovery (Power-Pipe) – Heat Recovery Water Heater. Drain water heat recovery devices recover heat energy from drain water and are used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the entering water temperature.[59]

Faucet Aerators. Faucet aerators, by mixing water and air, reduce the amount of water that flows through the faucet. The faucet aerator creates a fine water spray through an inserted screen in the faucet head. Flow rate requirements for this measure are presented in Table C.39.

Table C.39. Faucet Aerator Flow Rates

Measure Flow Rate (GPM*)	Baseline Flow Rate (GPM)
1.5	2.2
2.2	4.0

* Gallons per minute

Air or Ground Source Heat Pump Water Heater. The water heating heat pump moves heat from a warm reservoir (such as air) and transfers this heat into the hot water system.[60]

Water Heater Timer. A time clock turns the water heater off during periods when the household does not typically use hot water.

Hot Water Supply Pipe Insulation. R-4 insulation added around hot water pipes decreases heat loss. Only for existing construction. The baseline measure is no insulation.

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead. Flow rate requirements for this measure are presented in Table C.40.

Table C.40. Low-Flow Showerhead Flow Rates

Measure Flow Rate (GPM)	Baseline Flow Rate (GPM)
2.0	2.5
2.5	4.5

Low-Flow Spray Heads. Low-flow spray heads mix water and air to reduce the amount of water that flows through the spray head. The spray head creates a fine water spray through an inserted

[59] www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=858&BucketID=6&CategoryID=9

[60] Description source: U.S. Department of Energy

screen in the spray head, achieving a flow reduction of nearly 50%, from a flow rate of 3.0 GPM to 1.6 GPM.

Solar Water Heating. A solar water heater is generally mounted on the roof of a building and is designed to use the sun indirectly to heat water through a heat exchanger, rather than electricity or gas. Note that this is a passive process, not one that involves photovoltaic cells.

Water Heater Tank Blanket. Install R-5 insulation on older models with no insulation.

Water Heater Thermostat Setback. This measure generates savings by reducing the set point temperature from 130°F to 120°F.

Electric Equipment Measures

Air-Cooled Chiller, Screw chiller Screw compressors are positive displacement devices. The refrigerant chamber is actively compressed to a smaller volume by the twisting motion of two interlocking, rotating screws. Refrigerant trapped in the space enclosed between the two rotating screws is compressed as it makes its way from the inlet to the outlet of the compressor. A slide valve is used to adjust the compression effect by varying the amount of compression that occurs before the refrigerant is discharged. Screw chillers are generally used for small- to medium-sized buildings. This unit uses air to cool the refrigerant.

Centrifugal Chiller. A centrifugal chiller utilizes the vapor compression cycle to chill water and reject the heat collected from the chilled water plus the heat from the compressor to a second water loop cooled by a cooling tower. The advantage of centrifugal compressors is their high flow rates capability and good efficiency characteristics. This measure compares different models, rated in kW/ton in Table C.41.

Table C.41. 300 Ton Centrifugal Chiller kW/ton Comparison

Measure kW / ton	Baseline kW / ton
.507	.576 (state code replacement)
.461	.576 (state code replacement)

Centrifugal Chiller with VSD control. The VSD controls the rotational speed of the chiller compressor to match the output capacity with the part load cooling while maintaining full load efficiency. Baseline for this measure is a constant speed compressor motor with inlet vane control.

Direct Expansion Packaged Air Conditioner System. Direct Expansion (DX) system use a refrigerant piping circuit, compressor, and refrigerant coils to transfer heat. All components are in a single package typically installed on the building roof. As a measurement of efficiency, commercial sized units are normally rated as Energy Efficient Ratio (EER). Table C.42 displays the different models compared in this measure.

Table C.42. DX AC Unit EER Comparisons

Measure EER	Baseline EER
11.5	11.2 (state code)
12.0	11.2 (state code)
12.5	11.2 (state code)

Clothes Dryer with Moisture Sensor. High efficiency dryers have a moisture sensor that stops the drying cycle when the humidity in the drum falls below a certain level. Conventional drying equipment uses thermostats or timers that do not determine when clothes are dry, thereby causing excessive energy consumption due to extended run time.

Heat Pump – Air Source. Air source heat pumps use a Coefficient of Performance (COP) ratio of the cooling effect produced (expressed in Btu/hr), divided by the energy input (expressed on the same basis and as an EER Ratio).[61] These units use the difference between outdoor air temperatures and indoor air temperatures to cool and heat your building. Table C.43 displays the different models compared in this measure.

Table C.43. Heat Pump COP/EER Comparisons

Measure COP & EER	Baseline COP & EER
3.5 (COP) & 11.0 (EER)	3.3 (COP) & 11.0 (EER) (code)
3.8 (COP) & 11.8 (EER)	3.3 (COP) & 11.0 (EER) (code)

Packaged Terminal Air conditioner. Also known as PTAC units, package terminal air conditioning equipment houses all of the components—compressor; condenser and evaporator coils; expansion device; condenser and evaporator fans; and associated operating and control devices—within a single cabinet. In most cases, this package unit is installed within a space, through the wall, as in the lodging building sector. This is also a "ductless" system. Several different Energy Efficient Rated (EER) models were compared; Table C.44 displays the different efficiencies.

Table C.44. PTAC EER Comparisons

Measure EER	Baseline EER
8.77 (state code replacement)	Existing Unit
9.8	8.77 (state code replacement)
10.37	8.77 (state code replacement)
	10.37 (state code new construction)
11.0	8.77 (state code replacement)

Packaged Terminal Heat Pump. A heat pump is an air conditioner that contains a valve that lets it switch between the cooling mode and the heating mode. Unlike other packaged HVAC equipment, package terminal heat pumps use Coefficient of Performance (COP) as an efficiency rating for heating, and EER for cooling.[62] Table C.45 displays the different COP/EER values compared for this measure.

Table C.45. PTHP COP/EER Comparisons

Measure COP & EER	Baseline COP & EER
3.4 (COP) & 11.0 (EER)	2.6 (COP) & 8.67 (EER)
2.9 (COP) & 10.2 (EER)	
3.49 (COP) & 11.95 (EER)	2.94 (COP) & 10.17 (EER)

[61] http://tristate.apogee.net/cool/cfmec.asp
[62] http://tristate.apogee.net/cool/cfmec.asp

Room Air Conditioner – (Individual Rooms) (10,000 BTU/HR). Replace existing models with one that has a minimum efficiency level of 11 EER. These units often include controls for minimizing the amount of energy used to cool the room, larger coils and/or smaller fans, and more efficient motors.

Room Heat Pump. Existing heat pump is replaced by new model with minimum efficiency of 3.2 COP and 11 EER (code). These units often include controls for minimizing the amount of energy used to cool the room, larger coils and/or smaller fans, and more efficient motors.

Water-Cooled Chiller, Screw Chiller. Screw compressors are positive displacement devices. The refrigerant chamber is actively compressed to a smaller volume by the twisting motion of two interlocking, rotating screws. Refrigerant trapped in the space enclosed between the two rotating screws is compressed as it makes its way from the inlet to the outlet of the compressor. A slide valve is used to adjust the compression effect by varying the amount of compression that occurs before the refrigerant is discharged. Screw chillers are generally used for small- to medium-sized buildings. This unit uses water to cool the refrigerant. Table C.46 displays the measure and baseline kW/ton.

Table C.46. Screw Chiller kW/ton Comparison

Measure kW/ton	Baseline kW/ton
0.62	0.68 (state code replacement)
0.574	0.68 (state code replacement)

Water Heater (Electric). High efficiency water heaters are more efficient than standard electric water heaters due to reduced standby losses. This measure assumes an energy factor (EF) for the high efficiency water heaters of 0.95, an increase from the code minimum of 0.92.

C.4 – Commercial Gas Measure Descriptions

Gas Non-Equipment Measures

Cooking

Broiler. A type of oven unit, Energy start broilers have a rigorous start-up/shutdown and turndown schedule for additional energy savings over standard units. Improved efficiency broilers have an efficiency of 34%, compared to baseline models at 15%.

Cooking Fryers – Commercial. Commercial ENERGY STAR® electric fryers have a heavy load cooking efficiency of 80% or better, and when idle, uses less than 1,000 Watt.[63] The baseline efficiency is 70% for an non-ENERGY STAR commercial fryer.

Griddle. Energy Star griddles are at least 40% efficient and on average use less than ¼ therm/hour. The baseline measure is a standard grill at 32% efficiency.[64]

Oven – Convection – Commercial. Commercial ENERGY STAR® electric convection ovens have a cooking efficiency of 70% or better, with idle energy rates that vary depending upon size.[65] Standard electric convection ovens have a 65 percent cooking energy efficiency and an idle energy rate of 2 kW; whereas ENERGY STAR® qualified electric convection ovens must meet the specification requirements of 70 percent cooking energy efficiency and an idle energy rate of 1.6 kW.

Oven – Conveyor. A high efficiency conveyor oven has 23% efficiency; in comparison, a standard conveyor oven has 15% efficiency.

Steam Cookers – Commercial. Commercial ENERGY STAR® electric steam cookers have a cooking efficiency of 50%, with idle energy rates that vary depending upon pan size.[66] The baseline efficiency is 35% for an non-ENERGY STAR commercial steam cooker.

HVAC & Envelope

Automatic Ventilation VFD Control (occupancy/CO_2 sensors). The ventilation system automatically adjusts air flow when CO_2 levels are above a specified level. When using CO_2 control, a minimum ventilation rate is maintained at all times to control non-occupant contaminants like off-gassing from furniture, equipment and building components. Without it, as a baseline, the ventilation system would run constantly.

Boiler Economizer. Recovers heat energy that would otherwise be lost out the boiler stack. This heat energy is recovered by using a heat exchanger located on the stack to preheat boiler feed water.

---

63 http://www.energystar.gov/index.cfm?c=fryers.pr_fryers
64 www.energystar.org
65 http://www.energystar.gov/index.cfm?c=ovens.pr_comm_ovens
66 http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers

Building Commissioning and Retro-Commissioning. Commissioning ensures that energy-using systems that have been installed are operating in an optimal fashion in order to maximize energy efficiency. The commissioning process can be applied to existing buildings to restore them to optimal performance. Retro-commissioning is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and brings the buildings up to the design intentions of its current operation.[67,68] The baseline measure is no commissioning. The cost for this measure is derived by taking the cost of the initial commissioning for the first year and then taking a 40% commissioning cost in each year for the life of the measure (10 years). It is feasible to only perform retro-commissioning every three years. If this step is performed the total cost of the measure would go down, which would make the measure more cost effective than shown in this study. This change could potentially make the measure pass a cost effectiveness screen and would raise the total estimate for the total economic potential.

Direct Digital Control System – Install. Direct digitally controlled (DDC) systems allow for both HVAC and lighting to be controlled and monitored using an electronic or digital system. For lighting, replacing the manually operated wall switches with a digital interface allows for direct control of lights at a remote location at anytime. For HVAC, the entire system, including pumps, motors, fans, and set points, can be digitally programmed for each unit to further increase tighter control of the system.

Direct Digital Control System – Optimization. Allows for digital monitoring and control of HVAC and lighting systems. The optimization of the control system is upgrading a high-efficiency energy management system to a premium efficiency system.

Direct Digital Control System – Wireless Performance Monitoring. These are second-generation building automation systems that allow for wireless optimization and operation of building systems such as HVAC through computerized monitoring and control software and interfaces.

Duct Repair and Sealing. The repair and sealing of leaky ducts creates significant energy savings by ensuring conditioned air only goes to occupied spaces, thereby reducing an excessive runtime/load on the HVAC system.

Exhaust Air to Ventilation Air Heat Recovery. Captures air that is exhausted out of a building during the heating season, which is warmer than the air outside. Transferring this heat to the incoming air lowers the overall heating load.

Exhaust Hood Makeup Air. Provides exhaust air at the hood instead of allowing the hood to exhaust the conditioned air in the room. The baseline measure is for conditioned air to be expelled through exhaust hoods.

Green Roof. A green roof is a living roof that supports soil and plant growth. A series of carefully engineered layers are applied to the roof deck. These layers are watertight, lightweight, and long lasting. Green roofs can be incorporated into new buildings as long as load requirements are met. They are suited for roofs that have slopes ranging up to 20° and are most successful when sufficient attention has been paid to selecting plants that will thrive in the local

---

[67] http://www.green.ca.gov/CommissioningGuidelines/default.htm

[68] http://cbs.lbl.gov/BPA/cct.html

climate and conditions. One of the most significant advantages is that a green roof can last up to three times longer than a standard roof. A green roof can also buffer temperature extremes, which improves a building's energy performance by dropping the temperatures on the roof 3° – 7°, resulting in approximately 10 to 12% reduction in cooling loads.

Hotel Key Card Energy Control System. This is a key card system used to control room HVAC and lighting during non-occupied periods. Occupancy is determined by the presence of a key card and/or additional sensors. The central system sets heating and cooling to a minimum, and turns off lighting when the key card is removed. Once the guest returns and inserts the key card, the guest has full control of the room systems.

Infiltration Control (Caulking, Weather Stripping, etc.). Sealing air leaks in windows, doors, roof, crawlspaces, and outside walls decreases overall heating and cooling losses.

Insulation – Floor (Non-Slab). These measures represent an increase in R-value to current code levels of R-19 for the floor space (non-slab) and better.

Insulation – Ceiling. These measures represent an increase in R-value to current code values of R-20 or better.

Insulation – Duct. Packaged Direct Expansion (DX) and heat-pump equipment are generally coupled with a ducting system inside the building. Insulating the ducts reduces energy loss in the unoccupied plenum space. This measure assumes that R-5 or R-8 insulation will be installed, or R-5 insulation will be replaced with R-8.

Insulation – Wall. Wall insulation installed with a current code R-value of R-13 + R-7.5 or better.

Passive Solar Design. A home's windows, walls, and floors can be designed to collect, store, and distribute solar energy in the form of heat in the winter and reject solar heat in the summer. Passive solar design techniques are most easily integrated when designing a new home. Other measures include deciduous trees for shade, window eaves, and proper building orientation.

Radiant Barrier (Ceiling). Radiant barriers generally consist of a thin piece of aluminum that are installed in buildings to help reduce the solar heat gain from the sun during the summer, as well as helping to trap heat in during winter. They work by reducing heat transfer between the air space of the roof deck and the attic floor.

Radiant Gas Heating (Infrared Heater). Radiant heating systems rely on infra red radiation to heat objects, people, and surfaces. The effect is that radiant energy as received by people (directly from the heater and indirectly from other surfaces) allows them to perceive a comfort condition temperature that is 4° to 5° higher than the actual air temperature. This allows a radiant heater to operate at lower air temperatures thus decreasing the use of heating fuel by reducing air stratification within the space, side-wall and ceiling as well as building heat losses.

Scheduled AHU. Reduced AHU runtime decreases energy consumption by 3%.

Sensible and Total Heat Recovery Devices. Sensible heat recovery devices transfer energy (heat) from the return air stream back into the supply air stream, which avoids heat losses in exhausted air. This raises the incoming outdoor air temperature in the winter and cools it in the summer. Energy savings results from reduced needs for mechanical heating or cooling. Total heat devices, also called enthalpy recovery, transfer both sensible and latent heat. Latent heat

significantly raises the humidity of the outdoor air in the winter and reduces it in the summer. Dehumidification in the summer can be costly and total recovery devices help reduce this.[69]

Steam Pipe Insulation. Insulation of pipes from R-0 to R-4 prevents pipe losses from transferred heat. The size of the loss depends on the diameter of the pipe and the pressure of steam in PSI.

Thermostat – Programmable. A programmable thermostat controls the set point temperature automatically, ensuring the HVAC system is not running during low-occupancy hours.

Variable Air-Volume System. Allows the airflow volume of a HVAC system to vary with the heating or cooling load rather than over-cooling (or heating) and short-cycling. The baseline in this case is a constant volume system.

Windows – High-Efficiency. This measure represents an increase in building performance by reducing the U-value in existing construction and new construction windows.

Water Heat

Clothes Washer Commercial. ENERGY STAR® qualified commercial washers have more capacity than conventional top-load models with an agitator. Some front-loaders can wash over 20 pounds of laundry at once, compared to 10–15 pounds for a standard top-loader. This means residents can do fewer loads and avoid having to bring big, bulky items to the laundromat.[70]

Demand-Controlled Circulating Systems. A demand-controlled circulating system only circulates hot water when required. The baseline measure is a continuously circulating hot water system, resulting in energy loss through pipes.

Dishwashing – Commercial – High Efficiency. Dishwashers with a minimal idle rate as well as a minimal amount of water consumption per rack of loaded dishes depending upon size and type.

Dishwashing – Residential Sized System. Residential sized ENERGY STAR® dishwashing systems are often more appropriate for smaller commercial buildings. The smaller size leads to energy savings.

Drain Water Heat Recovery (Power-Pipe) – Heat Recovery Water Heater. Drain water heat recovery devices recover heat energy from drain water and are used to pre-heat cold water entering the hot water tank. This minimizes the temperature difference between the heating set point and the entering water temperature.[71]

Faucet Aerators. Faucet aerators, by mixing water and air, reduce the amount of water that flows through the faucet. The faucet aerator creates a fine water spray through an inserted screen in the faucet head.

Hot Water Supply Pipe Insulation. R-4 insulation added around hot water pipes decreases heat loss. Only for existing construction. The baseline measure is no insulation.

---

69 http://www.mcquay.com/mcquaybiz/marketing_tools/mt_corporate/EngNews/0701.pdf

70 http://www.energystar.gov/index.cfm?c=clotheswash.pr_clothes_washers_comm

71 www.toolbase.org/Techinventory/TechDetails.aspx?ContentDetailID=858&BucketID=6&CategoryID=9

Low-Flow Showerheads. Low-flow showerheads mix water and air to reduce the amount of water that flows through the showerhead. The showerhead creates a fine water spray through an inserted screen in the showerhead.

Low-Flow Spray Heads. Low-flow spray heads mix water and air to reduce the amount of water that flows through the spray head. The spray head creates a fine water spray through an inserted screen in the spray head, achieving a flow reduction of nearly 50%, from a flow rate of 3.0 GPM to 1.6 GPM.

Solar Water Heating. A solar water heater is generally mounted on the roof of a building and is designed to use the sun indirectly to heat water through a heat exchanger, rather than electricity or gas. Note that this is a passive process, not one that involves photovoltaic cells.

Solar Pool/Spa Heating System. Pool/spa water is pumped through an array of solar thermal collectors (solar thermal, not solar photovoltaic) where it absorbs heat during the daytime.

Swimming Pool/Spa Covers. Covers a pool/spa to reduce evaporation, which is the largest source if pool/spa energy loss. It takes 1 Btu (British thermal unit) to raise 1 pound of water 1 degree, but each pound of 80ºF water that evaporates takes 1,048 Btu of heat out of the pool.[72] The baseline measure is an uncovered pool or spa.

Tankless Water Heater. Tankless water heaters produce the majority of energy savings by avoiding standby losses that occur when a normal storage tank is not in use. Tankless water heaters provide hot water at a preset temperature when needed without storage, thereby reducing or eliminating standby losses.

Water Heater Tank Blanket. Install R-6.9 insulation on older models with no insulation.

Water Heater Thermostat Setback. This measure generates savings by reducing the set point temperature from 130°F to 120°F.

Water Heater Timer. A time clock turns the water heater off during periods when the household does not typically use hot water.

Gas Equipment Measures

Gas Boiler - Greater than 300 kBtuh. Boilers are classified as condensing and non-condensing. Condensing boilers condense the flue gas and water vapor, extracting useful heat and improving the boiler efficiency. Boilers are also rated by their input fuel consumption, or in terms of horsepower, where 1 boiler hp = 33,520 Btuh. This measure compares several boilers with different thermal efficiencies and is applicable to both new and existing construction. The overall efficiency of the boiler is defined as the gross output energy divided by the input energy and is affected by combustion efficiency, standby losses, cycling losses and heat transfer.[73] Table C.47 displays the measure and baseline thermal efficiencies.

---

72 http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13140

73 http://www.newbuildings.org/downloads/guidelines/BoilerGuideline.pdf

Table C.47. Gas Boiler Thermal-efficiency Comparison

Measure Thermal Efficiency	Baseline Thermal Efficiency
85%	80% (state code)
90%	80% (state code)

Gas Boiler - Less than 300 kBtuh. The National Energy Policy Act of 1992 mandates that all boiler manufacturers must meet the requirements of ASHRAE Std. 90.1. Boilers less than 300 kBtuh are rated using an Annual Fuel Utilization Efficiency (AFUE). AFUE measures the amount of heat actually delivered to the building compared to the amount of fuel that must be supplied to the unit and are displayed in Table C.48.

Table C.48. Gas Boiler AFUE Comparison

Measure AFUE	Baseline AFUE
AFUE 80% (state code)	Existing Unit
84.5%	AFUE 80% (state code)
AFUE 87% (condensing)	AFUE 80% (state code)

Gas Furnace. Similar to the small gas boiler measure, this furnace measure also compares several different AFUE values amongst different units. Table C.49 displays the different AFUE values compared in this measure.

Table C.49. Gas Furnace AFUE Comparison

Measure AFUE	Baseline AFUE
AFUE 90% (condensing)	AFUE 80% (state code)
AFUE 94% (condensing)	

Water Heater. Gas water heaters have a range of thermal efficiencies as shown in Table C.50. High efficiency models have better insulation, reducing standby losses.

Table C.50. Commercial Gas Water Heater Comparison

Measure Efficiency	Baseline Efficiency
0.62 EF	
0.67 EF	0.59 EF
0.90 EF	

C.5 – Industrial Measure Descriptions

Electric Non-Equipment Measures

Process Related

Any measures to improve the industrial process, not specific to the building itself.

Process Cooling Improvements. Improvements that will decrease the energy required for process-related cooling. Examples would include avoid frost formation on evaporators, shutting of cooling water when not required, using economic thickness of insulation for low temperatures.

Process Heating Improvements. Improvements that will decrease the energy required for process-related heating. Examples would include optimizing schedule for drying oven, reducing temperature of process equipment when on standby, and modifying equipment to improve drying process.

Process Heating O&M. Changing operation and maintenance (O&M) procedures of process heating can improve overall energy efficiency of a plant. Some O&M examples include repair faulty insulation, adjust burners for efficient operation, and eliminate leaks in combustible gas lines.

Process Heat Steam Distribution. Any elimination in leaks or improved insulation to the ducting will reduce loss in a distribution system.

Fan System Improvements. Savings from variable-speed drives (VSD) and/or improvements to the design of the fan system, such as better fans, ducting, and flow design.

Pump System Improvements. Similar to fan system improvements, with savings from a VSD and/or improvements to the overall pump system, such as better pumps, more efficient piping and eliminating unnecessary flows. In irrigation, this would include nozzle improvements and scientific irrigation systems.

Other Motor Improvements. Improvements to motors not specific to fans or pumps. This would include using higher efficiency motors, improved rewind practices and correct motor sizing. In the mining industry, this would also include milling technique improvements.

Other Motor O&M. Changing operation and maintenance (O&M) procedures of motors can improve overall energy efficiency of a plant. Some O&M examples include develop and repair/replace policy, avoid emergency rewind of motors, and avoid rewinding motors more than twice.

Air Compressor Improvements. Air compressor energy efficiency, used in the industrial process, can be improved by installing compressor air intakes in coolest locations, or using optimum-sized compressors, amongst others.

Air Compressor O&M. Changing operation and maintenance (O&M) procedures of an air compressor can improve the overall energy efficiency of a plant. Some O&M examples include reducing the pressure of compressed air to the minimum required, cooling compressor air intake with a heat exchanger or eliminating leaks.

Refrigeration Improvements. Refrigeration improvements can include isolating hot equipment from refrigerated area, using highest allowable temperature for refrigerated space or modify refrigeration system to operate at a lower pressure.

Other Process Improvements/O&M. Some generic process improvements/O&M include upgrading obsolete equipment, replace hydraulic/pneumatic equipment with electrical equipment and use optimum size and capacity equipment.

Building Related

Any measures to improve the building itself, not specific to the industrial process.

Boiler Improvements. The boiler is generally used to create steam or hot water for process or non-process applications. Savings can be found by installing a waste heat boiler to provide direct power or using flue gas heat to preheat boiler feedwater.

Lighting Improvements. Any changes to overall illumination levels, use of natural lighting, or technology improvements to use more efficient bulbs or ballasts that will decrease the overall lighting energy consumption.

HVAC Improvements. There are many changes that can be made to reduce the energy consumption in HVAC control of a plant. Many are measures found in the commercial and residential lists. A sample of improvements include: conditioning only space in use, installing timers and/or thermostats, lowering ceiling to reduce conditioned space, and installing or upgrading insulation on distribution systems.

HVAC O&M. Some operation and maintenance (O&M) improvements to the HVAC control system include size air handling grills/ducts/coils to minimize air resistance, adjust vents to minimize energy use and maintain air filters by cleaning or replacement.

Other Building Improvements. Some generic improvements to the building include de-energizing excess transformer capacity, increase electrical conductor size to reduce distribution losses, and optimize plant power factor.

Gas Non-Equipment Measures

Process Related

Any measures to improve the industrial process, not specific to the building itself.

Process Heating Improvements. Improvements that will decrease the energy required for process-related heating. Examples would include optimizing schedule for drying oven, reducing temperature of process equipment when on standby, and modifying equipment to improve drying process.

Process Heating O&M. Changing operation and maintenance (O&M) procedures of process heating can improve overall energy efficiency of a plant. Some O&M examples include repair faulty insulation, adjust burners for efficient operation, and eliminate leaks in combustible gas lines.

Steam Distribution Systems. Any elimination in leaks or improved insulation to the ducting will reduce loss in a distribution system.

Other Process Improvements/O&M. Some generic process improvements/O&M include upgrading obsolete equipment, reducing fluid flow rates, and use optimum size and capacity equipment.

Building Related

Any measures to improve the building itself, not specific to the industrial process.

HVAC Improvements. There are many changes that can be made to reduce the energy consumption in HVAC control of a plant. Many are measures found in the commercial and residential lists. A sample of improvements include: conditioning only space in use, installing timers and/or thermostats, lowering ceiling to reduce conditioned space, and installing or upgrading insulation on distribution systems.

HVAC O&M. Some operation and maintenance (O&M) improvements to the HVAC control system include size air handling grills/ducts/coils to minimize air resistance, adjust vents to minimize energy use and maintain air filters by cleaning or replacement.

Boiler Improvements. The boiler is generally used to create steam or hot water for process or non-process applications. Savings can be found by installing a waste heat boiler to provide direct power or using flue gas heat to preheat boiler feedwater.

Boiler O&M. Such improvements to the boiler would include analyze flue gas for proper air/fuel ration, establishing maintenance schedule or reducing excessive boiler blowdown.

Appendix D: Measure Details

D.1 – Residential Measure Details 1

Residential Electric Measure Details 1

Residential Gas Measure Details 61

D.2 – Commercial Measure Details 87

Commercial Electric Measure Details 87

Commercial Gas Measure Details 196

D.3 – Industrial Measure Details 265

Industrial Electric Measure Details 265

Industrial Gas Measure Details 273

Appendix D - Measure Details

This appendix presents the key inputs and outputs for every measure analyzed in the potentials assessment, by sector. The fields included are:

- Measure Name – The general name of the measure being analyzed
- Measure Description – Brief description of the measure (characteristics, efficiency level, etc.)
- Baseline – The assumed baseline condition that savings are calculated from. Depending on the measure and application, this may represent average existing conditions or current codes or standards
- Construction Vintage – Defines the construction vintage (new or existing buildings) that the measure is applied to. Measures may be applicable to only one vintage or to both.[1]
- Baseline kWh / therm – The assumed baseline consumption of the end use the measure is applied to, in kWh or therms per year.[2]
- Savings as Percent of End Use – The percent of the baseline end use consumption that can be saved by installing the measure.
- Measure Life – The expected useful life (EUL) of the measure.
- Measure Cost – The full or incremental cost (depending on application) of installing the measure. This cost includes labor, where appropriate.[3]
- Percent of Installations Incomplete – The percentage of buildings with the end use that do not currently have the measure installed. This factor is only applicable to non-equipment measures, as equipment efficiency shares are built into the end use model.
- Percent of Installations Technically Feasible - The percentage of buildings with the end use that have no physical limitations to measure installation. This factor is only applicable to non-equipment measures, as equipment saturations are built into the end use model.
- TRC Benefit-Cost Ratio – The measure's benefit-to-cost ratio based on the Total Resource Cost Test. As described in the Section 1 of the report, a measure is deemed cost-effective and included in the economic potential if its benefit-to-cost ratio is greater than or equal to 1.0.
- 2016 Technical Potential – The cumulative technical potential (in MWh or therms) in 2016. As described in Section 1 of the report, the technical potential assumes all equipment moves to the most efficient option when replaced, so lower efficiency measures will have no technical potential.

---

1 Not applicable in the industrial sector.

2 Because industrial potential is analyzed at the industry level instead of by customer, baseline kWh and therm values are not applicable.

3 Industrial costs are in terms of cost per first-year kWh or therm saved. These estimates are then applied to industry-wide savings to calculate levelized costs.

Table D.1. Residential Electric Measure Details

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 14	SEER 13	Existing	1,486	7.1%	15	$232	NA	NA	0.76	0
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 14	SEER 13	New	875	7.1%	15	$232	NA	NA	0.45	0
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 16	SEER 13	Existing	1,486	18.8%	15	$695	NA	NA	0.67	0
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 16	SEER 13	New	875	18.8%	15	$695	NA	NA	0.39	0
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 18	SEER 13	Existing	1,486	27.8%	15	$1,158	NA	NA	0.59	8,285
Manufactured	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 18	SEER 13	New	875	27.8%	15	$1,158	NA	NA	0.35	342
Manufactured	Central AC	Air Conditioner - Central, Early Replacement	SEER 13	Existing AC Unit SEER 10	Existing	1,879	23.1%	15	$2,080	81%	95%	0.35	11,292
Manufactured	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	Existing	1,879	30.0%	15	$2,395	99%	2%	0.39	378
Manufactured	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	New	873	30.0%	15	$1,123	99%	40%	0.39	66
Manufactured	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	1,879	10.0%	15	$942	95%	0%	0.33	0
Manufactured	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	873	10.0%	15	$942	95%	0%	0.15	0
Manufactured	Central AC	Attic Fan	Attic Fan	No Attic Fan	Existing	1,879	6.0%	15	$87	96%	85%	2.15	3,113
Manufactured	Central AC	Attic Fan	Attic Fan	No Attic Fan	New	873	6.0%	15	$87	96%	85%	1.00	11
Manufactured	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	1,879	41.3%	10	$574	30%	65%	1.53	1,023
Manufactured	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	873	41.3%	10	$574	30%	65%	0.71	0
Manufactured	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	1,879	3.3%	30	$159	55%	60%	1.08	406
Manufactured	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	873	3.3%	30	$159	25%	75%	0.50	3
Manufactured	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	1,879	0.3%	10	$98	20%	85%	0.07	35
Manufactured	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	873	0.3%	10	$98	20%	85%	0.03	0
Manufactured	Central AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	873	32.0%	30	$5,426	95%	45%	0.15	2
Manufactured	Central AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	873	14.0%	30	$3,831	95%	45%	0.09	1
Manufactured	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	1,879	3.4%	20	$49	95%	25%	2.77	344
Manufactured	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	873	3.2%	20	$52	95%	25%	1.13	3

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	1,879	2.0%	30	$108	50%	75%	0.98	382
Manufactured	Central AC	Deciduous Trees	Deciduous Trees	No Shading	New	873	2.0%	30	$108	50%	75%	0.46	4
Manufactured	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	1,879	0.4%	12	$40	55%	85%	0.25	56
Manufactured	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	873	0.4%	12	$40	55%	85%	0.12	1
Manufactured	Central AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	1,879	0.9%	6	$69	45%	80%	0.16	91
Manufactured	Central AC	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	873	8.0%	30	$5,419	15%	85%	0.04	3
Manufactured	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	1,879	15.0%	20	$424	65%	60%	1.40	1,766
Manufactured	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	New	873	15.0%	20	$424	65%	0%	0.65	0
Manufactured	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	873	19.0%	25	$899	95%	10%	0.46	0
Manufactured	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	1,879	19.0%	25	$899	95%	50%	0.99	338
Manufactured	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	1,879	10.0%	25	$2,995	90%	10%	0.16	238
Manufactured	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	873	10.0%	25	$194	75%	30%	1.12	10
Manufactured	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	Existing	1,879	70.0%	10	$2,634	95%	50%	0.57	846
Manufactured	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	New	873	70.0%	10	$2,634	95%	75%	0.26	11
Manufactured	Central AC	Green Roof	ecoroof	Standard Roof	New	873	6.5%	40	$20,095	98%	0%	0.01	0
Manufactured	Central AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	1,879	10.0%	15	$1,368	75%	75%	0.23	1,674
Manufactured	Central AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	1,879	14.9%	25	$482	7%	13%	1.44	56
Manufactured	Central AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	1,879	6.9%	25	$482	63%	13%	0.67	191
Manufactured	Central AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	1,879	6.1%	25	$712	95%	13%	0.40	239
Manufactured	Central AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	873	6.1%	25	$736	95%	20%	0.18	4
Manufactured	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	1,879	14.7%	25	$1,594	7%	90%	0.43	283

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	1,879	0.6%	25	$1,594	59%	90%	0.02	78
Manufactured	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	1,879	0.1%	25	$403	85%	87%	0.01	18
Manufactured	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	873	0.1%	25	$431	85%	87%	0.01	0
Manufactured	Central AC	Insulation (Duct)	R-6	R-0	Existing	1,879	2.6%	25	$427	75%	12%	0.29	70
Manufactured	Central AC	Insulation (Duct)	R-8	R-0	Existing	1,879	3.2%	25	$483	95%	12%	0.31	108
Manufactured	Central AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	1,879	0.1%	25	$1,099	4%	55%	0.00	1
Manufactured	Central AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	1,879	0.1%	25	$1,099	16%	55%	0.00	2
Manufactured	Central AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	1,879	0.1%	25	$275	40%	55%	0.02	5
Manufactured	Central AC	Insulation (Floor)	R-30	R-19 (state code)	New	873	0.1%	25	$294	40%	55%	0.01	0
Manufactured	Central AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	1,879	0.1%	25	$2,766	5%	75%	0.00	1
Manufactured	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	1,879	2.3%	25	$1,136	90%	10%	0.09	51
Manufactured	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	873	2.3%	25	$1,175	90%	10%	0.04	0
Manufactured	Central AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	1,879	13.0%	25	$3,112	5%	75%	0.20	13
Manufactured	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	1,879	0.5%	25	$1,136	85%	95%	0.02	100
Manufactured	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	873	0.5%	25	$1,175	85%	95%	0.01	1
Manufactured	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	Existing	1,879	15.0%	30	$203	95%	10%	3.91	124
Manufactured	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	New	873	15.0%	30	$91	95%	0%	4.06	0
Manufactured	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	Existing	1,879	4.5%	15	$350	95%	65%	0.40	0
Manufactured	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	New	873	4.5%	15	$350	95%	65%	0.19	5
Manufactured	Central AC	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	873	10.0%	40	$2,938	95%	10%	0.10	3
Manufactured	Central AC	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	1,879	10.0%	5	$225	50%	90%	0.45	1,670
Manufactured	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	1,879	2.0%	5	$5	60%	95%	3.80	503

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	873	2.0%	5	$5	40%	95%	1.76	3
Manufactured	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	1,879	6.0%	15	$1	85%	47%	186.92	1,107
Manufactured	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	873	6.0%	15	$1	85%	47%	86.81	11
Manufactured	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	1,879	6.7%	30	$435	97%	65%	0.82	1,498
Manufactured	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	873	6.7%	30	$343	97%	85%	0.48	23
Manufactured	Central AC	Solar Attic Fan	Solar Attic Fan	No Attic Fan	Existing	1,879	6.0%	10	$475	95%	50%	0.27	0
Manufactured	Central AC	Solar Attic Fan	Solar Attic Fan	No Attic Fan	New	873	6.0%	10	$475	95%	70%	0.12	2
Manufactured	Central AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	873	1.0%	25	$4,421	95%	5%	0.00	0
Manufactured	Central AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	873	1.0%	25	$6,171	90%	90%	0.00	0
Manufactured	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	1,879	6.8%	15	$26	50%	85%	8.15	1,312
Manufactured	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	873	6.8%	15	$26	50%	0%	3.78	0
Manufactured	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	Existing	1,879	13.5%	15	$425	95%	65%	0.99	3,444
Manufactured	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	New	873	13.5%	15	$425	95%	65%	0.46	18
Manufactured	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	Existing	1,879	6.0%	11	$1,370	95%	50%	0.10	745
Manufactured	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	873	6.0%	11	$1,370	95%	50%	0.05	9
Manufactured	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Existing	1,879	22.0%	15	$1,519	96%	50%	0.45	0
Manufactured	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	873	22.0%	15	$1,519	96%	50%	0.21	20
Manufactured	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	1,879	7.5%	11	$907	80%	95%	0.19	1,596
Manufactured	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	New	873	7.5%	11	$938	80%	95%	0.09	20
Manufactured	Central AC	Window Overhang	Window Overhang	No Window Overhang	New	873	14.0%	30	$861	80%	50%	0.40	0
Manufactured	Central AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	1,879	5.0%	25	$4,048	56%	75%	0.06	533
Manufactured	Central AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	1,879	31.5%	25	$4,048	24%	75%	0.36	1,803
Manufactured	Central AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	1,879	17.5%	25	$2,017	95%	75%	0.41	611
Manufactured	Central AC	Windows	U=0.19	U = 0.35 (State Code)	New	873	9.5%	25	$2,085	95%	95%	0.10	4
Manufactured	Central AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	1,879	4.5%	25	$382	85%	75%	0.55	823

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central AC	Windows	U=0.30	U = 0.35 (State Code)	New	873	4.5%	25	$395	85%	95%	0.25	11
Manufactured	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	12,306	10.0%	15	$942	95%	0%	1.06	0
Manufactured	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	8,782	10.0%	15	$942	95%	0%	0.75	0
Manufactured	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	12,306	3.3%	30	$159	55%	60%	3.58	488
Manufactured	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	8,782	3.3%	30	$159	25%	75%	2.55	5
Manufactured	Central Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	8,782	44.0%	30	$5,426	95%	45%	1.01	139
Manufactured	Central Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	8,782	14.0%	30	$3,831	95%	45%	0.46	0
Manufactured	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	12,306	2.0%	12	$40	55%	85%	4.06	458
Manufactured	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	8,782	2.0%	12	$40	55%	85%	2.90	7
Manufactured	Central Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	12,306	2.0%	6	$69	45%	80%	1.13	306
Manufactured	Central Heat	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	8,782	8.0%	30	$5,419	15%	85%	0.18	6
Manufactured	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	12,306	15.0%	20	$424	65%	60%	4.52	1,987
Manufactured	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	New	8,782	15.0%	20	$424	65%	0%	3.22	0
Manufactured	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	8,782	19.0%	25	$899	95%	10%	2.31	1
Manufactured	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	12,306	19.0%	25	$899	95%	50%	3.23	406
Manufactured	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	12,306	10.0%	25	$2,995	90%	10%	0.51	320
Manufactured	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	8,782	10.0%	25	$194	75%	30%	5.64	18
Manufactured	Central Heat	Green Roof	ecoroof	Standard Roof	New	8,782	6.5%	40	$20,095	98%	0%	0.05	0
Manufactured	Central Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	12,306	10.0%	15	$1,368	75%	75%	0.73	2,187
Manufactured	Central Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	12,306	14.9%	25	$482	7%	13%	4.72	63
Manufactured	Central Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	12,306	6.9%	25	$482	63%	13%	2.18	246
Manufactured	Central Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	12,306	6.1%	25	$712	95%	13%	1.30	322

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	8,782	6.1%	25	$736	95%	20%	0.90	7
Manufactured	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	12,306	37.0%	25	$1,594	7%	90%	3.55	1,006
Manufactured	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	12,306	10.2%	25	$1,594	59%	90%	0.98	2,206
Manufactured	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	12,306	1.0%	25	$403	85%	87%	0.38	248
Manufactured	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	8,782	3.0%	25	$431	85%	87%	0.76	13
Manufactured	Central Heat	Insulation (Duct)	R-6	R-0	Existing	12,306	3.5%	25	$427	75%	12%	1.27	136
Manufactured	Central Heat	Insulation (Duct)	R-8	R-0	Existing	12,306	4.3%	25	$483	95%	12%	1.35	210
Manufactured	Central Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	12,306	8.0%	25	$1,099	4%	55%	1.11	73
Manufactured	Central Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	12,306	2.5%	25	$1,099	16%	55%	0.35	74
Manufactured	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	12,306	2.0%	25	$275	40%	55%	1.11	182
Manufactured	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	New	8,782	2.0%	25	$294	40%	55%	0.74	3
Manufactured	Central Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	12,306	44.0%	25	$2,766	5%	75%	2.43	662
Manufactured	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	12,306	8.5%	25	$1,136	90%	10%	1.14	317
Manufactured	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	8,782	8.5%	25	$1,175	90%	10%	0.78	0
Manufactured	Central Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	12,306	49.0%	25	$3,112	5%	75%	2.41	81
Manufactured	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	12,306	3.3%	25	$1,136	85%	95%	0.44	916
Manufactured	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	8,782	3.3%	25	$1,175	85%	95%	0.31	0
Manufactured	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	Existing	12,306	15.0%	30	$203	95%	10%	12.92	140
Manufactured	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	New	8,782	15.0%	30	$91	95%	0%	20.58	0
Manufactured	Central Heat	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	12,306	5.0%	5	$225	50%	90%	0.73	959
Manufactured	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	12,306	2.0%	5	$5	60%	95%	12.28	567
Manufactured	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	8,782	2.0%	5	$5	40%	95%	8.77	6
Manufactured	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	12,306	2.0%	30	$435	97%	65%	0.80	458

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	8,782	2.0%	30	$343	97%	85%	0.73	10
Manufactured	Central Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	8,782	10.0%	25	$4,421	95%	5%	0.25	0
Manufactured	Central Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	8,782	10.0%	25	$6,171	90%	90%	0.18	0
Manufactured	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	12,306	6.8%	15	$26	50%	85%	26.06	1,479
Manufactured	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	8,782	6.8%	15	$26	50%	0%	18.60	0
Manufactured	Central Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	12,306	2.2%	25	$4,048	56%	75%	0.08	306
Manufactured	Central Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	12,306	13.0%	25	$4,048	24%	75%	0.49	824
Manufactured	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	12,306	8.0%	25	$2,017	95%	75%	0.61	306
Manufactured	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	New	8,782	18.0%	25	$2,085	95%	95%	0.94	18
Manufactured	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	12,306	2.0%	25	$382	85%	75%	0.80	398
Manufactured	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	New	8,782	2.0%	25	$395	85%	95%	0.55	8
Manufactured	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	433	7.7%	15	$150	45%	95%	0.20	104
Manufactured	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	440	7.7%	15	$150	45%	95%	0.21	2
Manufactured	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	433	23.0%	15	$411	85%	30%	0.22	183
Manufactured	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	440	23.0%	15	$411	85%	30%	0.22	4
Manufactured	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	Existing	527	50.0%	20	$1,550	75%	25%	0.20	822
Manufactured	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	New	537	50.0%	20	$1,550	75%	35%	0.20	26
Manufactured	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	717	15.0%	18	$55	NA	NA	2.08	590
Manufactured	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	730	15.0%	18	$55	NA	NA	2.12	44
Manufactured	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	683	23.0%	9	$200	99%	20%	0.44	1,124
Manufactured	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	675	23.0%	9	$200	99%	50%	0.43	58
Manufactured	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	Existing	551	10.0%	20	$22	NA	NA	2.90	235

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	New	561	10.0%	20	$22	NA	NA	2.96	21
Manufactured	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	Existing	678	7.9%	11	$33	70%	10%	1.15	74
Manufactured	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	New	549	10.2%	11	$33	70%	10%	1.15	2
Manufactured	Freezer	Stand-Alone Freezer - Early Replacement	Energy Star Freezer	Existing Non-Efficient Freezer	Existing	678	9.4%	12	$465	80%	35%	0.10	176
Manufactured	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Existing	678	248.7%	6	$98	80%	35%	6.30	4,629
Manufactured	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	Existing	604	25.0%	15	$350	95%	7%	0.51	194
Manufactured	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	New	458	25.0%	15	$350	95%	7%	0.39	3
Manufactured	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	Existing	604	25.0%	15	$350	95%	66%	0.51	1,814
Manufactured	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	New	458	25.0%	15	$350	95%	66%	0.39	30
Manufactured	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	604	75.0%	20	$425	85%	7%	1.62	675
Manufactured	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	458	75.0%	20	$425	85%	7%	1.23	11
Manufactured	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	604	75.0%	20	$425	85%	66%	1.62	6,219
Manufactured	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	458	75.0%	20	$425	85%	66%	1.23	103
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 14 SEER, 8.5 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	9,857	4.9%	15	$245	NA	NA	1.86	0
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 14 SEER, 8.5 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	8,912	4.9%	15	$245	NA	NA	1.68	0
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 16 SEER, 8.8 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	9,857	7.4%	15	$735	NA	NA	0.94	0
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 16 SEER, 8.8 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	8,912	7.4%	15	$735	NA	NA	0.85	0
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 18 SEER, 9.0 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	9,857	9.2%	15	$1,224	NA	NA	0.70	2
Manufactured	Heat Pump	Air Source Heat_Pump	2.5 ton, 18 SEER, 9.0 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	8,912	9.2%	15	$1,224	NA	NA	0.63	454
Manufactured	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF, 3 ton	New	8,898	14.0%	15	$3,500	99%	20%	0.34	1
Manufactured	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	8,898	10.0%	15	$942	95%	0%	0.89	0
Manufactured	Heat Pump	Attic Fan	Attic Fan	No Attic Fan	New	8,898	0.9%	15	$87	96%	85%	0.87	5
Manufactured	Heat Pump	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	8,898	5.5%	10	$574	30%	65%	0.55	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	8,898	3.3%	30	$159	25%	75%	2.98	10
Manufactured	Heat Pump	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	8,898	0.1%	10	$98	20%	85%	0.04	0
Manufactured	Heat Pump	Construction - ICF	Concrete Framing	Standard Wood Framing	New	8,898	41.7%	30	$5,426	95%	45%	1.12	272
Manufactured	Heat Pump	Construction - SIP	Specialty Framing	Standard Wood Framing	New	8,898	14.0%	30	$3,831	95%	45%	0.53	0
Manufactured	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	8,898	0.6%	20	$52	95%	25%	1.25	2
Manufactured	Heat Pump	Deciduous Trees	Deciduous Trees	No Shading	New	8,898	0.4%	30	$108	50%	75%	0.51	2
Manufactured	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	8,898	1.7%	12	$40	55%	85%	2.91	12
Manufactured	Heat Pump	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	8,898	8.0%	30	$5,419	15%	85%	0.22	11
Manufactured	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	New	8,898	15.0%	10	$424	65%	0%	2.02	0
Manufactured	Heat Pump	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	8,898	19.0%	25	$899	95%	10%	2.70	3
Manufactured	Heat Pump	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	8,898	10.0%	25	$194	75%	30%	6.60	36
Manufactured	Heat Pump	Green Roof	ecoroof	Standard Roof	New	8,898	6.5%	40	$20,095	98%	0%	0.06	0
Manufactured	Heat Pump	Heat_Pump - Ground or Water-Source - Closed Loop	EER = 14.1, COP = 3.3	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	8,898	7.2%	18	$14,583	95%	30%	0.05	1
Manufactured	Heat Pump	Heat_Pump - Ground or Water-Source - Open Loop	EER = 16.2, COP = 3.6	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	8,898	18.3%	18	$14,583	95%	15%	0.12	2
Manufactured	Heat Pump	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	8,898	6.1%	25	$736	95%	20%	1.05	18
Manufactured	Heat Pump	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	8,898	2.0%	25	$431	85%	87%	0.59	17
Manufactured	Heat Pump	Insulation (Floor)	R-30	R-19 (state code)	New	8,898	1.0%	25	$294	40%	55%	0.44	3
Manufactured	Heat Pump	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	8,898	7.3%	25	$1,175	90%	10%	0.79	0
Manufactured	Heat Pump	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	8,898	2.8%	25	$1,175	85%	95%	0.30	0
Manufactured	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER, 7.7 HSPF	New	8,898	15.0%	30	$91	95%	0%	24.05	0
Manufactured	Heat Pump	Motor - ECM Motor	ECM motor for Heat Pump Fan	Standard Motor	New	8,898	1.3%	20	$350	85%	90%	0.38	5
Manufactured	Heat Pump	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	8,898	10.0%	40	$2,938	95%	10%	0.59	11

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Heat Pump	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	8,898	2.0%	5	$5	40%	95%	10.30	12
Manufactured	Heat Pump	Proper Sizing - Heat Pump	Correctly Sized Heat_Pump (Cooling And Heating Unit)	Oversized Heat_Pump	New	8,898	8.6%	15	$1	85%	47%	719.11	57
Manufactured	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	8,898	2.6%	30	$343	97%	85%	1.12	27
Manufactured	Heat Pump	Solar Attic Fan	Solar Attic Fan	No Attic Fan	New	8,898	1.1%	10	$475	95%	70%	0.14	1
Manufactured	Heat Pump	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	8,898	9.9%	25	$4,421	95%	5%	0.29	0
Manufactured	Heat Pump	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	8,898	8.8%	25	$6,171	90%	90%	0.18	0
Manufactured	Heat Pump	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	8,898	6.8%	15	$26	50%	0%	21.92	0
Manufactured	Heat Pump	VSD Motor - ECM	Variable Speed Motor for Heat Pump Fan	Standard Motor	New	8,898	3.8%	20	$425	85%	90%	0.95	18
Manufactured	Heat Pump	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	8,898	6.0%	11	$1,370	95%	50%	0.28	32
Manufactured	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	8,898	4.1%	15	$1,519	96%	50%	0.23	11
Manufactured	Heat Pump	Window Film	SHGC Reduction = 45%	No Window Film	New	8,898	1.4%	11	$938	80%	95%	0.09	12
Manufactured	Heat Pump	Window Overhang	Window Overhang	No Window Overhang	New	8,898	2.6%	30	$861	80%	50%	0.45	0
Manufactured	Heat Pump	Windows	U=0.19	U = 0.35 (State Code)	New	8,898	13.5%	25	$2,085	95%	95%	0.83	22
Manufactured	Heat Pump	Windows	U=0.30	U = 0.35 (State Code)	New	8,898	2.5%	25	$395	85%	95%	0.80	20
Manufactured	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	Existing	813	3.5%	20	$12	83%	98%	7.59	1,106
Manufactured	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	New	788	3.5%	20	$12	83%	98%	7.59	21
Manufactured	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	Existing	813	3.0%	20	$12	83%	98%	9.28	892
Manufactured	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	New	788	3.0%	20	$12	83%	98%	9.28	15
Manufactured	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	Existing	813	3.0%	20	$12	83%	98%	12.66	822
Manufactured	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	New	788	3.0%	20	$12	83%	98%	12.66	14
Manufactured	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	Existing	813	39.1%	6	$3	83%	86%	5.33	10,148
Manufactured	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	New	788	39.1%	6	$3	83%	86%	5.33	205
Manufactured	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	Existing	813	10.9%	6	$3	83%	86%	6.52	2,606
Manufactured	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	New	788	10.9%	6	$3	83%	86%	6.52	49
Manufactured	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	Existing	813	5.6%	6	$3	83%	86%	8.89	1,231

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	New	788	5.6%	6	$3	83%	86%	8.89	24
Manufactured	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	Existing	813	1.4%	5	$12	75%	75%	1.07	363
Manufactured	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	New	788	1.4%	5	$12	75%	75%	1.07	8
Manufactured	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	Existing	813	1.6%	5	$29	65%	70%	1.15	331
Manufactured	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	New	788	1.6%	5	$29	35%	70%	1.15	4
Manufactured	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Existing	813	4.5%	10	$142	95%	10%	0.17	0
Manufactured	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	New	788	4.5%	10	$142	95%	10%	0.16	0
Manufactured	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	813	0.0%	13	$45	75%	50%	0.06	4
Manufactured	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	788	0.0%	13	$13	75%	50%	0.21	0
Manufactured	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	813	0.0%	13	$68	95%	50%	0.04	5
Manufactured	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	788	0.0%	13	$37	95%	50%	0.08	0
Manufactured	Lighting	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T12 Lamps and Fixtures	Existing	813	0.6%	13	$31	50%	50%	0.18	70
Manufactured	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	Existing	813	0.5%	16	$83	50%	5%	1.57	2
Manufactured	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	New	788	0.5%	16	$83	50%	5%	1.57	0
Manufactured	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	Existing	813	0.3%	7	$10	95%	90%	0.12	128
Manufactured	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	New	788	0.3%	7	$10	95%	90%	0.12	3
Manufactured	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	Existing	813	0.6%	20	$46	98%	85%	0.27	240
Manufactured	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	New	788	0.6%	20	$46	98%	85%	0.27	5
Manufactured	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	Existing	813	4.8%	20	$36	98%	85%	0.23	1,870
Manufactured	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	New	788	4.8%	20	$36	98%	85%	0.23	39
Manufactured	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	Existing	813	1.4%	20	$41	98%	85%	0.27	551
Manufactured	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	New	788	1.4%	20	$41	98%	85%	0.27	12

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	Existing	813	0.8%	20	$63	98%	85%	1.56	100
Manufactured	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	New	788	0.8%	20	$63	98%	85%	1.56	2
Manufactured	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	Existing	813	0.2%	16	$27	50%	5%	0.91	0
Manufactured	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	New	788	0.2%	16	$27	50%	5%	0.91	0
Manufactured	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	Existing	813	0.6%	10	$37	90%	40%	1.40	36
Manufactured	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	New	788	0.6%	10	$37	90%	40%	1.40	1
Manufactured	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Existing	813	14.0%	10	$61	85%	75%	1.23	1,734
Manufactured	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	New	788	14.0%	10	$61	85%	75%	1.19	36
Manufactured	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	Existing	813	0.9%	10	$18	75%	20%	3.33	62
Manufactured	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	New	788	0.9%	10	$18	75%	20%	3.33	1
Manufactured	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	Existing	813	15.0%	10	$38	50%	50%	2.11	1,776
Manufactured	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	New	788	15.0%	10	$38	50%	70%	2.05	52
Manufactured	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Existing	813	2.9%	10	$88	90%	75%	0.18	348
Manufactured	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	New	788	2.9%	10	$88	90%	75%	0.17	7
Manufactured	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Existing	1,465	2.4%	7	$30	85%	15%	0.51	235
Manufactured	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	New	1,491	2.4%	7	$30	85%	15%	0.51	5
Manufactured	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Existing	1,465	0.2%	7	$4	40%	55%	0.38	33
Manufactured	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	New	1,491	0.2%	7	$4	40%	55%	0.38	1
Manufactured	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	Existing	1,465	3.3%	9	$5	38%	100%	3.57	1,072
Manufactured	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	New	1,491	3.3%	9	$5	38%	100%	3.57	24
Manufactured	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	Existing	1,465	1.9%	7	$5	24%	100%	2.37	392
Manufactured	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	New	1,491	1.9%	7	$5	24%	100%	2.37	9

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	Existing	1,465	0.4%	10	$12	5%	15%	6.05	2
Manufactured	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	New	1,491	0.4%	10	$12	5%	15%	6.05	0
Manufactured	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	Existing	1,465	1.7%	6	$35	62%	81%	0.68	715
Manufactured	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	New	1,491	1.7%	6	$35	62%	81%	0.68	16
Manufactured	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	Existing	1,465	3.2%	9	$100	70%	38%	0.74	716
Manufactured	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	New	1,491	3.2%	9	$100	70%	38%	0.74	16
Manufactured	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	Existing	1,465	2.5%	7	$20	90%	91%	0.94	1,742
Manufactured	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	New	1,491	2.5%	7	$20	90%	91%	0.94	39
Manufactured	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	Existing	1,465	13.7%	4	$15	15%	100%	2.16	1,751
Manufactured	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	New	1,491	13.7%	4	$15	15%	100%	2.16	39
Manufactured	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	Existing	1,465	1.9%	6	$25	55%	25%	0.31	221
Manufactured	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	New	1,491	1.9%	6	$25	55%	25%	0.31	5
Manufactured	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	Existing	1,465	3.0%	4	$10	15%	100%	1.04	378
Manufactured	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	New	1,491	3.0%	4	$10	15%	100%	1.04	8
Manufactured	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	Existing	1,465	0.0%	5	$10	40%	75%	0.35	4
Manufactured	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	New	1,491	0.0%	5	$10	40%	75%	0.35	0
Manufactured	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	Existing	1,465	0.6%	4	$5	45%	10%	0.87	0
Manufactured	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	New	1,491	0.6%	4	$5	45%	10%	0.87	0
Manufactured	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	Existing	1,465	0.3%	7	$7	40%	85%	0.63	87
Manufactured	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	New	1,491	0.3%	7	$7	40%	85%	0.63	2
Manufactured	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	Existing	1,465	1.1%	7	$15	75%	90%	0.44	604
Manufactured	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	New	1,491	1.1%	7	$15	75%	90%	0.45	13
Manufactured	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	Existing	488	20.0%	20	$29	NA	NA	3.95	200
Manufactured	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	New	497	20.0%	20	$29	NA	NA	4.02	18
Manufactured	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	Existing	586	30.0%	20	$70	97%	32%	2.91	148

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	New	487	30.0%	20	$70	97%	32%	2.42	3
Manufactured	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	586	6.3%	5	$225	99%	0%	0.05	1
Manufactured	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	487	6.3%	5	$225	99%	0%	0.04	0
Manufactured	Refrigerator	Refrigerator/Freezer - Early Replacement	Standard Refrigerator	Existing Refrigerator	Existing	586	40.0%	20	$1,169	85%	11%	0.23	0
Manufactured	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Existing	586	282.8%	10	$98	85%	11%	10.52	8,520
Manufactured	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	Existing	855	9.3%	9	$14	NA	NA	5.71	577
Manufactured	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	New	503	9.3%	9	$14	NA	NA	3.36	18
Manufactured	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 9.8	Existing Room AC EER 9.0	Existing	903	8.2%	15	$460	97%	95%	0.27	1,029
Manufactured	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	903	41.3%	10	$574	30%	65%	0.74	220
Manufactured	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	501	41.3%	10	$574	30%	65%	0.41	1
Manufactured	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	903	3.3%	30	$159	55%	60%	0.52	111
Manufactured	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	501	3.3%	30	$159	25%	75%	0.29	1
Manufactured	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	903	0.3%	10	$98	20%	85%	0.03	7
Manufactured	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	501	0.3%	10	$98	20%	85%	0.02	0
Manufactured	Room AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	501	32.0%	30	$5,426	95%	45%	0.08	1
Manufactured	Room AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	501	14.0%	30	$3,831	95%	45%	0.05	0
Manufactured	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	903	3.4%	20	$49	95%	25%	1.33	83
Manufactured	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	501	3.2%	20	$52	95%	25%	0.65	1
Manufactured	Room AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	903	2.0%	30	$108	50%	75%	0.47	82
Manufactured	Room AC	Deciduous Trees	Deciduous Trees	No Shading	New	501	2.0%	30	$108	50%	75%	0.26	1
Manufactured	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	903	0.4%	12	$40	55%	85%	0.12	16
Manufactured	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	501	0.4%	12	$40	55%	85%	0.07	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Room AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	903	0.9%	6	$69	45%	80%	0.08	27
Manufactured	Room AC	Green Roof	ecoroof	Standard Roof	New	501	6.5%	40	$20,095	98%	0%	0.01	0
Manufactured	Room AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	903	10.0%	15	$1,368	75%	75%	0.11	489
Manufactured	Room AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	903	14.9%	25	$482	7%	13%	0.69	14
Manufactured	Room AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	903	6.9%	25	$482	63%	13%	0.32	55
Manufactured	Room AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	903	6.1%	25	$712	95%	13%	0.19	69
Manufactured	Room AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	501	6.1%	25	$736	95%	20%	0.10	2
Manufactured	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	903	14.7%	25	$1,594	7%	90%	0.21	82
Manufactured	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	903	0.6%	25	$1,594	59%	90%	0.01	24
Manufactured	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	903	0.1%	25	$403	85%	87%	0.01	6
Manufactured	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	501	0.1%	25	$431	85%	87%	0.00	0
Manufactured	Room AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	903	0.1%	25	$1,099	4%	55%	0.00	0
Manufactured	Room AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	903	0.1%	25	$1,099	16%	55%	0.00	1
Manufactured	Room AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	903	0.1%	25	$275	40%	55%	0.01	2
Manufactured	Room AC	Insulation (Floor)	R-30	R-19 (state code)	New	501	0.1%	25	$294	40%	55%	0.00	0
Manufactured	Room AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	903	0.1%	25	$2,766	5%	75%	0.00	0
Manufactured	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	903	2.3%	25	$1,136	90%	10%	0.04	16
Manufactured	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	501	2.3%	25	$1,175	90%	10%	0.02	0
Manufactured	Room AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	903	13.0%	25	$3,112	5%	75%	0.09	4
Manufactured	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	903	0.5%	25	$1,136	85%	95%	0.01	30
Manufactured	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	501	0.5%	25	$1,175	85%	95%	0.01	0
Manufactured	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	903	2.0%	5	$5	60%	95%	1.83	121
Manufactured	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	501	2.0%	5	$5	40%	95%	1.01	1

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	903	6.7%	30	$435	97%	65%	0.39	434
Manufactured	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	501	6.7%	30	$343	97%	85%	0.28	9
Manufactured	Room AC	Removal of Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	Proper Disposal of Room AC	Existing Room AC	Existing	903	100.0%	5	$100	85%	15%	4.87	1,746
Manufactured	Room AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	501	1.0%	25	$4,421	95%	5%	0.00	0
Manufactured	Room AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	501	1.0%	25	$6,171	90%	90%	0.00	0
Manufactured	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	903	7.5%	11	$907	80%	95%	0.09	466
Manufactured	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	New	501	7.5%	11	$938	80%	95%	0.05	8
Manufactured	Room AC	Window Overhang	Window Overhang	No Window Overhang	New	501	14.0%	30	$861	80%	50%	0.23	1
Manufactured	Room AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	903	5.0%	25	$4,048	56%	75%	0.03	161
Manufactured	Room AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	903	31.5%	25	$4,048	24%	75%	0.17	523
Manufactured	Room AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	903	17.5%	25	$2,017	95%	75%	0.20	177
Manufactured	Room AC	Windows	U=0.19	U = 0.35 (State Code)	New	501	9.5%	25	$2,085	95%	95%	0.06	2
Manufactured	Room AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	903	4.5%	25	$382	85%	75%	0.27	239
Manufactured	Room AC	Windows	U=0.30	U = 0.35 (State Code)	New	501	4.5%	25	$395	85%	95%	0.14	5
Manufactured	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	9,475	3.3%	30	$159	55%	60%	2.75	404
Manufactured	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	6,762	3.3%	30	$159	25%	75%	1.97	4
Manufactured	Room Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	6,762	44.0%	30	$5,426	95%	45%	0.78	5
Manufactured	Room Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	6,762	14.0%	30	$3,831	95%	45%	0.35	1
Manufactured	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	9,475	2.0%	12	$40	55%	85%	3.13	364
Manufactured	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	6,762	2.0%	12	$40	55%	85%	2.23	6
Manufactured	Room Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	9,475	2.0%	6	$69	45%	80%	0.87	256
Manufactured	Room Heat	Green Roof	ecoroof	Standard Roof	New	6,762	6.5%	40	$20,095	98%	0%	0.04	0
Manufactured	Room Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	9,475	10.0%	15	$1,368	75%	75%	0.56	1,660

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Room Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	9,475	14.9%	25	$482	7%	13%	3.63	52
Manufactured	Room Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	9,475	6.9%	25	$482	63%	13%	1.68	206
Manufactured	Room Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	9,475	6.1%	25	$712	95%	13%	1.00	238
Manufactured	Room Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	6,762	6.1%	25	$736	95%	20%	0.69	6
Manufactured	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	9,475	37.0%	25	$1,594	7%	90%	2.73	834
Manufactured	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	9,475	10.2%	25	$1,594	59%	90%	0.75	1,674
Manufactured	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	9,475	1.0%	25	$403	85%	87%	0.29	190
Manufactured	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	6,762	3.0%	25	$431	85%	87%	0.59	11
Manufactured	Room Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	9,475	8.0%	25	$1,099	4%	55%	0.86	55
Manufactured	Room Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	9,475	2.5%	25	$1,099	16%	55%	0.27	57
Manufactured	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	9,475	2.0%	25	$275	40%	55%	0.86	138
Manufactured	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	New	6,762	2.0%	25	$294	40%	55%	0.57	2
Manufactured	Room Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	9,475	44.0%	25	$2,766	5%	75%	1.87	554
Manufactured	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	9,475	8.5%	25	$1,136	90%	10%	0.88	240
Manufactured	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	6,762	8.5%	25	$1,175	90%	10%	0.60	1
Manufactured	Room Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	9,475	49.0%	25	$3,112	5%	75%	1.85	68
Manufactured	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	9,475	3.3%	25	$1,136	85%	95%	0.34	702
Manufactured	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	6,762	3.3%	25	$1,175	85%	95%	0.24	8
Manufactured	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	9,475	2.0%	5	$5	60%	95%	9.46	449
Manufactured	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	6,762	2.0%	5	$5	40%	95%	6.75	5
Manufactured	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	9,475	2.0%	30	$435	97%	65%	0.62	347
Manufactured	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	6,762	2.0%	30	$343	97%	85%	0.56	8
Manufactured	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	Existing	9,475	41.0%	20	$4,140	98%	30%	0.97	4,365
Manufactured	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	New	6,762	41.0%	20	$4,140	98%	30%	0.70	72

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Room Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	6,762	10.0%	25	$4,421	95%	5%	0.19	0
Manufactured	Room Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	6,762	10.0%	25	$6,171	90%	90%	0.14	2
Manufactured	Room Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	9,475	2.2%	25	$4,048	56%	75%	0.06	235
Manufactured	Room Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	9,475	13.0%	25	$4,048	24%	75%	0.38	631
Manufactured	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	9,475	8.0%	25	$2,017	95%	75%	0.47	233
Manufactured	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	New	6,762	18.0%	25	$2,085	95%	95%	0.73	13
Manufactured	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	9,475	2.0%	25	$382	85%	75%	0.62	302
Manufactured	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	New	6,762	2.0%	25	$395	85%	95%	0.43	7
Manufactured	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	Existing	2,591	3.2%	18	$114	NA	NA	0.77	676
Manufactured	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	New	2,637	3.2%	18	$114	NA	NA	0.79	28
Manufactured	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	2,662	4.9%	14	$92	68%	9%	1.23	157
Manufactured	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	2,632	4.9%	14	$92	68%	9%	1.22	2
Manufactured	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	2,662	9.8%	14	$735	25%	25%	0.31	467
Manufactured	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	2,662	15.6%	14	$227	85%	9%	1.58	266
Manufactured	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	2,632	15.6%	14	$227	85%	9%	1.56	3
Manufactured	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	Existing Dishwasher EF = 0.50	Existing	2,662	1.7%	13	$494	10%	30%	0.07	38
Manufactured	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	2,662	1.1%	13	$489	35%	16%	0.05	48
Manufactured	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	2,632	1.1%	13	$489	35%	16%	0.05	1
Manufactured	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	2,662	18.5%	30	$600	95%	45%	1.31	4,762
Manufactured	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	2,632	18.5%	30	$600	95%	95%	1.29	122
Manufactured	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	2,662	9.0%	9	$1	95%	95%	34.15	3,093
Manufactured	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	2,632	9.3%	9	$1	95%	95%	34.15	37
Manufactured	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	2,662	3.7%	9	$1	95%	95%	17.26	1,274
Manufactured	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	2,632	3.8%	9	$1	95%	95%	17.26	15
Manufactured	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	2,662	4.2%	9	$1	95%	95%	28.93	2,912

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Manufactured	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	Existing	2,662	43.2%	15	$2,209	95%	30%	0.48	937
Manufactured	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	New	2,632	43.2%	15	$2,209	95%	30%	0.47	11
Manufactured	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	2,662	55.2%	10	$239	5%	5%	3.86	88
Manufactured	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	2,632	55.2%	10	$239	5%	5%	3.82	1
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	2,662	1.2%	5	$7	38%	65%	1.35	185
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	2,632	1.2%	5	$7	38%	85%	1.33	3
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	2,662	4.1%	10	$5	33%	95%	14.21	968
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	2,632	4.3%	10	$5	85%	95%	14.21	30
Manufactured	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	2,662	4.1%	10	$12	33%	95%	5.86	968
Manufactured	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	Existing	2,662	42.9%	20	$8,500	95%	20%	0.16	621
Manufactured	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	New	2,632	45.5%	20	$8,500	95%	20%	0.17	8
Manufactured	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	Existing	2,662	3.2%	20	$1,347	95%	30%	0.07	68
Manufactured	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	New	2,632	3.2%	20	$1,229	95%	30%	0.08	1
Manufactured	Water Heat	Water Heater (Electric) - Early Retirement	EF = 0.92	EF = 0.88	Existing	2,662	4.3%	13	$456	10%	100%	0.21	331
Manufactured	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	2,662	8.5%	9	$130	90%	40%	0.98	1,901
Manufactured	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	2,632	8.5%	9	$130	75%	40%	0.97	19
Manufactured	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	2,662	5.0%	18	$136	80%	80%	1.05	1,774
Manufactured	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	2,632	5.0%	18	$136	10%	80%	1.04	2
Manufactured	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	2,662	6.5%	10	$18	65%	0%	6.04	3
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	2,662	6.0%	4	$8	43%	95%	4.59	1,567
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	2,632	6.0%	4	$8	43%	95%	4.54	19
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 14	SEER 13	Existing	1,011	7.1%	15	$232	NA	NA	0.52	0
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 14	SEER 13	New	693	7.1%	15	$232	NA	NA	0.35	0
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 16	SEER 13	Existing	1,011	18.8%	15	$695	NA	NA	0.45	0
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 16	SEER 13	New	693	18.8%	15	$695	NA	NA	0.31	0
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 18	SEER 13	Existing	1,011	27.8%	15	$1,158	NA	NA	0.40	14,922
Multi Family	Central AC	Air Conditioner - Central (2.5 ton unit)	SEER 18	SEER 13	New	693	27.8%	15	$1,158	NA	NA	0.28	769

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central AC	Air Conditioner - Central, Early Replacement	SEER 13	Existing AC Unit SEER 10	Existing	1,278	23.1%	15	$2,080	81%	95%	0.24	20,335
Multi Family	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	Existing	1,278	30.0%	15	$2,395	99%	2%	0.27	680
Multi Family	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	New	692	30.0%	15	$1,123	99%	40%	0.31	148
Multi Family	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	1,278	10.0%	15	$942	95%	0%	0.22	0
Multi Family	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	692	10.0%	15	$942	95%	0%	0.12	0
Multi Family	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	1,278	41.3%	10	$574	30%	65%	1.04	1,842
Multi Family	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	692	41.3%	10	$574	30%	65%	0.56	0
Multi Family	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	1,278	3.3%	30	$40	55%	60%	2.95	918
Multi Family	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	692	3.3%	30	$40	25%	75%	1.59	6
Multi Family	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	1,278	0.3%	10	$98	45%	85%	0.05	141
Multi Family	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	692	0.3%	10	$98	45%	85%	0.03	2
Multi Family	Central AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	692	32.0%	30	$2,209	95%	20%	0.28	3
Multi Family	Central AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	692	14.0%	30	$1,560	95%	20%	0.17	1
Multi Family	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	1,278	4.9%	20	$43	95%	25%	3.08	988
Multi Family	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	692	5.5%	20	$34	95%	25%	2.32	13
Multi Family	Central AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	1,278	2.0%	30	$108	75%	30%	0.67	412
Multi Family	Central AC	Deciduous Trees	Deciduous Trees	No Shading	New	692	2.0%	30	$108	90%	30%	0.36	7
Multi Family	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	1,278	0.4%	12	$20	55%	85%	0.35	124
Multi Family	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	692	0.4%	12	$20	55%	85%	0.19	2
Multi Family	Central AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	1,278	0.9%	6	$35	55%	80%	0.22	220
Multi Family	Central AC	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	692	8.0%	30	$2,384	10%	85%	0.07	5
Multi Family	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	1,278	15.0%	20	$424	65%	60%	0.95	0
Multi Family	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	New	692	15.0%	20	$424	65%	0%	0.51	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	692	19.0%	25	$899	95%	10%	0.36	0
Multi Family	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	1,278	19.0%	25	$899	95%	50%	0.67	0
Multi Family	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	1,278	10.0%	25	$2,636	90%	10%	0.12	457
Multi Family	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	692	10.0%	25	$128	75%	30%	1.34	23
Multi Family	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	Existing	1,278	70.0%	10	$2,634	95%	1%	0.38	30
Multi Family	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	New	692	70.0%	10	$2,634	95%	1%	0.21	0
Multi Family	Central AC	Green Roof	ecoroof	Standard Roof	New	692	6.5%	40	$9,315	98%	0%	0.02	0
Multi Family	Central AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	1,278	10.0%	15	$1,133	75%	75%	0.19	3,049
Multi Family	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	1,278	14.7%	25	$1,403	7%	45%	0.33	238
Multi Family	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	1,278	0.6%	25	$1,403	59%	45%	0.01	75
Multi Family	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	1,278	0.1%	25	$355	85%	87%	0.01	35
Multi Family	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	692	0.1%	25	$286	85%	87%	0.01	1
Multi Family	Central AC	Insulation (Duct)	R-6	R-0	Existing	1,278	2.6%	25	$376	75%	12%	0.22	121
Multi Family	Central AC	Insulation (Duct)	R-8	R-0	Existing	1,278	3.2%	25	$425	95%	12%	0.24	195
Multi Family	Central AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	1,278	0.1%	25	$968	4%	80%	0.00	2
Multi Family	Central AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	1,278	0.1%	25	$968	16%	80%	0.00	6
Multi Family	Central AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	1,278	0.1%	25	$242	40%	80%	0.01	15
Multi Family	Central AC	Insulation (Floor)	R-30	R-19 (state code)	New	692	0.1%	25	$195	40%	80%	0.01	0
Multi Family	Central AC	Insulation (Slab)	R-10 (state code)	R-0	Existing	1,278	5.3%	25	$833	60%	10%	0.20	161
Multi Family	Central AC	Insulation (Slab)	R-15	R-10 (state code)	Existing	1,278	1.4%	25	$231	87%	0%	0.20	0
Multi Family	Central AC	Insulation (Slab)	R-15	R-10 (state code)	New	692	1.4%	25	$188	64%	65%	0.13	4
Multi Family	Central AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	1,278	0.1%	25	$1,298	5%	75%	0.00	2
Multi Family	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	1,278	2.3%	25	$533	90%	10%	0.13	103

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	692	2.3%	25	$478	90%	10%	0.08	0
Multi Family	Central AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	1,278	13.0%	25	$1,460	5%	75%	0.28	27
Multi Family	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	1,278	0.5%	25	$533	90%	95%	0.03	205
Multi Family	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	692	0.5%	25	$478	90%	95%	0.02	2
Multi Family	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	Existing	1,278	15.0%	30	$203	95%	10%	2.66	1,207
Multi Family	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	New	692	15.0%	30	$91	95%	0%	3.21	0
Multi Family	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	Existing	1,278	4.5%	15	$350	95%	65%	0.27	767
Multi Family	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	New	692	4.5%	15	$350	95%	65%	0.15	10
Multi Family	Central AC	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	692	10.0%	40	$1,949	95%	10%	0.12	7
Multi Family	Central AC	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	1,278	10.0%	5	$225	50%	90%	0.31	3,115
Multi Family	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	1,278	2.0%	5	$3	60%	95%	4.14	1,014
Multi Family	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	692	2.0%	5	$3	40%	95%	2.24	8
Multi Family	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	1,278	6.0%	15	$1	85%	47%	127.16	2,168
Multi Family	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	692	6.0%	15	$1	85%	47%	68.79	26
Multi Family	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	1,278	6.7%	30	$383	97%	65%	0.63	3,298
Multi Family	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	692	6.7%	30	$227	97%	85%	0.57	56
Multi Family	Central AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	692	1.0%	25	$1,800	95%	5%	0.01	0
Multi Family	Central AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	692	1.0%	25	$2,513	90%	90%	0.01	0
Multi Family	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	1,278	6.8%	15	$26	25%	85%	5.54	1,270
Multi Family	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	692	6.8%	15	$26	25%	0%	3.00	0
Multi Family	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	Existing	1,278	13.5%	15	$425	95%	65%	0.67	3,481

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	New	692	13.5%	15	$425	95%	65%	0.36	40
Multi Family	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	Existing	1,278	6.0%	11	$1,370	95%	50%	0.07	1,434
Multi Family	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	692	6.0%	11	$1,370	95%	50%	0.04	20
Multi Family	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Existing	1,278	22.0%	15	$1,519	96%	50%	0.31	6,570
Multi Family	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	692	22.0%	15	$1,519	96%	50%	0.17	93
Multi Family	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	1,278	7.5%	11	$426	80%	95%	0.28	3,761
Multi Family	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	New	692	7.5%	11	$458	80%	95%	0.14	45
Multi Family	Central AC	Window Overhang	Window Overhang	No Window Overhang	New	692	14.0%	30	$689	80%	50%	0.40	0
Multi Family	Central AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	1,278	5.0%	25	$1,899	56%	75%	0.08	1,026
Multi Family	Central AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	1,278	31.5%	25	$1,899	24%	75%	0.53	4,161
Multi Family	Central AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	1,278	17.5%	25	$946	95%	75%	0.59	1,399
Multi Family	Central AC	Windows	U=0.19	U = 0.35 (State Code)	New	692	9.5%	25	$1,019	95%	95%	0.16	9
Multi Family	Central AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	1,278	4.5%	25	$179	85%	75%	0.80	1,951
Multi Family	Central AC	Windows	U=0.30	U = 0.35 (State Code)	New	692	4.5%	25	$193	85%	95%	0.40	28
Multi Family	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	8,279	10.0%	15	$942	95%	0%	0.71	0
Multi Family	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	5,812	10.0%	15	$942	95%	0%	0.50	0
Multi Family	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	8,279	3.3%	30	$40	55%	60%	9.62	3,571
Multi Family	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	5,812	3.3%	30	$40	25%	75%	6.75	32
Multi Family	Central Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	5,812	44.0%	30	$2,209	95%	20%	1.64	83
Multi Family	Central Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	5,812	14.0%	30	$1,560	95%	20%	0.74	0
Multi Family	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	8,279	2.0%	12	$20	55%	85%	5.47	3,071
Multi Family	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	5,812	2.0%	12	$20	55%	85%	3.84	47
Multi Family	Central Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	8,279	2.0%	6	$35	55%	80%	1.52	2,605
Multi Family	Central Heat	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	5,812	8.0%	30	$2,384	10%	85%	0.28	26
Multi Family	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	8,279	15.0%	20	$424	65%	60%	3.04	13,104

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	New	5,812	15.0%	20	$424	65%	0%	2.13	0
Multi Family	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	5,812	19.0%	25	$899	95%	10%	1.53	9
Multi Family	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	8,279	19.0%	25	$899	95%	50%	2.17	2,716
Multi Family	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	8,279	10.0%	25	$2,636	90%	10%	0.39	2,168
Multi Family	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	5,812	10.0%	25	$128	75%	30%	5.62	116
Multi Family	Central Heat	Green Roof	ecoroof	Standard Roof	New	5,812	6.5%	40	$9,315	98%	0%	0.07	0
Multi Family	Central Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	8,279	10.0%	15	$1,133	75%	75%	0.59	15,371
Multi Family	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	8,279	37.0%	25	$1,403	7%	45%	2.71	3,321
Multi Family	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	8,279	10.2%	25	$1,403	59%	45%	0.75	7,540
Multi Family	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	8,279	1.0%	25	$355	85%	87%	0.29	1,765
Multi Family	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	5,812	3.0%	25	$286	85%	87%	0.76	91
Multi Family	Central Heat	Insulation (Duct)	R-6	R-0	Existing	8,279	3.5%	25	$376	75%	12%	0.97	927
Multi Family	Central Heat	Insulation (Duct)	R-8	R-0	Existing	8,279	4.3%	25	$425	95%	12%	1.03	1,416
Multi Family	Central Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	8,279	8.0%	25	$968	4%	80%	0.85	742
Multi Family	Central Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	8,279	2.5%	25	$968	16%	80%	0.27	766
Multi Family	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	8,279	2.0%	25	$242	40%	80%	0.85	1,850
Multi Family	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	New	5,812	2.0%	25	$195	40%	80%	0.74	26
Multi Family	Central Heat	Insulation (Slab)	R-10 (state code)	R-0	Existing	8,279	5.3%	25	$833	60%	10%	0.65	793
Multi Family	Central Heat	Insulation (Slab)	R-15	R-10 (state code)	Existing	8,279	1.4%	25	$231	87%	0%	0.64	0
Multi Family	Central Heat	Insulation (Slab)	R-15	R-10 (state code)	New	5,812	1.4%	25	$188	64%	65%	0.55	23
Multi Family	Central Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	8,279	44.0%	25	$1,298	5%	75%	3.49	4,832
Multi Family	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	8,279	8.5%	25	$533	90%	10%	1.63	2,268
Multi Family	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	5,812	8.5%	25	$478	90%	10%	1.28	25

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Central Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	8,279	49.0%	25	$1,460	5%	75%	3.45	589
Multi Family	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	8,279	3.3%	25	$533	90%	95%	0.64	7,084
Multi Family	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	5,812	3.3%	25	$478	90%	95%	0.50	0
Multi Family	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	Existing	8,279	15.0%	30	$203	95%	10%	8.69	939
Multi Family	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	New	5,812	15.0%	30	$91	95%	0%	13.62	0
Multi Family	Central Heat	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	8,279	5.0%	5	$225	50%	90%	0.49	6,464
Multi Family	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	8,279	2.0%	5	$3	60%	95%	13.22	3,896
Multi Family	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	5,812	2.0%	5	$3	40%	95%	9.28	40
Multi Family	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	8,279	2.0%	30	$383	97%	65%	0.61	3,077
Multi Family	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	5,812	2.0%	30	$227	97%	85%	0.73	65
Multi Family	Central Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	5,812	10.0%	25	$1,800	95%	5%	0.40	0
Multi Family	Central Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	5,812	10.0%	25	$2,513	90%	90%	0.29	0
Multi Family	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	8,279	6.8%	15	$26	25%	85%	17.53	4,882
Multi Family	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	5,812	6.8%	15	$26	25%	0%	12.31	0
Multi Family	Central Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	8,279	2.2%	25	$1,899	56%	75%	0.12	2,183
Multi Family	Central Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	8,279	13.0%	25	$1,899	24%	75%	0.70	6,035
Multi Family	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	8,279	8.0%	25	$946	95%	75%	0.87	0
Multi Family	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	New	5,812	18.0%	25	$1,019	95%	95%	1.28	796
Multi Family	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	8,279	2.0%	25	$179	85%	75%	1.15	3,774
Multi Family	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	New	5,812	2.0%	25	$193	85%	95%	0.75	0
Multi Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	433	7.7%	15	$150	45%	95%	0.20	949
Multi Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	440	7.7%	15	$150	45%	95%	0.20	21

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	433	23.0%	15	$411	85%	30%	0.22	1,679
Multi Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	440	23.0%	15	$411	85%	30%	0.22	37
Multi Family	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	Existing	527	50.0%	20	$1,550	75%	5%	0.20	1,127
Multi Family	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	New	537	50.0%	20	$1,550	75%	5%	0.20	25
Multi Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	643	15.0%	18	$55	NA	NA	1.86	545
Multi Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	655	15.0%	18	$55	NA	NA	1.89	41
Multi Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	621	23.0%	9	$200	99%	10%	0.40	525
Multi Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	606	23.0%	9	$200	99%	20%	0.39	21
Multi Family	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	Existing	551	10.0%	20	$22	NA	NA	2.89	136
Multi Family	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	New	561	10.0%	20	$22	NA	NA	2.95	12
Multi Family	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	Existing	678	7.9%	11	$33	70%	5%	1.15	21
Multi Family	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	New	549	10.2%	11	$33	70%	5%	1.15	0
Multi Family	Freezer	Stand-Alone Freezer - Early Replacement	Energy Star Freezer	Existing Non-Efficient Freezer	Existing	678	9.4%	12	$465	80%	35%	0.10	101
Multi Family	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Existing	678	248.7%	6	$98	80%	35%	6.28	2,675
Multi Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	Existing	429	25.0%	15	$350	95%	5%	0.36	235
Multi Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	New	301	25.0%	15	$350	95%	5%	0.25	4
Multi Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	Existing	429	25.0%	15	$350	95%	16%	0.36	766
Multi Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	New	301	25.0%	15	$350	95%	16%	0.25	12
Multi Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	429	75.0%	20	$425	85%	5%	1.12	653
Multi Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	301	75.0%	20	$425	85%	5%	0.79	11

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	429	75.0%	20	$425	85%	16%	1.12	2,203
Multi Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	301	75.0%	20	$425	85%	16%	0.79	33
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 14 SEER, 8.5 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	6,165	4.9%	15	$245	NA	NA	1.16	0
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 14 SEER, 8.5 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	5,692	4.9%	15	$245	NA	NA	1.07	0
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 16 SEER, 8.8 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	6,165	7.4%	15	$735	NA	NA	0.59	0
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 16 SEER, 8.8 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	5,692	7.4%	15	$735	NA	NA	0.54	0
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 18 SEER, 9.0 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	Existing	6,165	9.2%	15	$1,224	NA	NA	0.44	3
Multi Family	Heat Pump	Air Source Heat_Pump	2.5 ton, 18 SEER, 9.0 HSPF	2.5 ton, 13 SEER, 7.7 HSPF	New	5,692	9.2%	15	$1,224	NA	NA	0.40	822
Multi Family	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF, 3 ton	New	5,683	14.0%	15	$3,500	99%	20%	0.21	1
Multi Family	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	5,683	10.0%	15	$942	95%	0%	0.57	0
Multi Family	Heat Pump	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	5,683	5.5%	10	$574	30%	65%	0.35	0
Multi Family	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	5,683	3.3%	30	$40	25%	75%	7.62	18
Multi Family	Heat Pump	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	5,683	0.1%	10	$98	45%	85%	0.02	1
Multi Family	Heat Pump	Construction - ICF	Concrete Framing	Standard Wood Framing	New	5,683	41.7%	30	$2,209	95%	20%	1.76	45
Multi Family	Heat Pump	Construction - SIP	Specialty Framing	Standard Wood Framing	New	5,683	14.0%	30	$1,560	95%	20%	0.84	0
Multi Family	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	5,683	1.0%	20	$34	95%	25%	2.06	7
Multi Family	Heat Pump	Deciduous Trees	Deciduous Trees	No Shading	New	5,683	0.4%	30	$108	90%	30%	0.33	3
Multi Family	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	5,683	1.7%	12	$20	55%	85%	3.71	23
Multi Family	Heat Pump	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	5,683	8.0%	30	$2,384	10%	85%	0.31	15
Multi Family	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	New	5,683	15.0%	10	$424	65%	0%	1.29	0
Multi Family	Heat Pump	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	5,683	19.0%	25	$899	95%	10%	1.73	5
Multi Family	Heat Pump	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	5,683	10.0%	25	$128	75%	30%	6.36	65
Multi Family	Heat Pump	Green Roof	ecoroof	Standard Roof	New	5,683	6.5%	40	$9,315	98%	0%	0.08	0
Multi Family	Heat Pump	Heat_Pump - Ground or Water-Source - Closed Loop	EER = 14.1, COP = 3.3	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	5,683	7.2%	18	$14,583	99%	30%	0.03	3

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Heat Pump	Heat_Pump - Ground or Water-Source - Open Loop	EER = 16.2, COP = 3.6	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	5,683	18.3%	18	$14,583	99%	15%	0.08	3
Multi Family	Heat Pump	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	5,683	2.0%	25	$286	85%	87%	0.57	34
Multi Family	Heat Pump	Insulation (Floor)	R-30	R-19 (state code)	New	5,683	1.0%	25	$195	40%	80%	0.42	7
Multi Family	Heat Pump	Insulation (Slab)	R-15	R-10 (state code)	New	5,683	1.4%	25	$188	64%	65%	0.62	14
Multi Family	Heat Pump	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	5,683	7.3%	25	$478	90%	10%	1.24	14
Multi Family	Heat Pump	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	5,683	2.8%	25	$478	90%	95%	0.47	0
Multi Family	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER, 7.7 HSPF	New	5,683	15.0%	30	$91	95%	0%	15.36	0
Multi Family	Heat Pump	Motor - ECM Motor	ECM motor for Heat Pump Fan	Standard Motor	New	5,683	1.3%	20	$350	85%	90%	0.24	11
Multi Family	Heat Pump	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	5,683	10.0%	40	$1,949	95%	10%	0.57	22
Multi Family	Heat Pump	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	5,683	2.0%	5	$3	40%	95%	10.53	22
Multi Family	Heat Pump	Proper Sizing - Heat Pump	Correctly Sized Heat_Pump (Cooling And Heating Unit)	Oversized Heat_Pump	New	5,683	8.6%	15	$1	85%	47%	459.27	104
Multi Family	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	5,683	2.6%	30	$227	97%	85%	1.07	52
Multi Family	Heat Pump	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	5,683	9.9%	25	$1,800	95%	5%	0.45	0
Multi Family	Heat Pump	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	5,683	8.8%	25	$2,513	90%	90%	0.29	0
Multi Family	Heat Pump	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	5,683	6.8%	15	$26	25%	0%	14.00	0
Multi Family	Heat Pump	VSD Motor - ECM	Variable Speed Motor for Heat Pump Fan	Standard Motor	New	5,683	3.8%	20	$425	85%	90%	0.60	34
Multi Family	Heat Pump	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	5,683	6.0%	11	$1,370	95%	50%	0.18	63
Multi Family	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	5,683	4.1%	15	$1,519	96%	50%	0.15	43
Multi Family	Heat Pump	Window Film	SHGC Reduction = 45%	No Window Film	New	5,683	1.4%	11	$458	80%	95%	0.12	23
Multi Family	Heat Pump	Window Overhang	Window Overhang	No Window Overhang	New	5,683	2.6%	30	$689	80%	50%	0.36	0
Multi Family	Heat Pump	Windows	U=0.19	U = 0.35 (State Code)	New	5,683	13.5%	25	$1,019	95%	95%	1.08	334
Multi Family	Heat Pump	Windows	U=0.30	U = 0.35 (State Code)	New	5,683	2.5%	25	$193	85%	95%	1.05	0
Multi Family	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	Existing	716	3.5%	20	$12	79%	98%	7.59	2,648

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	New	587	3.5%	20	$12	79%	98%	7.59	42
Multi Family	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	Existing	716	3.0%	20	$12	79%	98%	9.28	2,136
Multi Family	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	New	587	3.0%	20	$12	79%	98%	9.28	31
Multi Family	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	Existing	716	3.0%	20	$12	79%	98%	12.66	1,969
Multi Family	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	New	587	3.0%	20	$12	79%	98%	12.66	29
Multi Family	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	Existing	716	39.1%	6	$3	79%	86%	5.33	24,303
Multi Family	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	New	587	39.1%	6	$3	79%	86%	5.33	415
Multi Family	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	Existing	716	10.9%	6	$3	79%	86%	6.52	6,241
Multi Family	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	New	587	10.9%	6	$3	79%	86%	6.52	99
Multi Family	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	Existing	716	5.6%	6	$3	79%	86%	8.89	2,948
Multi Family	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	New	587	5.6%	6	$3	79%	86%	8.89	48
Multi Family	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	Existing	716	1.4%	5	$12	75%	75%	1.07	905
Multi Family	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	New	587	1.4%	5	$12	75%	75%	1.07	16
Multi Family	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	Existing	716	1.6%	5	$29	65%	70%	1.15	827
Multi Family	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	New	587	1.6%	5	$29	35%	70%	1.15	8
Multi Family	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Existing	716	4.5%	10	$142	95%	10%	0.15	0
Multi Family	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	New	587	4.5%	10	$142	95%	10%	0.12	0
Multi Family	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	716	0.0%	13	$45	75%	50%	0.06	10
Multi Family	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	587	0.0%	13	$13	75%	50%	0.21	0
Multi Family	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	716	0.0%	13	$68	95%	50%	0.04	13
Multi Family	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	587	0.0%	13	$37	95%	50%	0.08	0
Multi Family	Lighting	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T12 Lamps and Fixtures	Existing	716	0.6%	13	$31	50%	50%	0.18	174

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	Existing	716	0.5%	16	$83	50%	5%	1.57	5
Multi Family	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	New	587	0.5%	16	$83	50%	5%	1.57	0
Multi Family	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	Existing	716	0.3%	7	$10	95%	90%	0.10	320
Multi Family	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	New	587	0.3%	7	$10	95%	90%	0.09	6
Multi Family	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	Existing	716	0.6%	20	$46	98%	85%	0.27	600
Multi Family	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	New	587	0.6%	20	$46	98%	85%	0.27	11
Multi Family	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	Existing	716	4.8%	20	$36	98%	85%	0.23	4,669
Multi Family	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	New	587	4.8%	20	$36	98%	85%	0.23	83
Multi Family	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	Existing	716	1.4%	20	$41	98%	85%	0.27	1,376
Multi Family	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	New	587	1.4%	20	$41	98%	85%	0.27	25
Multi Family	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	Existing	716	0.8%	20	$63	98%	85%	1.56	251
Multi Family	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	New	587	0.8%	20	$63	98%	85%	1.56	4
Multi Family	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	Existing	716	0.2%	16	$27	50%	5%	0.91	0
Multi Family	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	New	587	0.2%	16	$27	50%	5%	0.91	0
Multi Family	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	Existing	716	0.6%	10	$37	90%	40%	1.40	89
Multi Family	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	New	587	0.6%	10	$37	90%	40%	1.40	2
Multi Family	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Existing	716	14.0%	10	$61	85%	75%	1.09	4,737
Multi Family	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	New	587	14.0%	10	$61	85%	75%	0.89	77
Multi Family	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	Existing	716	0.9%	10	$18	5%	0%	3.33	0
Multi Family	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	New	587	0.9%	10	$18	5%	0%	3.33	0
Multi Family	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	Existing	716	15.0%	10	$38	50%	25%	1.86	2,217
Multi Family	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	New	587	15.0%	10	$38	50%	25%	1.52	40

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Existing	716	2.9%	10	$88	90%	75%	0.16	951
Multi Family	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	New	587	2.9%	10	$88	90%	75%	0.13	17
Multi Family	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Existing	1,195	2.9%	7	$30	85%	15%	0.51	679
Multi Family	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	New	1,217	2.9%	7	$30	85%	15%	0.51	15
Multi Family	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Existing	1,195	0.2%	7	$4	40%	55%	0.38	76
Multi Family	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	New	1,217	0.2%	7	$4	40%	55%	0.38	2
Multi Family	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	Existing	1,195	3.9%	9	$5	38%	100%	3.56	2,930
Multi Family	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	New	1,217	3.9%	9	$5	38%	100%	3.56	65
Multi Family	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	Existing	1,195	2.7%	7	$5	24%	74%	2.37	952
Multi Family	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	New	1,217	2.7%	7	$5	24%	74%	2.37	21
Multi Family	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	Existing	1,195	0.6%	10	$12	5%	15%	6.03	8
Multi Family	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	New	1,217	0.6%	10	$12	5%	15%	6.03	0
Multi Family	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	Existing	1,195	1.9%	6	$35	62%	68%	0.68	1,607
Multi Family	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	New	1,217	1.9%	6	$35	62%	68%	0.68	36
Multi Family	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	Existing	1,195	1.6%	9	$100	70%	22%	0.73	501
Multi Family	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	New	1,217	1.6%	9	$100	70%	22%	0.73	11
Multi Family	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	Existing	1,195	2.4%	7	$20	90%	66%	0.93	2,790
Multi Family	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	New	1,217	2.4%	7	$20	90%	66%	0.93	62
Multi Family	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	Existing	1,195	12.8%	4	$15	15%	64%	2.16	2,420
Multi Family	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	New	1,217	12.8%	4	$15	15%	64%	2.16	54
Multi Family	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	Existing	1,195	1.5%	6	$25	55%	14%	0.31	233
Multi Family	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	New	1,217	1.5%	6	$25	55%	14%	0.31	5
Multi Family	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	Existing	1,195	3.6%	4	$10	15%	82%	1.03	879
Multi Family	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	New	1,217	3.6%	4	$10	15%	82%	1.03	19
Multi Family	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	Existing	1,195	0.2%	5	$10	40%	56%	0.35	81
Multi Family	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	New	1,217	0.2%	5	$10	40%	56%	0.35	2
Multi Family	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	Existing	1,195	0.9%	4	$5	45%	10%	0.87	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	New	1,217	0.9%	4	$5	45%	10%	0.87	0
Multi Family	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	Existing	1,195	0.7%	7	$7	40%	85%	0.63	449
Multi Family	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	New	1,217	0.7%	7	$7	40%	85%	0.63	10
Multi Family	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	Existing	1,195	1.1%	7	$15	75%	90%	0.36	1,399
Multi Family	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	New	1,217	1.1%	7	$15	75%	90%	0.37	31
Multi Family	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	Existing	488	20.0%	20	$29	NA	NA	3.94	585
Multi Family	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	New	497	20.0%	20	$29	NA	NA	4.01	51
Multi Family	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	Existing	586	30.0%	20	$70	97%	32%	2.90	433
Multi Family	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	New	487	30.0%	20	$70	97%	32%	2.41	8
Multi Family	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	586	6.3%	5	$225	99%	0%	0.05	5
Multi Family	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	487	6.3%	5	$225	99%	0%	0.04	0
Multi Family	Refrigerator	Refrigerator/Freezer - Early Replacement	Standard Refrigerator	Existing Refrigerator	Existing	586	40.0%	20	$1,169	85%	7%	0.23	0
Multi Family	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Existing	586	282.8%	10	$98	99%	7%	10.48	18,509
Multi Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	Existing	581	9.3%	9	$14	NA	NA	3.89	1,039
Multi Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	New	399	9.3%	9	$14	NA	NA	2.66	37
Multi Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 9.8	Existing Room AC EER 9.0	Existing	614	8.2%	15	$460	97%	95%	0.18	1,854
Multi Family	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	614	41.3%	10	$574	30%	65%	0.50	397
Multi Family	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	397	41.3%	10	$574	30%	65%	0.32	3
Multi Family	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	614	3.3%	30	$40	55%	60%	1.42	201
Multi Family	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	397	3.3%	30	$40	25%	75%	0.92	2
Multi Family	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	614	0.3%	10	$98	45%	85%	0.02	30

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	397	0.3%	10	$98	45%	85%	0.01	0
Multi Family	Room AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	397	32.0%	30	$2,209	95%	20%	0.16	1
Multi Family	Room AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	397	14.0%	30	$1,560	95%	20%	0.10	0
Multi Family	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	614	4.9%	20	$43	95%	25%	1.48	216
Multi Family	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	397	5.5%	20	$34	95%	25%	1.33	4
Multi Family	Room AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	614	2.0%	30	$108	75%	30%	0.32	89
Multi Family	Room AC	Deciduous Trees	Deciduous Trees	No Shading	New	397	2.0%	30	$108	90%	30%	0.21	1
Multi Family	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	614	0.4%	12	$20	55%	85%	0.17	30
Multi Family	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	397	0.4%	12	$20	55%	85%	0.11	1
Multi Family	Room AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	614	0.9%	6	$35	55%	80%	0.11	60
Multi Family	Room AC	Green Roof	ecoroof	Standard Roof	New	397	6.5%	40	$9,315	98%	0%	0.01	0
Multi Family	Room AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	614	10.0%	15	$1,133	75%	75%	0.09	841
Multi Family	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	614	14.7%	25	$1,403	7%	45%	0.16	64
Multi Family	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	614	0.6%	25	$1,403	59%	45%	0.01	22
Multi Family	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	614	0.1%	25	$355	85%	87%	0.00	10
Multi Family	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	397	0.1%	25	$286	85%	87%	0.00	0
Multi Family	Room AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	614	0.1%	25	$968	4%	80%	0.00	0
Multi Family	Room AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	614	0.1%	25	$968	16%	80%	0.00	2
Multi Family	Room AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	614	0.1%	25	$242	40%	80%	0.01	4
Multi Family	Room AC	Insulation (Floor)	R-30	R-19 (state code)	New	397	0.1%	25	$195	40%	80%	0.01	0
Multi Family	Room AC	Insulation (Slab)	R-10 (state code)	R-0	Existing	614	5.3%	25	$833	60%	10%	0.10	44
Multi Family	Room AC	Insulation (Slab)	R-15	R-10 (state code)	Existing	614	1.4%	25	$231	87%	0%	0.10	0
Multi Family	Room AC	Insulation (Slab)	R-15	R-10 (state code)	New	397	1.4%	25	$188	64%	65%	0.08	2
Multi Family	Room AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	614	0.1%	25	$1,298	5%	75%	0.00	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	614	2.3%	25	$533	90%	10%	0.06	28
Multi Family	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	397	2.3%	25	$478	90%	10%	0.05	0
Multi Family	Room AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	614	13.0%	25	$1,460	5%	75%	0.14	7
Multi Family	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	614	0.5%	25	$533	90%	95%	0.01	59
Multi Family	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	397	0.5%	25	$478	90%	95%	0.01	1
Multi Family	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	614	2.0%	5	$3	60%	95%	1.99	218
Multi Family	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	397	2.0%	5	$3	40%	95%	1.28	3
Multi Family	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	614	6.7%	30	$383	97%	65%	0.30	763
Multi Family	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	397	6.7%	30	$227	97%	85%	0.33	18
Multi Family	Room AC	Removal of Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	Proper Disposal of Room AC	Existing Room AC	Existing	614	100.0%	5	$100	85%	15%	3.31	3,145
Multi Family	Room AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	397	1.0%	25	$1,800	95%	5%	0.01	0
Multi Family	Room AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	397	1.0%	25	$2,513	90%	90%	0.00	0
Multi Family	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	614	7.5%	11	$426	80%	95%	0.13	911
Multi Family	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	New	397	7.5%	11	$458	80%	95%	0.08	17
Multi Family	Room AC	Window Overhang	Window Overhang	No Window Overhang	New	397	14.0%	30	$689	80%	50%	0.23	2
Multi Family	Room AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	614	5.0%	25	$1,899	56%	75%	0.04	295
Multi Family	Room AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	614	31.5%	25	$1,899	24%	75%	0.25	963
Multi Family	Room AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	614	17.5%	25	$946	95%	75%	0.28	324
Multi Family	Room AC	Windows	U=0.19	U = 0.35 (State Code)	New	397	9.5%	25	$1,019	95%	95%	0.09	4
Multi Family	Room AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	614	4.5%	25	$179	85%	75%	0.38	452
Multi Family	Room AC	Windows	U=0.30	U = 0.35 (State Code)	New	397	4.5%	25	$193	85%	95%	0.23	10
Multi Family	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	6,375	3.3%	30	$40	55%	60%	7.41	2,790
Multi Family	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	4,475	3.3%	30	$40	25%	75%	5.20	24
Multi Family	Room Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	4,475	44.0%	30	$2,209	95%	20%	1.27	329
Multi Family	Room Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	4,475	14.0%	30	$1,560	95%	20%	0.57	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	6,375	2.0%	12	$20	55%	85%	4.21	2,406
Multi Family	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	4,475	2.0%	12	$20	55%	85%	2.96	37
Multi Family	Room Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	6,375	2.0%	6	$35	55%	80%	1.17	2,128
Multi Family	Room Heat	Green Roof	ecoroof	Standard Roof	New	4,475	6.5%	40	$9,315	98%	0%	0.05	0
Multi Family	Room Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	6,375	10.0%	15	$1,133	75%	75%	0.46	11,417
Multi Family	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	6,375	37.0%	25	$1,403	7%	45%	2.09	2,713
Multi Family	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	6,375	10.2%	25	$1,403	59%	45%	0.58	5,601
Multi Family	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	6,375	1.0%	25	$355	85%	87%	0.22	1,323
Multi Family	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	4,475	3.0%	25	$286	85%	87%	0.58	78
Multi Family	Room Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	6,375	8.0%	25	$968	4%	80%	0.65	539
Multi Family	Room Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	6,375	2.5%	25	$968	16%	80%	0.21	574
Multi Family	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	6,375	2.0%	25	$242	40%	80%	0.65	1,343
Multi Family	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	New	4,475	2.0%	25	$195	40%	80%	0.57	22
Multi Family	Room Heat	Insulation (Slab)	R-10 (state code)	R-0	Existing	6,375	5.3%	25	$833	60%	10%	0.50	589
Multi Family	Room Heat	Insulation (Slab)	R-15	R-10 (state code)	Existing	6,375	1.4%	25	$231	87%	0%	0.49	0
Multi Family	Room Heat	Insulation (Slab)	R-15	R-10 (state code)	New	4,475	1.4%	25	$188	64%	65%	0.42	17
Multi Family	Room Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	6,375	44.0%	25	$1,298	5%	75%	2.69	3,786
Multi Family	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	6,375	8.5%	25	$533	90%	10%	1.26	1,870
Multi Family	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	4,475	8.5%	25	$478	90%	10%	0.98	0
Multi Family	Room Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	6,375	49.0%	25	$1,460	5%	75%	2.66	462
Multi Family	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	6,375	3.3%	25	$533	90%	95%	0.49	5,262
Multi Family	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	4,475	3.3%	25	$478	90%	95%	0.38	0
Multi Family	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	6,375	2.0%	5	$3	60%	95%	10.18	3,000

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	4,475	2.0%	5	$3	40%	95%	7.15	31
Multi Family	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	6,375	2.0%	30	$383	97%	65%	0.47	2,285
Multi Family	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	4,475	2.0%	30	$227	97%	85%	0.56	56
Multi Family	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	Existing	6,375	41.0%	20	$4,140	98%	30%	0.66	29,094
Multi Family	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	New	4,475	41.0%	20	$4,140	98%	30%	0.46	400
Multi Family	Room Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	4,475	10.0%	25	$1,800	95%	5%	0.31	0
Multi Family	Room Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	4,475	10.0%	25	$2,513	90%	90%	0.22	0
Multi Family	Room Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	6,375	2.2%	25	$1,899	56%	75%	0.09	1,636
Multi Family	Room Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	6,375	13.0%	25	$1,899	24%	75%	0.54	4,482
Multi Family	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	6,375	8.0%	25	$946	95%	75%	0.67	1,815
Multi Family	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	New	4,475	18.0%	25	$1,019	95%	95%	0.98	88
Multi Family	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	6,375	2.0%	25	$179	85%	75%	0.88	2,644
Multi Family	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	New	4,475	2.0%	25	$193	85%	95%	0.58	47
Multi Family	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	Existing	1,802	3.2%	18	$114	NA	NA	0.54	1,429
Multi Family	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	New	1,834	3.2%	18	$114	NA	NA	0.55	41
Multi Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	1,852	4.9%	14	$92	68%	9%	0.86	0
Multi Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	1,831	4.9%	14	$92	68%	9%	0.85	0
Multi Family	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	1,852	9.8%	14	$735	25%	25%	0.21	987
Multi Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	1,852	15.6%	14	$227	85%	9%	1.10	1,871
Multi Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	1,831	15.6%	14	$227	85%	9%	1.09	15
Multi Family	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	Existing Dishwasher EF = 0.50	Existing	1,852	2.4%	13	$494	10%	30%	0.07	116
Multi Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	1,852	1.6%	13	$489	35%	15%	0.05	133
Multi Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	1,831	1.6%	13	$489	35%	15%	0.05	1
Multi Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	1,852	18.5%	30	$600	95%	45%	0.91	10,108

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	1,831	18.5%	30	$600	95%	95%	0.90	179
Multi Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	1,852	8.6%	9	$1	95%	95%	34.15	6,267
Multi Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	1,831	8.9%	9	$1	95%	95%	34.15	52
Multi Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	1,852	3.6%	9	$1	95%	95%	17.26	2,581
Multi Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	1,831	3.7%	9	$1	95%	95%	17.26	22
Multi Family	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	1,852	4.1%	9	$1	95%	95%	28.93	5,899
Multi Family	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	Existing	1,852	43.2%	15	$2,209	95%	30%	0.33	1,980
Multi Family	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	New	1,831	43.2%	15	$2,209	95%	30%	0.33	16
Multi Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	1,852	55.2%	10	$239	5%	5%	2.69	182
Multi Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	1,831	55.2%	10	$239	5%	5%	2.65	2
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	1,852	1.2%	5	$7	62%	65%	0.94	623
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	1,831	1.2%	5	$7	62%	85%	0.93	7
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	1,852	5.9%	10	$5	33%	95%	14.21	2,943
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	1,831	6.1%	10	$5	85%	95%	14.21	64
Multi Family	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	1,852	5.9%	10	$12	33%	95%	5.86	2,943
Multi Family	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	Existing	1,852	37.5%	20	$4,250	95%	5%	0.19	286
Multi Family	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	New	1,831	38.9%	20	$4,250	95%	5%	0.20	2
Multi Family	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	Existing	1,852	3.2%	20	$1,347	95%	30%	0.05	144
Multi Family	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	New	1,831	3.2%	20	$1,229	95%	30%	0.06	1
Multi Family	Water Heat	Water Heater (Electric) - Early Retirement	EF = 0.92	EF = 0.88	Existing	1,852	4.3%	13	$456	10%	100%	0.14	699
Multi Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	1,852	8.5%	9	$130	90%	5%	0.68	491
Multi Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	1,831	8.5%	9	$130	75%	5%	0.68	3
Multi Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	1,852	5.0%	18	$136	80%	80%	0.73	3,767
Multi Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	1,831	5.0%	18	$136	10%	80%	0.72	4
Multi Family	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	1,852	6.5%	10	$18	73%	0%	4.20	6
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	1,852	6.0%	4	$8	64%	95%	3.19	4,888

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	1,831	6.0%	4	$8	64%	95%	3.15	41
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 14	SEER 13	Existing	1,892	7.1%	15	$278	NA	NA	0.81	0
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 14	SEER 13	New	1,132	7.1%	15	$278	NA	NA	0.48	0
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 16	SEER 13	Existing	1,892	18.8%	15	$834	NA	NA	0.71	0
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 16	SEER 13	New	1,132	18.8%	15	$834	NA	NA	0.42	0
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 18	SEER 13	Existing	1,892	27.8%	15	$1,389	NA	NA	0.63	162,297
Single Family	Central AC	Air Conditioner - Central (3.0 ton unit)	SEER 18	SEER 13	New	1,132	27.8%	15	$1,389	NA	NA	0.38	6,354
Single Family	Central AC	Air Conditioner - Central, Early Replacement	SEER 13	Existing AC Unit SEER 10	Existing	2,392	23.1%	15	$2,355	81%	95%	0.39	221,190
Single Family	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	Existing	2,392	30.0%	15	$2,449	99%	2%	0.49	7,399
Single Family	Central AC	Air Conditioner - Central, Ductless Variable Refrigerant Flow	Air Conditioner - Central, Ductless Variable Refrigerant Flow	SEER 13	New	1,129	30.0%	15	$1,178	99%	40%	0.48	1,220
Single Family	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	2,392	10.0%	15	$942	95%	0%	0.42	0
Single Family	Central AC	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	1,129	10.0%	15	$942	95%	0%	0.20	0
Single Family	Central AC	Attic Fan	Attic Fan	No Attic Fan	Existing	2,392	6.0%	15	$87	96%	85%	2.74	60,985
Single Family	Central AC	Attic Fan	Attic Fan	No Attic Fan	New	1,129	6.0%	15	$87	96%	85%	1.29	503
Single Family	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	2,392	41.3%	10	$574	30%	65%	1.95	20,039
Single Family	Central AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	1,129	41.3%	10	$574	30%	65%	0.92	0
Single Family	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	2,392	3.3%	30	$159	55%	60%	1.38	7,925
Single Family	Central AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	1,129	3.3%	30	$159	25%	75%	0.65	45
Single Family	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	2,392	0.3%	10	$98	20%	85%	0.09	680
Single Family	Central AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	1,129	0.3%	10	$98	20%	85%	0.04	6
Single Family	Central AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	1,129	32.0%	30	$11,271	95%	45%	0.09	44
Single Family	Central AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	1,129	14.0%	30	$7,959	95%	45%	0.06	18
Single Family	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	2,392	3.4%	20	$50	95%	25%	3.43	6,863
Single Family	Central AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	1,129	3.2%	20	$56	95%	25%	1.36	59
Single Family	Central AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	2,392	2.0%	30	$108	50%	75%	1.25	7,474

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central AC	Deciduous Trees	Deciduous Trees	No Shading	New	1,129	2.0%	30	$108	80%	75%	0.59	123
Single Family	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	2,392	0.4%	12	$40	55%	85%	0.32	1,212
Single Family	Central AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	1,129	0.4%	12	$40	55%	85%	0.15	12
Single Family	Central AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	2,392	0.9%	6	$69	45%	80%	0.21	1,979
Single Family	Central AC	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	1,129	8.0%	30	$25,221	15%	85%	0.01	58
Single Family	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	2,392	15.0%	20	$424	65%	60%	1.78	35,132
Single Family	Central AC	Duct Sealing	Duct Sealing	No Duct Sealing	New	1,129	15.0%	20	$424	65%	0%	0.84	0
Single Family	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	1,129	19.0%	25	$899	95%	10%	0.59	0
Single Family	Central AC	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	2,392	19.0%	25	$899	95%	50%	1.26	6,597
Single Family	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	2,392	10.0%	25	$6,149	90%	10%	0.10	4,489
Single Family	Central AC	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	1,129	10.0%	25	$418	75%	30%	0.67	169
Single Family	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	Existing	2,392	70.0%	10	$2,241	95%	50%	0.85	16,567
Single Family	Central AC	Evaporative Space Cooling	SEER 40	SEER 13	New	1,129	70.0%	10	$2,241	95%	75%	0.40	205
Single Family	Central AC	Green Roof	ecoroof	Standard Roof	New	1,129	6.5%	40	$21,662	98%	0%	0.01	0
Single Family	Central AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	2,392	10.0%	15	$1,368	75%	75%	0.29	36,401
Single Family	Central AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	2,392	14.9%	25	$488	7%	13%	1.81	1,091
Single Family	Central AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	2,392	6.9%	25	$488	63%	13%	0.84	3,721
Single Family	Central AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	2,392	6.1%	25	$721	95%	13%	0.50	4,882
Single Family	Central AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	1,129	6.1%	25	$764	95%	20%	0.22	78
Single Family	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	2,392	14.7%	25	$1,637	7%	90%	0.53	5,654
Single Family	Central AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	2,392	0.6%	25	$1,637	59%	90%	0.02	1,526

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	2,392	0.1%	25	$414	85%	87%	0.01	356
Single Family	Central AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	1,129	0.1%	25	$465	85%	87%	0.01	4
Single Family	Central AC	Insulation (Duct)	R-6	R-0	Existing	2,392	2.6%	25	$877	75%	12%	0.18	1,290
Single Family	Central AC	Insulation (Duct)	R-8	R-0	Existing	2,392	3.2%	25	$991	95%	12%	0.19	1,968
Single Family	Central AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	2,392	0.1%	25	$1,129	4%	55%	0.01	11
Single Family	Central AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	2,392	0.1%	25	$1,129	16%	55%	0.01	42
Single Family	Central AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	2,392	0.1%	25	$282	40%	55%	0.02	106
Single Family	Central AC	Insulation (Floor)	R-30	R-19 (state code)	New	1,129	0.1%	25	$317	40%	55%	0.01	1
Single Family	Central AC	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	2,392	3.0%	25	$188	45%	60%	0.95	0
Single Family	Central AC	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	1,129	3.0%	25	$199	45%	80%	0.42	52
Single Family	Central AC	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	2,392	7.0%	25	$225	45%	60%	1.85	15,551
Single Family	Central AC	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	1,129	7.0%	25	$239	45%	80%	0.82	60
Single Family	Central AC	Insulation (Slab)	R-10 (state code)	R-0	Existing	2,392	5.3%	25	$1,032	60%	10%	0.30	1,918
Single Family	Central AC	Insulation (Slab)	R-15	R-10 (state code)	Existing	2,392	1.4%	25	$298	87%	0%	0.29	0
Single Family	Central AC	Insulation (Slab)	R-15	R-10 (state code)	New	1,129	1.4%	25	$330	64%	32%	0.12	19
Single Family	Central AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	2,392	0.1%	25	$5,605	5%	75%	0.00	16
Single Family	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	2,392	2.3%	25	$2,303	90%	10%	0.06	1,001
Single Family	Central AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	1,129	2.3%	25	$2,440	90%	10%	0.03	2
Single Family	Central AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	2,392	13.0%	25	$6,306	5%	75%	0.12	243
Single Family	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	2,392	0.5%	25	$2,303	85%	95%	0.01	1,942
Single Family	Central AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	1,129	0.5%	25	$2,440	85%	95%	0.01	14
Single Family	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	Existing	2,392	15.0%	30	$271	95%	10%	3.74	2,452
Single Family	Central AC	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER	New	1,129	15.0%	30	$121	95%	0%	3.94	0
Single Family	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	Existing	2,392	4.5%	15	$350	95%	65%	0.51	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central AC	Motor - ECM Motor	ECM motor for Central Air Conditioner	Standard Motor	New	1,129	4.5%	15	$350	95%	65%	0.24	95
Single Family	Central AC	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	1,129	10.0%	40	$6,338	95%	10%	0.06	55
Single Family	Central AC	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	2,392	10.0%	5	$225	50%	90%	0.57	32,599
Single Family	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	2,392	2.0%	5	$7	60%	95%	3.87	10,001
Single Family	Central AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	1,129	2.0%	5	$7	40%	95%	1.83	61
Single Family	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	2,392	6.0%	15	$1	85%	47%	237.99	21,688
Single Family	Central AC	Proper Sizing - Central Air Conditioner	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	1,129	6.0%	15	$1	85%	47%	112.36	196
Single Family	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	2,392	6.7%	30	$447	97%	65%	1.01	29,225
Single Family	Central AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	1,129	6.7%	30	$370	97%	85%	0.58	403
Single Family	Central AC	Solar Attic Fan	Solar Attic Fan	No Attic Fan	Existing	2,392	6.0%	10	$475	95%	50%	0.34	0
Single Family	Central AC	Solar Attic Fan	Solar Attic Fan	No Attic Fan	New	1,129	6.0%	10	$475	95%	70%	0.16	0
Single Family	Central AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	1,129	1.0%	25	$9,183	95%	5%	0.00	0
Single Family	Central AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	1,129	1.0%	25	$12,818	90%	90%	0.00	2
Single Family	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	2,392	6.8%	15	$26	24%	85%	10.37	12,340
Single Family	Central AC	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	1,129	6.8%	15	$26	24%	0%	4.90	0
Single Family	Central AC	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Existing	2,392	7.0%	12	$1,349	95%	65%	0.17	0
Single Family	Central AC	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	New	1,129	7.0%	12	$1,349	95%	65%	0.08	0
Single Family	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	Existing	2,392	13.5%	15	$425	95%	65%	1.26	67,203
Single Family	Central AC	VSD Motor - ECM	Variable Speed Motor for Central Air Conditioner Fan	Standard Motor	New	1,129	13.5%	15	$425	95%	65%	0.60	327
Single Family	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	Existing	2,392	6.0%	11	$1,370	95%	50%	0.13	15,526
Single Family	Central AC	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	1,129	6.0%	11	$1,370	95%	50%	0.06	182
Single Family	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Existing	2,392	22.0%	15	$1,519	96%	50%	0.57	0
Single Family	Central AC	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	1,129	22.0%	15	$1,519	96%	50%	0.27	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	2,392	7.5%	11	$2,206	80%	95%	0.10	30,167
Single Family	Central AC	Window Film	SHGC Reduction = 45%	No Window Film	New	1,129	7.5%	11	$2,338	80%	95%	0.05	354
Single Family	Central AC	Window Overhang	Window Overhang	No Window Overhang	New	1,129	14.0%	30	$861	80%	50%	0.52	0
Single Family	Central AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	2,392	5.0%	25	$9,843	56%	75%	0.03	10,360
Single Family	Central AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	2,392	31.5%	25	$9,843	24%	75%	0.19	32,941
Single Family	Central AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	2,392	17.5%	25	$4,904	95%	75%	0.21	11,073
Single Family	Central AC	Windows	U=0.19	U = 0.35 (State Code)	New	1,129	9.5%	25	$5,197	95%	95%	0.05	75
Single Family	Central AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	2,392	4.5%	25	$928	85%	75%	0.29	14,797
Single Family	Central AC	Windows	U=0.30	U = 0.35 (State Code)	New	1,129	4.5%	25	$984	85%	95%	0.13	206
Single Family	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	13,533	10.0%	15	$942	95%	0%	1.16	0
Single Family	Central Heat	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	11,793	10.0%	15	$942	95%	0%	1.01	0
Single Family	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	13,533	3.3%	30	$159	55%	60%	3.93	8,687
Single Family	Central Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	11,793	3.3%	30	$159	25%	75%	3.43	100
Single Family	Central Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	11,793	44.0%	30	$11,271	95%	45%	0.65	143
Single Family	Central Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	11,793	14.0%	30	$7,959	95%	45%	0.29	43
Single Family	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	13,533	2.0%	12	$40	55%	85%	4.47	8,205
Single Family	Central Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	11,793	2.0%	12	$40	55%	85%	3.90	159
Single Family	Central Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	13,533	2.0%	6	$69	45%	80%	1.24	5,501
Single Family	Central Heat	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	11,793	8.0%	30	$25,221	15%	85%	0.05	144
Single Family	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	13,533	15.0%	20	$424	65%	60%	4.97	35,599
Single Family	Central Heat	Duct Sealing	Duct Sealing	No Duct Sealing	New	11,793	15.0%	20	$424	65%	0%	4.33	0
Single Family	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	11,793	19.0%	25	$899	95%	10%	3.10	29
Single Family	Central Heat	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	13,533	19.0%	25	$899	95%	50%	3.55	7,177
Single Family	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	13,533	10.0%	25	$6,149	90%	10%	0.27	5,581

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central Heat	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	11,793	10.0%	25	$418	75%	30%	3.51	376
Single Family	Central Heat	Green Roof	ecoroof	Standard Roof	New	11,793	6.5%	40	$21,662	98%	0%	0.06	1
Single Family	Central Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	13,533	10.0%	15	$1,368	75%	75%	0.80	39,271
Single Family	Central Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	13,533	14.9%	25	$488	7%	13%	5.12	1,121
Single Family	Central Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	13,533	6.9%	25	$488	63%	13%	2.36	4,426
Single Family	Central Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	13,533	6.1%	25	$721	95%	13%	1.41	5,815
Single Family	Central Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	11,793	6.1%	25	$764	95%	20%	1.16	185
Single Family	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	13,533	37.0%	25	$1,637	7%	90%	3.80	17,919
Single Family	Central Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	13,533	10.2%	25	$1,637	59%	90%	1.05	39,621
Single Family	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	13,533	1.0%	25	$414	85%	87%	0.41	4,721
Single Family	Central Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	11,793	3.0%	25	$465	85%	87%	0.95	352
Single Family	Central Heat	Insulation (Duct)	R-6	R-0	Existing	13,533	3.5%	25	$877	75%	12%	0.68	2,057
Single Family	Central Heat	Insulation (Duct)	R-8	R-0	Existing	13,533	4.3%	25	$991	95%	12%	0.72	3,142
Single Family	Central Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	13,533	8.0%	25	$1,129	4%	55%	1.19	1,307
Single Family	Central Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	13,533	2.5%	25	$1,129	16%	55%	0.38	1,409
Single Family	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	13,533	2.0%	25	$282	40%	55%	1.19	3,261
Single Family	Central Heat	Insulation (Floor)	R-30	R-19 (state code)	New	11,793	2.0%	25	$317	40%	55%	0.92	68
Single Family	Central Heat	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	13,533	4.0%	25	$188	45%	60%	3.58	6,058
Single Family	Central Heat	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	11,793	4.0%	25	$199	45%	80%	2.95	164
Single Family	Central Heat	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	13,533	7.0%	25	$225	45%	60%	5.23	4,727
Single Family	Central Heat	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	11,793	7.0%	25	$239	45%	80%	4.30	127
Single Family	Central Heat	Insulation (Slab)	R-10 (state code)	R-0	Existing	13,533	5.3%	25	$1,032	60%	10%	0.86	2,075
Single Family	Central Heat	Insulation (Slab)	R-15	R-10 (state code)	Existing	13,533	1.4%	25	$298	87%	0%	0.81	0
Single Family	Central Heat	Insulation (Slab)	R-15	R-10 (state code)	New	11,793	1.4%	25	$330	64%	32%	0.64	45
Single Family	Central Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	13,533	44.0%	25	$5,605	5%	75%	1.32	11,211

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	13,533	8.5%	25	$2,303	90%	10%	0.62	4,892
Single Family	Central Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	11,793	8.5%	25	$2,440	90%	10%	0.51	22
Single Family	Central Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	13,533	49.0%	25	$6,306	5%	75%	1.31	1,367
Single Family	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	13,533	3.3%	25	$2,303	85%	95%	0.24	16,375
Single Family	Central Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	11,793	3.3%	25	$2,440	85%	95%	0.20	230
Single Family	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	Existing	13,533	15.0%	30	$271	95%	10%	10.66	2,508
Single Family	Central Heat	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	Electric Furnace	New	11,793	15.0%	30	$121	95%	0%	20.72	0
Single Family	Central Heat	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	13,533	5.0%	5	$225	50%	90%	0.80	17,377
Single Family	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	13,533	2.0%	5	$7	60%	95%	10.81	10,148
Single Family	Central Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	11,793	2.0%	5	$7	40%	95%	9.42	130
Single Family	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	13,533	2.0%	30	$447	97%	65%	0.86	8,282
Single Family	Central Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	11,793	2.0%	30	$370	97%	85%	0.91	255
Single Family	Central Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	11,793	10.0%	25	$9,183	95%	5%	0.16	3
Single Family	Central Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	11,793	10.0%	25	$12,818	90%	90%	0.11	57
Single Family	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	13,533	6.8%	15	$26	24%	85%	28.66	12,522
Single Family	Central Heat	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	11,793	6.8%	15	$26	24%	0%	24.98	0
Single Family	Central Heat	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Existing	13,533	7.0%	12	$1,349	95%	65%	0.46	0
Single Family	Central Heat	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	New	11,793	7.0%	12	$1,349	95%	65%	0.40	0
Single Family	Central Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	13,533	2.2%	25	$9,843	56%	75%	0.04	5,398
Single Family	Central Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	13,533	13.0%	25	$9,843	24%	75%	0.22	13,997
Single Family	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	13,533	8.0%	25	$4,904	95%	75%	0.27	5,348
Single Family	Central Heat	Windows	U=0.19	U = 0.35 (State Code)	New	11,793	18.0%	25	$5,197	95%	95%	0.51	366

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	13,533	2.0%	25	$928	85%	75%	0.36	6,853
Single Family	Central Heat	Windows	U=0.30	U = 0.35 (State Code)	New	11,793	2.0%	25	$984	85%	95%	0.30	201
Single Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	433	7.7%	15	$150	45%	95%	0.20	3,438
Single Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	440	7.7%	15	$150	45%	95%	0.20	76
Single Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	433	23.0%	15	$411	85%	30%	0.22	6,080
Single Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	440	23.0%	15	$411	85%	30%	0.22	135
Single Family	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	Existing	527	50.0%	20	$1,550	75%	25%	0.19	21,449
Single Family	Cooking Range	Induction Stovetop	Induction Stovetop	Standard Stovetop	New	537	50.0%	20	$1,550	75%	35%	0.20	666
Single Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	854	15.0%	18	$55	NA	NA	2.43	10,571
Single Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	869	15.0%	18	$55	NA	NA	2.47	797
Single Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	825	23.0%	9	$200	99%	20%	0.52	20,353
Single Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	804	23.0%	9	$200	99%	50%	0.51	1,032
Single Family	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	Existing	551	10.0%	20	$22	NA	NA	2.85	5,762
Single Family	Freezer	Freezer - Stand-Alone	Energy Star 14.8 cu ft Chest Freezer	Standard 14.8 cu ft Freezer	New	561	10.0%	20	$22	NA	NA	2.90	507
Single Family	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	Existing	678	7.9%	11	$33	70%	10%	1.13	1,813
Single Family	Freezer	Freezer, Compact	Energy Star Freezer	Standard Freezer	New	549	10.2%	11	$33	70%	10%	1.13	41
Single Family	Freezer	Stand-Alone Freezer - Early Replacement	Energy Star Freezer	Existing Non-Efficient Freezer	Existing	678	9.4%	12	$465	80%	35%	0.10	4,314
Single Family	Freezer	Stand-Alone Freezer - Removal	Proper Disposal of Freezer	Existing Non-Efficient Freezer	Existing	678	248.7%	6	$98	80%	35%	6.18	113,723
Single Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	Existing	718	25.0%	15	$350	95%	7%	0.64	3,156
Single Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Electric Furnace	Standard Motor	New	613	25.0%	15	$350	95%	7%	0.54	59
Single Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	Existing	718	25.0%	15	$350	95%	66%	0.64	32,292

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	HVAC Aux	Motor - ECM Motor	ECM Motor for Forced Air Gas Furnace	Standard Motor	New	613	25.0%	15	$350	95%	66%	0.54	600
Single Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	718	75.0%	20	$425	85%	7%	2.00	11,908
Single Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	613	75.0%	20	$425	85%	7%	1.71	175
Single Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	718	75.0%	20	$425	85%	66%	2.00	109,771
Single Family	HVAC Aux	VSD Motor - ECM	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	613	75.0%	20	$425	85%	66%	1.71	2,088
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 14 SEER, 8.5 HSPF	3 ton, 13 SEER, 7.7 HSPF	Existing	11,221	4.9%	15	$294	NA	NA	1.76	0
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 14 SEER, 8.5 HSPF	3 ton, 13 SEER, 7.7 HSPF	New	11,453	4.9%	15	$294	NA	NA	1.80	0
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 16 SEER, 8.8 HSPF	3 ton, 13 SEER, 7.7 HSPF	Existing	11,221	7.4%	15	$881	NA	NA	0.89	0
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 16 SEER, 8.8 HSPF	3 ton, 13 SEER, 7.7 HSPF	New	11,453	7.4%	15	$881	NA	NA	0.91	0
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 18 SEER, 9.0 HSPF	3 ton, 13 SEER, 7.7 HSPF	Existing	11,221	9.2%	15	$1,469	NA	NA	0.66	13,650
Single Family	Heat Pump	Air Source Heat_Pump	3 ton, 18 SEER, 9.0 HSPF	3 ton, 13 SEER, 7.7 HSPF	New	11,453	9.2%	15	$1,469	NA	NA	0.68	8,368
Single Family	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF, 3 ton	Existing	12,852	14.0%	15	$3,500	99%	20%	0.48	178
Single Family	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF, 3 ton	New	11,434	14.0%	15	$3,500	99%	20%	0.43	14
Single Family	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	12,852	10.0%	15	$942	95%	0%	1.29	0
Single Family	Heat Pump	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	11,434	10.0%	15	$942	95%	0%	1.14	0
Single Family	Heat Pump	Attic Fan	Attic Fan	No Attic Fan	Existing	12,852	0.9%	15	$87	96%	85%	1.25	1,397
Single Family	Heat Pump	Attic Fan	Attic Fan	No Attic Fan	New	11,434	0.9%	15	$87	96%	85%	1.12	229
Single Family	Heat Pump	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	12,852	5.5%	10	$574	30%	65%	0.79	0
Single Family	Heat Pump	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	11,434	5.5%	10	$574	30%	65%	0.70	0
Single Family	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	12,852	3.3%	30	$159	55%	60%	4.31	1,794
Single Family	Heat Pump	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	11,434	3.3%	30	$159	25%	75%	3.83	173
Single Family	Heat Pump	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	12,852	0.1%	10	$98	20%	85%	0.05	20
Single Family	Heat Pump	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	11,434	0.1%	10	$98	20%	85%	0.05	3
Single Family	Heat Pump	Construction - ICF	Concrete Framing	Standard Wood Framing	New	11,434	41.7%	30	$11,271	95%	45%	0.69	229
Single Family	Heat Pump	Construction - SIP	Specialty Framing	Standard Wood Framing	New	11,434	14.0%	30	$7,959	95%	45%	0.33	71

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	12,852	0.6%	20	$50	95%	25%	1.99	237
Single Family	Heat Pump	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	11,434	0.6%	20	$56	95%	25%	1.48	39
Single Family	Heat Pump	Deciduous Trees	Deciduous Trees	No Shading	Existing	12,852	0.4%	30	$108	50%	75%	0.74	269
Single Family	Heat Pump	Deciduous Trees	Deciduous Trees	No Shading	New	11,434	0.4%	30	$108	80%	75%	0.65	70
Single Family	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	12,852	1.7%	12	$40	55%	85%	4.20	1,396
Single Family	Heat Pump	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	11,434	1.7%	12	$40	55%	85%	3.73	234
Single Family	Heat Pump	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	12,852	1.8%	6	$69	45%	80%	1.23	1,000
Single Family	Heat Pump	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	11,434	8.0%	30	$25,221	15%	85%	0.06	233
Single Family	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	12,852	15.0%	10	$424	65%	60%	2.92	7,144
Single Family	Heat Pump	Duct Sealing	Duct Sealing	No Duct Sealing	New	11,434	15.0%	10	$424	65%	0%	2.60	0
Single Family	Heat Pump	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	11,434	19.0%	25	$899	95%	10%	3.47	51
Single Family	Heat Pump	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	12,852	19.0%	25	$899	95%	50%	3.90	1,483
Single Family	Heat Pump	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	12,852	10.0%	25	$6,149	90%	10%	0.30	1,080
Single Family	Heat Pump	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	11,434	10.0%	25	$418	75%	30%	3.93	654
Single Family	Heat Pump	Green Roof	ecoroof	Standard Roof	New	11,434	6.5%	40	$21,662	98%	0%	0.07	0
Single Family	Heat Pump	Heat_Pump - Ground or Water-Source - Closed Loop	EER = 14.1, COP = 3.3	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	11,434	7.2%	18	$15,400	95%	30%	0.06	26
Single Family	Heat Pump	Heat_Pump - Ground or Water-Source - Open Loop	EER = 16.2, COP = 3.6	Air Source Heat_Pump - 13 SEER, 7.7 HSPF (Federal Code) (11.3 EER, 3.2 COP)	New	11,434	18.3%	18	$15,400	95%	15%	0.15	33
Single Family	Heat Pump	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	12,852	10.0%	15	$1,368	75%	75%	0.89	8,191
Single Family	Heat Pump	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	12,852	14.9%	25	$488	7%	13%	5.62	238

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Heat Pump	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	12,852	6.9%	25	$488	63%	13%	2.59	897
Single Family	Heat Pump	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	12,852	6.1%	25	$721	95%	13%	1.55	1,146
Single Family	Heat Pump	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	11,434	6.1%	25	$764	95%	20%	1.30	311
Single Family	Heat Pump	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	12,852	32.7%	25	$1,637	7%	90%	3.69	3,111
Single Family	Heat Pump	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	12,852	8.0%	25	$1,637	59%	90%	0.90	5,716
Single Family	Heat Pump	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	12,852	1.0%	25	$414	85%	87%	0.45	904
Single Family	Heat Pump	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	11,434	2.0%	25	$465	85%	87%	0.71	386
Single Family	Heat Pump	Insulation (Duct)	R-6	R-0	Existing	12,852	3.4%	25	$877	75%	12%	0.71	392
Single Family	Heat Pump	Insulation (Duct)	R-8	R-0	Existing	12,852	4.0%	25	$991	95%	12%	0.75	599
Single Family	Heat Pump	Insulation (Floor)	R-19 (state code)	R-0	Existing	12,852	4.0%	25	$1,129	4%	55%	0.65	114
Single Family	Heat Pump	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	12,852	1.3%	25	$1,129	16%	55%	0.21	129
Single Family	Heat Pump	Insulation (Floor)	R-30	R-19 (state code)	Existing	12,852	1.0%	25	$282	40%	55%	0.65	284
Single Family	Heat Pump	Insulation (Floor)	R-30	R-19 (state code)	New	11,434	1.0%	25	$317	40%	55%	0.52	56
Single Family	Heat Pump	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	12,852	4.0%	25	$188	45%	60%	3.94	1,251
Single Family	Heat Pump	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	11,434	4.0%	25	$199	45%	80%	3.30	284
Single Family	Heat Pump	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	12,852	7.0%	25	$225	45%	60%	5.74	1,004
Single Family	Heat Pump	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	11,434	7.0%	25	$239	45%	80%	4.82	221
Single Family	Heat Pump	Insulation (Slab)	R-10 (state code)	R-0	Existing	12,852	5.3%	25	$1,032	60%	10%	0.94	433
Single Family	Heat Pump	Insulation (Slab)	R-15	R-10 (state code)	Existing	12,852	1.4%	25	$298	87%	0%	0.89	0
Single Family	Heat Pump	Insulation (Slab)	R-15	R-10 (state code)	New	11,434	1.4%	25	$330	64%	32%	0.71	77
Single Family	Heat Pump	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	12,852	28.0%	25	$5,605	5%	75%	0.92	1,295
Single Family	Heat Pump	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	12,852	7.3%	25	$2,303	90%	10%	0.58	842
Single Family	Heat Pump	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	11,434	7.3%	25	$2,440	90%	10%	0.49	33
Single Family	Heat Pump	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	12,852	42.2%	25	$6,306	5%	75%	1.24	235
Single Family	Heat Pump	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	12,852	2.8%	25	$2,303	85%	95%	0.22	2,662
Single Family	Heat Pump	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	11,434	2.8%	25	$2,440	85%	95%	0.19	315

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER, 7.7 HSPF	Existing	12,852	15.0%	30	$271	95%	10%	11.68	506
Single Family	Heat Pump	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	13 SEER, 7.7 HSPF	New	11,434	15.0%	30	$121	95%	0%	23.18	0
Single Family	Heat Pump	Motor - ECM Motor	ECM motor for Heat Pump Fan	Standard Motor	Existing	12,852	1.3%	20	$350	85%	80%	0.55	0
Single Family	Heat Pump	Motor - ECM Motor	ECM motor for Heat Pump Fan	Standard Motor	New	11,434	1.3%	20	$350	85%	90%	0.49	0
Single Family	Heat Pump	Natural Ventilation & Cooling	Natural Ventilation & Cooling	No Ventilation	New	11,434	10.0%	40	$6,338	95%	10%	0.35	225
Single Family	Heat Pump	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	12,852	5.9%	5	$225	50%	90%	1.05	4,213
Single Family	Heat Pump	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	12,852	2.0%	5	$7	60%	95%	11.91	2,048
Single Family	Heat Pump	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	11,434	2.0%	5	$7	40%	95%	10.59	226
Single Family	Heat Pump	Proper Sizing - Heat Pump	Correctly Sized Heat_Pump (Cooling And Heating Unit)	Oversized Heat_Pump	Existing	12,852	8.6%	15	$1	85%	47%	1,038.72	6,419
Single Family	Heat Pump	Proper Sizing - Heat Pump	Correctly Sized Heat_Pump (Cooling And Heating Unit)	Oversized Heat_Pump	New	11,434	8.6%	15	$1	85%	47%	924.11	1,048
Single Family	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	12,852	2.6%	30	$447	97%	65%	1.24	2,449
Single Family	Heat Pump	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	11,434	2.6%	30	$370	97%	85%	1.33	578
Single Family	Heat Pump	Solar Attic Fan	Solar Attic Fan	No Attic Fan	Existing	12,852	1.1%	10	$475	95%	50%	0.20	0
Single Family	Heat Pump	Solar Attic Fan	Solar Attic Fan	No Attic Fan	New	11,434	1.1%	10	$475	95%	70%	0.18	0
Single Family	Heat Pump	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	11,434	9.9%	25	$9,183	95%	5%	0.18	5
Single Family	Heat Pump	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	11,434	8.8%	25	$12,818	90%	90%	0.11	83
Single Family	Heat Pump	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	12,852	6.8%	15	$26	24%	85%	31.66	2,527
Single Family	Heat Pump	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	11,434	6.8%	15	$26	24%	0%	28.17	0
Single Family	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Existing	12,852	7.0%	12	$1,349	95%	65%	0.51	0
Single Family	Heat Pump	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	New	11,434	7.0%	12	$1,349	95%	65%	0.46	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Heat Pump	VSD Motor - ECM	Variable Speed Motor for Heat Pump Fan	Standard Motor	Existing	12,852	3.8%	20	$425	85%	80%	1.37	3,881
Single Family	Heat Pump	VSD Motor - ECM	Variable Speed Motor for Heat Pump Fan	Standard Motor	New	11,434	3.8%	20	$425	85%	90%	1.22	799
Single Family	Heat Pump	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	Existing	12,852	6.0%	11	$1,370	95%	50%	0.40	3,636
Single Family	Heat Pump	Whole-House Dehumidifier	Whole-House Dehumidifier	No Dehumidifier	New	11,434	6.0%	11	$1,370	95%	50%	0.35	723
Single Family	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	Existing	12,852	4.1%	15	$1,519	96%	50%	0.33	0
Single Family	Heat Pump	Whole-House Fan	Whole-House Fan	No Whole-House Fan	New	11,434	4.1%	15	$1,519	96%	50%	0.29	0
Single Family	Heat Pump	Window Film	SHGC Reduction = 45%	No Window Film	Existing	12,852	1.4%	11	$2,206	80%	95%	0.06	1,229
Single Family	Heat Pump	Window Film	SHGC Reduction = 45%	No Window Film	New	11,434	1.4%	11	$2,338	80%	95%	0.05	248
Single Family	Heat Pump	Window Overhang	Window Overhang	No Window Overhang	New	11,434	2.6%	30	$861	80%	50%	0.58	0
Single Family	Heat Pump	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	12,852	2.7%	25	$9,843	56%	75%	0.05	1,296
Single Family	Heat Pump	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	12,852	8.5%	25	$9,843	24%	75%	0.16	1,783
Single Family	Heat Pump	Windows	U=0.19	U = 0.35 (State Code)	Existing	12,852	10.5%	25	$4,904	95%	75%	0.39	1,358
Single Family	Heat Pump	Windows	U=0.19	U = 0.35 (State Code)	New	11,434	13.5%	25	$5,197	95%	95%	0.43	449
Single Family	Heat Pump	Windows	U=0.30	U = 0.35 (State Code)	Existing	12,852	2.5%	25	$928	85%	75%	0.49	1,660
Single Family	Heat Pump	Windows	U=0.30	U = 0.35 (State Code)	New	11,434	2.5%	25	$984	85%	95%	0.41	410
Single Family	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	Existing	1,670	3.5%	20	$12	83%	98%	7.59	32,568
Single Family	Lighting	CFL Fixtures, 15W	2-15 W CFLs, 2.3 hr/day	2-60 W Incandescent	New	1,909	3.5%	20	$12	83%	98%	7.59	721
Single Family	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	Existing	1,670	3.0%	20	$12	83%	98%	9.28	26,268
Single Family	Lighting	CFL Fixtures, 20W	2-20 W CFLs, 2.3 hr/day	2-75 W Incandescent	New	1,909	3.0%	20	$12	83%	98%	9.28	536
Single Family	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	Existing	1,670	3.0%	20	$12	83%	98%	12.66	24,211
Single Family	Lighting	CFL Fixtures, 25W	2-25 W CFLs, 2.3 hr/day	2-100 W Incandescent	New	1,909	3.0%	20	$12	83%	98%	12.66	504
Single Family	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	Existing	1,670	39.1%	6	$3	83%	86%	5.33	298,910
Single Family	Lighting	CFL Lamps, 15W	One CFL 15W, 2.3 hr/day	One Incandescent 60W, 2.3 hr/day	New	1,909	39.1%	6	$3	83%	86%	5.33	7,110
Single Family	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	Existing	1,670	10.9%	6	$3	83%	86%	6.52	76,764
Single Family	Lighting	CFL Lamps, 20W	One CFL 20W, 2.3 hr/day	One Incandescent 75W, 2.3 hr/day	New	1,909	10.9%	6	$3	83%	86%	6.52	1,695
Single Family	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	Existing	1,670	5.6%	6	$3	83%	86%	8.89	36,256

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Lighting	CFL Lamps, 25W	One CFL 25W, 2.3 hr/day	One Incandescent 100W, 2.3 hr/day	New	1,909	5.6%	6	$3	83%	86%	8.89	821
Single Family	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	Existing	1,670	1.4%	5	$12	75%	75%	1.07	10,679
Single Family	Lighting	CFL Lighting - 3-Way	13 W, 20W And 25W	30W, 75W, 100W	New	1,909	1.4%	5	$12	75%	75%	1.07	266
Single Family	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	Existing	1,670	1.6%	5	$29	65%	70%	1.15	9,754
Single Family	Lighting	CFL Torchieries	55 W CFL	Incandescent Torchieries, 180W Halogen	New	1,909	1.6%	5	$29	35%	70%	1.15	131
Single Family	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	Existing	1,670	4.5%	10	$142	95%	10%	0.35	0
Single Family	Lighting	Daylighting Controls (Photocell) - Indoor/Outdoors	Install Photocell	No Daylighting Controls	New	1,909	4.5%	10	$142	95%	10%	0.40	0
Single Family	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	1,670	0.0%	13	$45	75%	50%	0.06	121
Single Family	Lighting	Fluorescent, Super T8 Lamps and Fixtures	Fluorescent, Super T8 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	1,909	0.0%	13	$13	75%	50%	0.21	3
Single Family	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	Existing	1,670	0.0%	13	$68	95%	50%	0.04	153
Single Family	Lighting	Fluorescent, T5 Lamps and Fixtures	Fluorescent, T5 Lamps and Fixtures	Standard T8 Lamps and Fixtures	New	1,909	0.0%	13	$37	95%	50%	0.08	4
Single Family	Lighting	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T8 Lamps and Fixtures	Fluorescent, T12 Lamps and Fixtures	Existing	1,670	0.6%	13	$31	50%	50%	0.18	2,058
Single Family	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	Existing	1,670	0.5%	16	$83	50%	5%	1.57	61
Single Family	Lighting	High Pressure Sodium Lamps, Outdoor	High Pressure Sodium (70 W HPS Lamp)	Mercury Vapor	New	1,909	0.5%	16	$83	50%	5%	1.57	2
Single Family	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	Existing	1,670	0.3%	7	$10	95%	90%	0.24	3,777
Single Family	Lighting	LED Christmas Lighting	LED Christmas Lighting	Incandescent Christmas Lighting	New	1,909	0.3%	7	$10	95%	90%	0.28	94
Single Family	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	Existing	1,670	0.6%	20	$46	98%	85%	0.27	7,082
Single Family	Lighting	LED Interior Lighting (White), 13W	One LED 13W, 2.3 hr/day	One CFL 25W, 2.3 hr/day	New	1,909	0.6%	20	$46	98%	85%	0.27	176
Single Family	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	Existing	1,670	4.8%	20	$36	98%	85%	0.23	55,081
Single Family	Lighting	LED Interior Lighting (White), 7W	One LED 7W, 2.3 hr/day	One CFL 15W, 2.3 hr/day	New	1,909	4.8%	20	$36	98%	85%	0.23	1,372
Single Family	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	Existing	1,670	1.4%	20	$41	98%	85%	0.27	16,229
Single Family	Lighting	LED Interior Lighting (White), 9W	One LED 9W, 2.3 hr/day	One CFL 20W, 2.3 hr/day	New	1,909	1.4%	20	$41	98%	85%	0.27	404

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	Existing	1,670	0.8%	20	$63	98%	85%	1.56	2,959
Single Family	Lighting	LED, White - Outdoor	9 W LED	75 W Incandescent	New	1,909	0.8%	20	$63	98%	85%	1.56	74
Single Family	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	Existing	1,670	0.2%	16	$27	50%	5%	0.91	0
Single Family	Lighting	Low Pressure Sodium Lamps, Outdoor	Low Pressure Sodium (55 W LPS Lamp)	75 W Incandescent	New	1,909	0.2%	16	$27	50%	5%	0.91	0
Single Family	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	Existing	1,670	0.6%	10	$37	90%	40%	1.40	1,050
Single Family	Lighting	Metal Halide, Outdoor	Metal Halide PAR 38 Ceramic 70 Watt	90W Incandescent Flood	New	1,909	0.6%	10	$37	90%	40%	1.40	26
Single Family	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	Existing	1,670	14.0%	10	$61	85%	75%	2.53	51,063
Single Family	Lighting	Occupancy Sensors	Wall-Switch Occupancy Sensors	No Occupancy Sensor	New	1,909	14.0%	10	$61	85%	75%	2.89	1,240
Single Family	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	Existing	1,670	0.9%	10	$18	75%	20%	3.33	1,816
Single Family	Lighting	Outdoor Lighting - Photovoltaic, Installation	Outdoor Lighting - Photovoltaic, Installation	Wired outdoor lighting 75 Watt	New	1,909	0.9%	10	$18	75%	20%	3.33	45
Single Family	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	Existing	1,670	15.0%	10	$77	50%	50%	2.17	52,304
Single Family	Lighting	Photosensor Control - Lighting, Outdoor	photocell controls, outdoors 100W lamp	manual switch 100W lamp	New	1,909	15.0%	10	$77	50%	70%	2.48	1,824
Single Family	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	Existing	1,670	2.9%	10	$88	90%	75%	0.37	10,255
Single Family	Lighting	Time Clocks (Exterior Lighting)	Exterior Lighting on a Time Clock	Exterior Lighting (Manual Control)	New	1,909	2.9%	10	$88	90%	75%	0.42	249
Single Family	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	Existing	2,247	1.6%	7	$30	85%	15%	0.50	3,950
Single Family	Plug Load	1-Watt Standby Power	1W or less standby power use for small appliances	Standard plug load appliance.	New	2,379	1.6%	7	$30	85%	15%	0.50	88
Single Family	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	Existing	2,247	0.2%	7	$4	40%	55%	0.37	814
Single Family	Plug Load	Energy Star Battery Chargers	Energy Star Battery Chargers	Standard Battery Chargers	New	2,379	0.2%	7	$4	40%	55%	0.37	18
Single Family	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	Existing	2,247	3.3%	9	$5	38%	100%	3.51	26,562
Single Family	Plug Load	Energy Star Box TV	Energy Star TV	Standard TV	New	2,379	3.3%	9	$5	38%	100%	3.51	589
Single Family	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	Existing	2,247	1.9%	7	$5	24%	100%	2.33	9,721
Single Family	Plug Load	Energy Star DVD System	Energy Star DVD System	Standard DVD System	New	2,379	1.9%	7	$5	24%	100%	2.33	216

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	Existing	2,247	0.4%	10	$12	5%	15%	5.94	57
Single Family	Plug Load	Energy Star Dehumidifiers	Energy Star Dehumidifiers	Standard Dehumidifiers	New	2,379	0.4%	10	$12	5%	15%	5.94	1
Single Family	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	Existing	2,247	1.7%	6	$35	62%	81%	0.67	17,725
Single Family	Plug Load	Energy Star Digital Set Top Receiver	Energy Star Digital Set Top Receiver	Standard Digital Set Top Receiver	New	2,379	1.7%	6	$35	62%	81%	0.67	393
Single Family	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	Existing	2,247	3.2%	9	$100	70%	38%	0.72	17,747
Single Family	Plug Load	Energy Star Flat Screen HDTV	Energy Star HDTV	Standard HDTV	New	2,379	3.2%	9	$100	70%	38%	0.72	394
Single Family	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	Existing	2,247	2.5%	7	$20	90%	91%	0.92	43,158
Single Family	Plug Load	Energy Star Home Audio System	Energy Star Home Audio System	Standard Home Audio system	New	2,379	2.5%	7	$20	90%	91%	0.92	957
Single Family	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	Existing	2,247	13.7%	4	$15	15%	100%	2.12	43,378
Single Family	Plug Load	Energy Star Office Computer	Energy Star Office Computer	Standard Office Computer	New	2,379	13.7%	4	$15	15%	100%	2.12	962
Single Family	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	Existing	2,247	1.9%	6	$25	55%	25%	0.31	5,481
Single Family	Plug Load	Energy Star Office Copiers	Energy Star Office Copiers	Standard Office Copiers	New	2,379	1.9%	6	$25	55%	25%	0.31	122
Single Family	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	Existing	2,247	2.0%	4	$10	15%	100%	1.02	6,352
Single Family	Plug Load	Energy Star Office Monitor	Energy Star Office Monitor	Standard Office Monitor	New	2,379	2.0%	4	$10	15%	100%	1.02	141
Single Family	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	Existing	2,247	0.0%	5	$10	40%	75%	0.34	98
Single Family	Plug Load	Energy Star Office Printer	Energy Star Office Printer	Standard Office Printer	New	2,379	0.0%	5	$10	40%	75%	0.34	2
Single Family	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	Existing	2,247	0.6%	4	$5	45%	10%	0.86	0
Single Family	Plug Load	Energy Star VCR	Energy Star VCR/DVD Combo	Standard Home VCR	New	2,379	0.6%	4	$5	45%	10%	0.86	0
Single Family	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	Existing	2,247	0.3%	7	$7	40%	85%	0.62	2,162
Single Family	Plug Load	Power supply transformer/converter - External power adapters	Power supply transformer/converter - High efficiency External power adapters	Standard Efficiency	New	2,379	0.3%	7	$7	40%	85%	0.62	48
Single Family	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	Existing	2,247	1.1%	7	$15	75%	90%	0.66	14,978
Single Family	Plug Load	Smart Strip	Smart Strip	Standard Powerstrip	New	2,379	1.1%	7	$15	75%	90%	0.70	332
Single Family	Pool Pump	Pool Pump Timers	Pool Pump Timers	No Pool Pump Timers	Existing	1,475	50.0%	10	$50	83%	3%	9.06	1,355
Single Family	Pool Pump	Pool Pump Timers	Pool Pump Timers	No Pool Pump Timers	New	1,502	50.0%	10	$50	83%	3%	9.22	30
Single Family	Pool Pump	Pool Pumps - VSD	VSD	Constant Speed	Existing	1,475	85.0%	10	$680	92%	3%	1.12	2,521
Single Family	Pool Pump	Pool Pumps - VSD	VSD	Constant Speed	New	1,502	85.0%	10	$680	92%	3%	1.14	56

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	Existing	488	20.0%	20	$29	NA	NA	3.88	3,700
Single Family	Refrigerator	Refrigerator/Freezer - Energy Star	Energy Star Refrigerator	Standard Refrigerator	New	497	20.0%	20	$29	NA	NA	3.95	325
Single Family	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	Existing	586	30.0%	20	$70	97%	32%	2.86	2,738
Single Family	Refrigerator	1 kWh/day Refrigerator	20 cf top-freezer using no more than 1 kWh/day	Standard Refrigerator, 20.5 cf, top-freezer	New	487	30.0%	20	$70	97%	32%	2.38	51
Single Family	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	586	6.3%	5	$225	99%	0%	0.05	27
Single Family	Refrigerator	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	487	6.3%	5	$225	99%	0%	0.04	1
Single Family	Refrigerator	Refrigerator/Freezer - Early Replacement	Standard Refrigerator	Existing Refrigerator	Existing	586	40.0%	20	$1,169	85%	11%	0.23	0
Single Family	Refrigerator	Refrigerator/Freezer - Removal of Secondary	Proper Disposal of Refrigerator/Freezer	Existing Non-Efficient Refrigerator/Freezer	Existing	586	282.8%	10	$98	82%	11%	10.32	152,434
Single Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	Existing	1,088	9.3%	9	$21	NA	NA	4.85	4,652
Single Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 10.8	EER 9.8	New	651	9.3%	9	$21	NA	NA	2.90	145
Single Family	Room AC	Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	EER = 9.8	Existing Room AC EER 9.0	Existing	1,150	8.2%	15	$460	97%	95%	0.34	8,304
Single Family	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	Existing	1,150	41.3%	10	$574	30%	65%	0.94	1,777
Single Family	Room AC	Blinds - Fixed Angle/Automatic	Install Blinds (Reduce Window SHGC by 50%)	No Interior Shading Device	New	648	41.3%	10	$574	30%	65%	0.53	11
Single Family	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	1,150	3.3%	30	$159	55%	60%	0.66	894
Single Family	Room AC	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	648	3.3%	30	$159	25%	75%	0.37	8
Single Family	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	Existing	1,150	0.3%	10	$98	20%	85%	0.04	60
Single Family	Room AC	Ceiling Fan	Ceiling Fan	No Ceiling Fan	New	648	0.3%	10	$98	20%	85%	0.02	1
Single Family	Room AC	Construction - ICF	Concrete Framing	Standard Wood Framing	New	648	32.0%	30	$11,271	95%	45%	0.05	8
Single Family	Room AC	Construction - SIP	Specialty Framing	Standard Wood Framing	New	648	14.0%	30	$7,959	95%	45%	0.03	3
Single Family	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	Existing	1,150	3.4%	20	$50	95%	25%	1.65	670
Single Family	Room AC	Cool Roofs	Lighter Colored Shingles (White)	Standard Roof Shingles	New	648	3.2%	20	$56	95%	25%	0.78	10
Single Family	Room AC	Deciduous Trees	Deciduous Trees	No Shading	Existing	1,150	2.0%	30	$108	50%	75%	0.60	663
Single Family	Room AC	Deciduous Trees	Deciduous Trees	No Shading	New	648	2.0%	30	$108	80%	75%	0.34	13

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	1,150	0.4%	12	$40	55%	85%	0.16	144
Single Family	Room AC	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	648	0.4%	12	$40	55%	85%	0.09	2
Single Family	Room AC	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	1,150	0.9%	6	$69	45%	80%	0.10	235
Single Family	Room AC	Green Roof	ecoroof	Standard Roof	New	648	6.5%	40	$21,662	98%	0%	0.01	0
Single Family	Room AC	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	1,150	10.0%	15	$1,368	75%	75%	0.14	4,314
Single Family	Room AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	1,150	14.9%	25	$488	7%	13%	0.87	113
Single Family	Room AC	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	1,150	6.9%	25	$488	63%	13%	0.40	441
Single Family	Room AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	1,150	6.1%	25	$721	95%	13%	0.24	579
Single Family	Room AC	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	648	6.1%	25	$764	95%	20%	0.13	14
Single Family	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	1,150	14.7%	25	$1,637	7%	90%	0.26	670
Single Family	Room AC	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	1,150	0.6%	25	$1,637	59%	90%	0.01	189
Single Family	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	1,150	0.1%	25	$414	85%	87%	0.01	44
Single Family	Room AC	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	648	0.1%	25	$465	85%	87%	0.00	1
Single Family	Room AC	Insulation (Floor)	R-19 (state code)	R-0	Existing	1,150	0.1%	25	$1,129	4%	55%	0.00	1
Single Family	Room AC	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	1,150	0.1%	25	$1,129	16%	55%	0.00	5
Single Family	Room AC	Insulation (Floor)	R-30	R-19 (state code)	Existing	1,150	0.1%	25	$282	40%	55%	0.01	13
Single Family	Room AC	Insulation (Floor)	R-30	R-19 (state code)	New	648	0.1%	25	$317	40%	55%	0.01	0
Single Family	Room AC	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	1,150	3.0%	25	$188	45%	60%	0.46	468
Single Family	Room AC	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	648	3.0%	25	$199	45%	80%	0.24	9
Single Family	Room AC	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	1,150	7.0%	25	$225	45%	60%	0.89	476
Single Family	Room AC	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	648	7.0%	25	$239	45%	80%	0.47	10
Single Family	Room AC	Insulation (Slab)	R-10 (state code)	R-0	Existing	1,150	5.3%	25	$1,032	60%	10%	0.15	227
Single Family	Room AC	Insulation (Slab)	R-15	R-10 (state code)	Existing	1,150	1.4%	25	$298	87%	0%	0.14	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Room AC	Insulation (Slab)	R-15	R-10 (state code)	New	648	1.4%	25	$330	64%	32%	0.07	3
Single Family	Room AC	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	1,150	0.1%	25	$5,605	5%	75%	0.00	2
Single Family	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	1,150	2.3%	25	$2,303	90%	10%	0.03	124
Single Family	Room AC	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	648	2.3%	25	$2,440	90%	10%	0.01	0
Single Family	Room AC	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	1,150	13.0%	25	$6,306	5%	75%	0.06	30
Single Family	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	1,150	0.5%	25	$2,303	85%	95%	0.01	241
Single Family	Room AC	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	648	0.5%	25	$2,440	85%	95%	0.00	3
Single Family	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	1,150	2.0%	5	$7	60%	95%	1.86	976
Single Family	Room AC	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	648	2.0%	5	$7	40%	95%	1.05	10
Single Family	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	1,150	6.7%	30	$447	97%	65%	0.49	3,464
Single Family	Room AC	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	648	6.7%	30	$370	97%	85%	0.33	70
Single Family	Room AC	Removal of Air Conditioner - Room (Individual Rooms) (10,000 BTU/HR)	Proper Disposal of Room AC	Existing Room AC	Existing	1,150	100.0%	5	$100	85%	15%	6.20	14,087
Single Family	Room AC	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	648	1.0%	25	$9,183	95%	5%	0.00	0
Single Family	Room AC	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	648	1.0%	25	$12,818	90%	90%	0.00	0
Single Family	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	Existing	1,150	7.5%	11	$2,206	80%	95%	0.05	3,702
Single Family	Room AC	Window Film	SHGC Reduction = 45%	No Window Film	New	648	7.5%	11	$2,338	80%	95%	0.03	64
Single Family	Room AC	Window Overhang	Window Overhang	No Window Overhang	New	648	14.0%	30	$861	80%	50%	0.30	8
Single Family	Room AC	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	1,150	5.0%	25	$9,843	56%	75%	0.01	1,283
Single Family	Room AC	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	1,150	31.5%	25	$9,843	24%	75%	0.09	3,904
Single Family	Room AC	Windows	U=0.19	U = 0.35 (State Code)	Existing	1,150	17.5%	25	$4,904	95%	75%	0.10	1,312
Single Family	Room AC	Windows	U=0.19	U = 0.35 (State Code)	New	648	9.5%	25	$5,197	95%	95%	0.03	14
Single Family	Room AC	Windows	U=0.30	U = 0.35 (State Code)	Existing	1,150	4.5%	25	$928	85%	75%	0.14	1,754
Single Family	Room AC	Windows	U=0.30	U = 0.35 (State Code)	New	648	4.5%	25	$984	85%	95%	0.07	36
Single Family	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	10,420	3.3%	30	$159	55%	60%	3.03	3,688
Single Family	Room Heat	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	9,081	3.3%	30	$159	25%	75%	2.64	41

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Room Heat	Construction - ICF	Concrete Framing	Standard Wood Framing	New	9,081	44.0%	30	$11,271	95%	45%	0.50	52
Single Family	Room Heat	Construction - SIP	Specialty Framing	Standard Wood Framing	New	9,081	14.0%	30	$7,959	95%	45%	0.23	16
Single Family	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	10,420	2.0%	12	$40	55%	85%	3.44	3,341
Single Family	Room Heat	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	9,081	2.0%	12	$40	55%	85%	3.00	64
Single Family	Room Heat	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	10,420	2.0%	6	$69	45%	80%	0.95	2,361
Single Family	Room Heat	Green Roof	ecoroof	Standard Roof	New	9,081	6.5%	40	$21,662	98%	0%	0.05	0
Single Family	Room Heat	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	10,420	10.0%	15	$1,368	75%	75%	0.62	15,167
Single Family	Room Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-0	Existing	10,420	14.9%	25	$488	7%	13%	3.94	476
Single Family	Room Heat	Insulation (Basement - Wall) 2*4	R-13 (state code)	R-7 (Average Existing Insulation Value)	Existing	10,420	6.9%	25	$488	63%	13%	1.82	1,900
Single Family	Room Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	Existing	10,420	6.1%	25	$721	95%	13%	1.09	2,195
Single Family	Room Heat	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13 (state code)	New	9,081	6.1%	25	$764	95%	20%	0.89	67
Single Family	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	10,420	37.0%	25	$1,637	7%	90%	2.93	7,608
Single Family	Room Heat	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	10,420	10.2%	25	$1,637	59%	90%	0.81	15,302
Single Family	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	10,420	1.0%	25	$414	85%	87%	0.31	1,838
Single Family	Room Heat	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	9,081	3.0%	25	$465	85%	87%	0.73	127
Single Family	Room Heat	Insulation (Floor)	R-19 (state code)	R-0	Existing	10,420	8.0%	25	$1,129	4%	55%	0.92	505
Single Family	Room Heat	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	10,420	2.5%	25	$1,129	16%	55%	0.29	549
Single Family	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	Existing	10,420	2.0%	25	$282	40%	55%	0.92	1,259
Single Family	Room Heat	Insulation (Floor)	R-30	R-19 (state code)	New	9,081	2.0%	25	$317	40%	55%	0.71	25
Single Family	Room Heat	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	10,420	3.0%	25	$188	45%	60%	2.07	1,929
Single Family	Room Heat	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	9,081	3.0%	25	$199	45%	80%	1.70	50
Single Family	Room Heat	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	10,420	7.0%	25	$225	45%	60%	4.02	2,007
Single Family	Room Heat	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	9,081	7.0%	25	$239	45%	80%	3.31	51

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Room Heat	Insulation (Slab)	R-10 (state code)	R-0	Existing	10,420	5.3%	25	$1,032	60%	10%	0.66	802
Single Family	Room Heat	Insulation (Slab)	R-15	R-10 (state code)	Existing	10,420	1.4%	25	$298	87%	0%	0.62	0
Single Family	Room Heat	Insulation (Slab)	R-15	R-10 (state code)	New	9,081	1.4%	25	$330	64%	32%	0.49	16
Single Family	Room Heat	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	10,420	44.0%	25	$5,605	5%	75%	1.02	4,330
Single Family	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	10,420	8.5%	25	$2,303	90%	10%	0.48	1,905
Single Family	Room Heat	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	9,081	8.5%	25	$2,440	90%	10%	0.39	8
Single Family	Room Heat	Insulation (Wall) 2*6	R-20 (state code)	R-0	Existing	10,420	49.0%	25	$6,306	5%	75%	1.01	528
Single Family	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	Existing	10,420	3.3%	25	$2,303	85%	95%	0.19	6,434
Single Family	Room Heat	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20 (state code)	New	9,081	3.3%	25	$2,440	85%	95%	0.15	83
Single Family	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	10,420	2.0%	5	$7	60%	95%	8.32	4,121
Single Family	Room Heat	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	9,081	2.0%	5	$7	40%	95%	7.25	52
Single Family	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	10,420	2.0%	30	$447	97%	65%	0.66	3,199
Single Family	Room Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	9,081	2.0%	30	$370	97%	85%	0.70	92
Single Family	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	Existing	10,420	41.0%	20	$4,140	98%	30%	1.07	40,263
Single Family	Room Heat	Radiant Electric Ceiling Panels	Radiant Electric Heating with Ceiling Panels	Electric Baseboard Heating	New	9,081	41.0%	20	$4,140	98%	30%	0.93	796
Single Family	Room Heat	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	9,081	10.0%	25	$9,183	95%	5%	0.12	1
Single Family	Room Heat	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-33	2*6Wall R-20 (state code)	New	9,081	10.0%	25	$12,818	90%	90%	0.09	21
Single Family	Room Heat	Windows	U = 0.35 (State Code)	U=0.4 (existing windows)	Existing	10,420	2.2%	25	$9,843	56%	75%	0.03	2,121
Single Family	Room Heat	Windows	U = 0.35 (State Code)	U=0.65 (existing windows)	Existing	10,420	13.0%	25	$9,843	24%	75%	0.17	5,499
Single Family	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	Existing	10,420	8.0%	25	$4,904	95%	75%	0.21	2,082
Single Family	Room Heat	Windows	U=0.19	U = 0.35 (State Code)	New	9,081	18.0%	25	$5,197	95%	95%	0.39	132
Single Family	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	Existing	10,420	2.0%	25	$928	85%	75%	0.28	2,668
Single Family	Room Heat	Windows	U=0.30	U = 0.35 (State Code)	New	9,081	2.0%	25	$984	85%	95%	0.23	73
Single Family	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	Existing	2,928	3.2%	18	$114	NA	NA	0.87	6,513
Single Family	Water Heat	Water_Heater (40 Gallon Electric)	EF = 0.95	EF = 0.92	New	2,980	3.2%	18	$114	NA	NA	0.89	451

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	3,009	4.9%	14	$92	68%	12%	1.39	2,113
Single Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	2,975	4.9%	14	$92	68%	12%	1.37	41
Single Family	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	3,009	9.8%	14	$735	25%	35%	0.35	6,299
Single Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	3,009	15.6%	14	$227	77%	12%	1.79	3,244
Single Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	2,975	15.6%	14	$227	77%	12%	1.77	63
Single Family	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	Existing Dishwasher EF = 0.50	Existing	3,009	1.7%	13	$494	10%	30%	0.08	367
Single Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	3,009	1.1%	13	$489	35%	16%	0.06	467
Single Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	2,975	1.1%	13	$489	35%	16%	0.06	9
Single Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	3,009	18.5%	30	$600	95%	45%	1.48	45,184
Single Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	2,975	18.5%	30	$600	95%	95%	1.46	1,911
Single Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	3,009	8.0%	9	$1	95%	95%	34.15	26,372
Single Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	2,975	8.2%	9	$1	95%	95%	34.15	525
Single Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	3,009	3.3%	9	$1	95%	95%	17.26	10,859
Single Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	2,975	3.4%	9	$1	95%	95%	17.26	216
Single Family	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	3,009	3.8%	9	$1	95%	95%	28.93	24,821
Single Family	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	Existing	3,009	43.2%	15	$2,209	95%	30%	0.54	9,028
Single Family	Water Heat	Heat Pump Water Heater	EF=2.0	No Heat Pump Water Heater	New	2,975	43.2%	15	$2,209	95%	30%	0.53	174
Single Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	3,009	55.2%	10	$239	5%	5%	4.36	833
Single Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	2,975	55.2%	10	$239	5%	5%	4.31	17
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	3,009	1.2%	5	$7	38%	65%	1.52	1,752
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	2,975	1.2%	5	$7	38%	85%	1.51	46
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	3,009	7.3%	10	$5	33%	95%	14.21	16,511
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	2,975	7.5%	10	$5	85%	95%	14.21	860
Single Family	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	3,009	7.3%	10	$12	33%	95%	5.86	16,511
Single Family	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	Existing	3,009	42.9%	20	$8,500	95%	20%	0.18	5,981

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Single Family	Water Heat	Solar Water Heater	Solar thermal collector	Non-solar hot water heater	New	2,975	45.5%	20	$8,500	95%	20%	0.19	122
Single Family	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	Existing	3,009	3.2%	20	$1,347	95%	30%	0.08	654
Single Family	Water Heat	Tankless Water_Heater	EF = 0.95, 4.0 gpm	EF = 0.92	New	2,975	3.2%	20	$1,229	95%	30%	0.09	13
Single Family	Water Heat	Water Heater (Electric) - Early Retirement	EF = 0.92	EF = 0.88	Existing	3,009	4.3%	13	$456	10%	100%	0.23	3,188
Single Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	3,009	8.5%	9	$130	90%	40%	1.11	18,034
Single Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	2,975	8.5%	9	$130	75%	40%	1.10	300
Single Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	3,009	5.0%	18	$136	80%	80%	1.19	16,836
Single Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	2,975	5.0%	18	$136	10%	80%	1.18	38
Single Family	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	3,009	6.5%	10	$18	65%	0%	6.83	26
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	3,009	6.0%	4	$8	43%	95%	5.18	14,873
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	2,975	6.0%	4	$8	43%	95%	5.13	297

Table D.2. Residential Gas Measure Details

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	Existing	579	2.5%	18	$200	NA	NA	0.85	0
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	New	414	2.5%	18	$200	NA	NA	0.61	0
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	Existing	579	13.3%	18	$750	NA	NA	1.21	0
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	New	414	13.3%	18	$750	NA	NA	0.86	0
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	Existing	579	18.7%	18	$1,050	NA	NA	1.21	468,386
Manufactured	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	New	414	18.7%	18	$1,050	NA	NA	0.87	28,774
Manufactured	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	594	10.0%	15	$942	95%	0%	0.63	0
Manufactured	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	399	10.0%	15	$942	95%	0%	0.43	0
Manufactured	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	594	3.3%	30	$75	55%	60%	4.58	84,999
Manufactured	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	399	3.3%	30	$10	25%	75%	23.04	927
Manufactured	Central Heat Furnace	Construction - ICF	Concrete Framing	Standard Wood Framing	New	399	44.0%	30	$5,426	95%	1%	0.57	0
Manufactured	Central Heat Furnace	Construction - SIP	Specialty Framing	Standard Wood Framing	New	399	14.0%	30	$3,831	95%	1%	0.26	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	594	2.0%	12	$80	55%	85%	1.22	61,475
Manufactured	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	399	3.0%	12	$80	55%	85%	1.23	1,949
Manufactured	Central Heat Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	594	1.3%	3	$69	65%	80%	0.23	39,796
Manufactured	Central Heat Furnace	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	399	8.0%	30	$104	75%	85%	5.45	7,649
Manufactured	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	594	6.0%	20	$424	65%	60%	1.08	105,830
Manufactured	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	New	399	6.0%	20	$424	65%	0%	0.72	0
Manufactured	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	399	19.0%	25	$899	95%	10%	1.30	810
Manufactured	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	594	19.0%	25	$899	95%	50%	1.94	64,636
Manufactured	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	594	10.0%	25	$2,995	90%	10%	0.31	50,757
Manufactured	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	399	10.0%	25	$194	75%	30%	3.18	3,199
Manufactured	Central Heat Furnace	Gas Furnace - Early Retirement	AFUE=78	Existing Furance	Existing	594	7.7%	20	$2,549	10%	95%	0.23	65,323
Manufactured	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	Existing	594	5.0%	18	$1	85%	39%	383.37	146,661
Manufactured	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	New	399	5.0%	18	$1	85%	39%	257.11	2,555

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	Green Roof	ecoroof	Standard Roof	New	399	6.5%	40	$20,095	98%	0%	0.03	8
Manufactured	Central Heat Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	594	10.0%	15	$406	85%	85%	1.47	512,774
Manufactured	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13	R-0	Existing	594	14.9%	25	$791	7%	14%	1.73	9,587
Manufactured	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13	R-7 (Average Existing Insulation Value)	Existing	594	6.9%	25	$791	63%	14%	0.80	38,385
Manufactured	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	Existing	594	6.1%	25	$419	95%	14%	1.33	52,422
Manufactured	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	New	399	6.1%	25	$442	95%	14%	0.84	1,062
Manufactured	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	594	15.0%	25	$450	7%	87%	3.06	66,506
Manufactured	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	594	10.5%	25	$450	59%	95%	2.14	443,819
Manufactured	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	594	1.0%	25	$124	85%	87%	0.74	44,421
Manufactured	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	399	2.0%	25	$140	85%	87%	0.88	1,980
Manufactured	Central Heat Furnace	Insulation (Duct)	R-6	R-0	Existing	594	3.5%	25	$132	75%	12%	2.46	24,659
Manufactured	Central Heat Furnace	Insulation (Duct)	R-8	R-0	Existing	594	4.3%	25	$145	95%	12%	2.69	37,664
Manufactured	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-0	Existing	594	6.0%	25	$657	4%	55%	0.84	8,389

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	594	1.9%	25	$657	16%	55%	0.26	9,319
Manufactured	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	Existing	594	2.0%	25	$410	40%	30%	0.45	14,163
Manufactured	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	New	399	2.0%	25	$465	40%	30%	0.27	296
Manufactured	Central Heat Furnace	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	594	43.0%	25	$612	10%	75%	6.45	241,039
Manufactured	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	594	19.1%	25	$759	90%	10%	2.31	105,828
Manufactured	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	399	19.1%	25	$808	90%	10%	1.45	2,351
Manufactured	Central Heat Furnace	Insulation (Wall) 2*6	R-20	R-0	Existing	594	48.0%	25	$999	45%	75%	4.42	130,504
Manufactured	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	Existing	594	2.8%	25	$730	50%	95%	0.35	0
Manufactured	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	New	399	2.8%	25	$778	50%	95%	0.22	0
Manufactured	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	Existing	594	13.3%	15	$175	95%	15%	4.56	7,660
Manufactured	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	New	399	13.3%	15	$175	95%	15%	3.06	135
Manufactured	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	Existing	594	15.0%	30	$203	95%	10%	7.81	23,736
Manufactured	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	New	399	15.0%	30	$91	95%	0%	11.69	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	594	5.0%	2	$100	75%	95%	0.40	221,901
Manufactured	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	594	2.0%	5	$5	60%	95%	7.71	96,037
Manufactured	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	399	2.0%	5	$5	40%	95%	5.17	1,149
Manufactured	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	594	2.0%	30	$247	97%	65%	0.86	79,548
Manufactured	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	399	2.0%	30	$279	97%	85%	0.51	2,104
Manufactured	Central Heat Furnace	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	399	3.0%	25	$1,428	95%	95%	0.13	0
Manufactured	Central Heat Furnace	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-37	2*6Wall R-20	New	399	11.0%	25	$1,999	95%	95%	0.34	0
Manufactured	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	594	6.8%	15	$26	60%	85%	15.63	302,651
Manufactured	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	399	6.8%	15	$26	60%	0%	10.48	0
Manufactured	Central Heat Furnace	Windows	U = 0.35	U=0.4 (existing windows)	Existing	594	2.0%	25	$3,932	56%	75%	0.05	46,868
Manufactured	Central Heat Furnace	Windows	U = 0.35	U=0.65 (existing windows)	Existing	594	15.5%	25	$3,932	24%	75%	0.36	163,135
Manufactured	Central Heat Furnace	Windows	U=0.19	U=0.35	Existing	594	7.3%	25	$1,959	95%	75%	0.34	44,346
Manufactured	Central Heat Furnace	Windows	U=0.19	U=0.35	New	399	18.4%	25	$2,085	95%	95%	0.54	3,259

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Central Heat Furnace	Windows	U=0.30	U=0.35	Existing	594	1.9%	25	$371	85%	75%	0.47	61,387
Manufactured	Central Heat Furnace	Windows	U=0.30	U=0.35	New	399	2.4%	25	$395	85%	95%	0.37	2,067
Manufactured	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	19	8.0%	15	$320	45%	44%	0.05	5,174
Manufactured	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	19	8.0%	15	$320	45%	44%	0.05	148
Manufactured	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	19	23.0%	15	$290	85%	85%	0.15	53,871
Manufactured	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	19	23.0%	15	$290	85%	85%	0.15	1,540
Manufactured	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	36	15.0%	18	$55	NA	NA	1.13	6,666
Manufactured	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	36	15.0%	18	$55	NA	NA	1.13	645
Manufactured	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	35	23.0%	9	$200	99%	70%	0.25	52,455
Manufactured	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	34	23.0%	9	$200	99%	70%	0.24	1,384
Manufactured	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	Existing	121	4.8%	13	$77	NA	NA	0.66	0
Manufactured	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	New	121	4.8%	13	$77	NA	NA	0.66	0
Manufactured	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	Existing	121	26.3%	13	$1,154	NA	NA	0.24	99,558
Manufactured	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	New	121	26.3%	13	$1,154	NA	NA	0.24	9,185
Manufactured	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	121	5.2%	14	$92	68%	13%	0.63	6,803
Manufactured	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	118	5.2%	14	$92	68%	13%	0.62	171
Manufactured	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	121	9.9%	14	$735	25%	25%	0.15	13,599
Manufactured	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	121	12.9%	14	$227	85%	13%	0.63	8,973
Manufactured	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	118	12.9%	14	$227	85%	13%	0.62	226

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	EF = 0.46 Existing Dishwasher	Existing	121	4.1%	13	$174	15%	23%	0.25	3,090
Manufactured	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	121	2.2%	13	$489	35%	12%	0.05	2,070
Manufactured	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	118	2.2%	13	$489	35%	12%	0.05	52
Manufactured	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	121	3.5%	30	$600	95%	45%	0.12	23,736
Manufactured	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	118	3.5%	30	$600	95%	50%	0.12	737
Manufactured	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	121	7.1%	9	$1	95%	95%	19.75	69,774
Manufactured	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	118	7.3%	9	$1	95%	95%	19.75	1,802
Manufactured	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	121	2.9%	9	$1	55%	95%	9.98	16,634
Manufactured	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	118	3.0%	9	$1	55%	95%	9.98	430
Manufactured	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	121	3.3%	9	$1	10%	95%	16.73	6,913
Manufactured	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	121	30.0%	10	$239	90%	5%	1.02	23,612
Manufactured	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	118	30.0%	10	$239	90%	5%	1.00	638
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	121	1.2%	15	$7	25%	65%	1.97	3,350
Manufactured	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	118	1.2%	15	$7	75%	85%	1.93	357
Manufactured	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	Existing	121	4.8%	15	$67	95%	15%	0.85	583
Manufactured	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	New	118	4.8%	15	$67	95%	15%	0.83	16
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	121	12.1%	10	$5	85%	95%	20.40	213,287
Manufactured	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	118	12.4%	10	$5	65%	95%	20.40	4,213
Manufactured	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	121	8.0%	10	$12	33%	95%	5.61	54,367
Manufactured	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	Existing	121	24.4%	20	$1,527	99%	26%	0.24	13,853
Manufactured	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	New	118	24.4%	20	$1,409	99%	26%	0.26	349
Manufactured	Water Heat	Water Heater (Gas) Early Retirement	EF = 0.59	EF=0.54	Existing	121	8.5%	13	$718	10%	95%	0.12	17,618
Manufactured	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	121	8.5%	9	$130	90%	40%	0.48	51,730
Manufactured	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	118	8.5%	9	$130	75%	40%	0.47	1,164

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Manufactured	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	121	5.0%	18	$136	80%	80%	0.51	52,442
Manufactured	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	118	5.0%	18	$136	10%	80%	0.50	178
Manufactured	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	121	6.5%	10	$18	75%	0%	2.94	84
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	121	6.0%	5	$0	43%	95%	2,439.15	43,170
Manufactured	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	118	6.0%	5	$0	43%	95%	2,384.59	1,173
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	Existing	384	2.5%	18	$200	NA	NA	0.56	0
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	New	271	2.5%	18	$200	NA	NA	0.40	0
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	Existing	384	13.3%	18	$750	NA	NA	0.80	0
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	New	271	13.3%	18	$750	NA	NA	0.57	0
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	Existing	384	18.7%	18	$1,050	NA	NA	0.80	1,764,139
Multi Family	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	New	271	18.7%	18	$1,050	NA	NA	0.57	105,131
Multi Family	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	393	10.0%	15	$942	95%	0%	0.42	0
Multi Family	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	261	10.0%	15	$942	95%	0%	0.28	0
Multi Family	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	393	3.3%	30	$19	55%	60%	12.09	335,976
Multi Family	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	261	3.3%	30	$3	25%	75%	60.38	3,453

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Central Heat Furnace	Construction - ICF	Concrete Framing	Standard Wood Framing	New	261	44.0%	30	$2,293	95%	45%	0.89	0
Multi Family	Central Heat Furnace	Construction - SIP	Specialty Framing	Standard Wood Framing	New	261	14.0%	30	$1,619	95%	20%	0.40	0
Multi Family	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	393	2.0%	12	$20	55%	85%	3.23	275,167
Multi Family	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	261	3.0%	12	$20	55%	85%	3.23	7,786
Multi Family	Central Heat Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	393	1.3%	3	$35	55%	80%	0.30	132,927
Multi Family	Central Heat Furnace	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	261	8.0%	30	$74	10%	85%	5.00	3,801
Multi Family	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	393	6.0%	20	$424	65%	60%	0.71	0
Multi Family	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	New	261	6.0%	20	$424	65%	0%	0.47	0
Multi Family	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	261	19.0%	25	$899	95%	10%	0.85	0
Multi Family	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	393	19.0%	25	$899	95%	50%	1.28	748,902
Multi Family	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	393	10.0%	25	$2,636	90%	10%	0.23	189,861
Multi Family	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	261	10.0%	25	$128	75%	30%	3.14	12,316
Multi Family	Central Heat Furnace	Gas Furnace - Early Retirement	AFUE=78	Existing Furance	Existing	393	7.7%	20	$2,549	10%	95%	0.15	244,977

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	Existing	393	5.0%	18	$1	85%	39%	253.16	550,014
Multi Family	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	New	261	5.0%	18	$1	85%	39%	168.48	9,524
Multi Family	Central Heat Furnace	Green Roof	ecoroof	Standard Roof	New	261	6.5%	40	$14,330	98%	0%	0.03	31
Multi Family	Central Heat Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	393	10.0%	15	$203	75%	85%	1.94	1,830,185
Multi Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	393	15.0%	25	$383	7%	87%	2.37	227,998
Multi Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	393	10.5%	25	$383	59%	95%	1.66	1,542,695
Multi Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	393	1.0%	25	$106	85%	87%	0.57	174,153
Multi Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	261	2.0%	25	$100	85%	87%	0.81	7,766
Multi Family	Central Heat Furnace	Insulation (Duct)	R-6	R-0	Existing	393	3.5%	25	$113	75%	12%	1.91	84,537
Multi Family	Central Heat Furnace	Insulation (Duct)	R-8	R-0	Existing	393	4.3%	25	$124	95%	12%	2.08	129,122
Multi Family	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-0	Existing	393	6.0%	25	$560	4%	80%	0.65	45,882
Multi Family	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	393	1.9%	25	$560	16%	80%	0.21	50,702
Multi Family	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	Existing	393	2.0%	25	$350	40%	80%	0.35	135,882

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	New	261	2.0%	25	$332	40%	80%	0.24	3,109
Multi Family	Central Heat Furnace	Insulation (Slab)	R-10 (state code)	R-0	Existing	393	4.3%	25	$662	60%	47%	0.39	260,614
Multi Family	Central Heat Furnace	Insulation (Slab)	R-15	R-10 (state code)	Existing	393	1.4%	25	$152	87%	47%	0.57	137,004
Multi Family	Central Heat Furnace	Insulation (Slab)	R-15	R-10 (state code)	New	261	1.4%	25	$145	64%	47%	0.40	2,104
Multi Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	393	43.0%	25	$283	10%	75%	9.23	899,499
Multi Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	393	19.1%	25	$347	90%	10%	3.34	399,464
Multi Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	261	19.1%	25	$340	90%	10%	2.27	9,164
Multi Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20	R-0	Existing	393	48.0%	25	$461	35%	75%	6.32	379,147
Multi Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	Existing	393	2.8%	25	$337	90%	95%	0.50	0
Multi Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	New	261	2.8%	25	$330	90%	95%	0.34	0
Multi Family	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	Existing	393	13.3%	15	$175	95%	25%	3.01	46,161
Multi Family	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	New	261	13.3%	15	$175	95%	25%	2.00	847
Multi Family	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	Existing	393	15.0%	30	$203	95%	10%	5.16	282,263

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	New	261	15.0%	30	$91	95%	0%	7.66	0
Multi Family	Central Heat Furnace	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	393	5.0%	2	$100	75%	95%	0.27	800,187
Multi Family	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	393	2.0%	5	$3	60%	95%	8.14	373,101
Multi Family	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	261	2.0%	5	$3	40%	95%	5.42	4,281
Multi Family	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	393	2.0%	30	$210	97%	65%	0.66	300,760
Multi Family	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	261	2.0%	30	$199	97%	85%	0.47	8,181
Multi Family	Central Heat Furnace	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	261	3.0%	25	$603	95%	95%	0.20	0
Multi Family	Central Heat Furnace	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-37	2*6Wall R-20	New	261	11.0%	25	$845	95%	95%	0.53	0
Multi Family	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	393	6.8%	15	$26	55%	85%	10.32	1,028,567
Multi Family	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	261	6.8%	15	$26	55%	0%	6.87	0
Multi Family	Central Heat Furnace	Windows	U = 0.35	U=0.4 (existing windows)	Existing	393	2.0%	25	$1,815	56%	75%	0.07	175,183
Multi Family	Central Heat Furnace	Windows	U = 0.35	U=0.65 (existing windows)	Existing	393	15.5%	25	$1,815	24%	75%	0.52	644,658
Multi Family	Central Heat Furnace	Windows	U=0.19	U=0.35	Existing	393	7.3%	25	$904	95%	75%	0.49	168,998

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Central Heat Furnace	Windows	U=0.19	U=0.35	New	261	18.4%	25	$1,057	95%	95%	0.70	12,886
Multi Family	Central Heat Furnace	Windows	U=0.30	U=0.35	Existing	393	1.9%	25	$171	85%	75%	0.67	248,591
Multi Family	Central Heat Furnace	Windows	U=0.30	U=0.35	New	261	2.4%	25	$200	85%	95%	0.48	8,309
Multi Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	19	8.0%	15	$320	45%	44%	0.05	3,785
Multi Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	19	8.0%	15	$320	45%	44%	0.05	108
Multi Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	19	23.0%	15	$290	85%	85%	0.15	39,410
Multi Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	19	23.0%	15	$290	85%	85%	0.15	1,127
Multi Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	36	15.0%	18	$55	NA	NA	1.13	3,499
Multi Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	36	15.0%	18	$55	NA	NA	1.13	338
Multi Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	35	23.0%	9	$200	99%	20%	0.25	7,867
Multi Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	34	23.0%	9	$200	99%	20%	0.24	208
Multi Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	Existing	118	4.8%	13	$77	NA	NA	0.64	0
Multi Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	New	118	4.8%	13	$77	NA	NA	0.64	0
Multi Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	Existing	118	26.3%	13	$1,154	NA	NA	0.23	122,128
Multi Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	New	118	26.3%	13	$1,154	NA	NA	0.23	30,842
Multi Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	118	5.2%	14	$92	68%	13%	0.61	8,345
Multi Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	115	5.2%	14	$92	68%	13%	0.60	570
Multi Family	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	118	9.9%	14	$735	25%	25%	0.15	16,680
Multi Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	118	12.9%	14	$227	85%	13%	0.61	11,006

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	115	12.9%	14	$227	85%	13%	0.60	751
Multi Family	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	EF = 0.46 Existing Dishwasher	Existing	118	4.1%	13	$174	15%	27%	0.24	4,449
Multi Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	118	2.2%	13	$489	35%	15%	0.05	2,980
Multi Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	115	2.2%	13	$489	35%	15%	0.04	203
Multi Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	118	3.5%	30	$600	95%	45%	0.12	29,296
Multi Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	115	3.5%	30	$600	95%	50%	0.12	2,469
Multi Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	118	7.2%	9	$1	95%	95%	19.75	87,689
Multi Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	115	7.4%	9	$1	95%	95%	19.75	6,142
Multi Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	118	3.0%	9	$1	55%	95%	9.98	20,904
Multi Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	115	3.1%	9	$1	55%	95%	9.98	1,464
Multi Family	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	118	3.4%	9	$1	10%	95%	16.73	8,687
Multi Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	118	30.0%	10	$239	90%	5%	1.00	28,366
Multi Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	115	30.0%	10	$239	90%	5%	0.98	2,090
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	118	1.2%	15	$7	62%	65%	1.92	10,010
Multi Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	115	1.2%	15	$7	67%	85%	1.88	1,044
Multi Family	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	Existing	118	4.8%	15	$67	95%	25%	0.83	1,167
Multi Family	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	New	115	4.8%	15	$67	95%	25%	0.81	86
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	118	12.4%	10	$5	85%	95%	20.40	268,049
Multi Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	115	12.7%	10	$5	65%	95%	20.40	14,358
Multi Family	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	118	8.2%	10	$12	33%	95%	5.61	68,326
Multi Family	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	Existing	118	24.4%	20	$1,527	99%	26%	0.24	16,992
Multi Family	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	New	115	24.4%	20	$1,409	99%	26%	0.25	1,160
Multi Family	Water Heat	Water Heater (Gas) Early Retirement	EF = 0.59	EF=0.54	Existing	118	8.5%	13	$718	10%	95%	0.12	21,610

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Multi Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	118	8.5%	9	$130	90%	5%	0.47	7,766
Multi Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	115	8.5%	9	$130	75%	5%	0.46	477
Multi Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	118	5.0%	18	$136	80%	80%	0.50	64,725
Multi Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	115	5.0%	18	$136	10%	80%	0.49	596
Multi Family	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	118	6.5%	10	$18	78%	0%	2.87	105
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	118	6.0%	5	$0	64%	95%	2,380.62	78,376
Multi Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	115	6.0%	5	$0	64%	95%	2,327.38	5,785
Single Family	Central Heat Boiler	Gas Boiler	AFUE=82%	AFUE=80%	Existing	834	2.4%	18	$650	NA	NA	0.37	0
Single Family	Central Heat Boiler	Gas Boiler	AFUE=82%	AFUE=80%	New	759	2.4%	18	$650	NA	NA	0.33	0
Single Family	Central Heat Boiler	Gas Boiler	AFUE=90%	AFUE=80%	Existing	834	11.1%	18	$2,283	NA	NA	0.48	0
Single Family	Central Heat Boiler	Gas Boiler	AFUE=90%	AFUE=80%	New	759	11.1%	18	$2,283	NA	NA	0.43	0
Single Family	Central Heat Boiler	Gas Boiler	AFUE=94%	AFUE=80%	Existing	834	14.9%	18	$3,183	NA	NA	0.46	339,669
Single Family	Central Heat Boiler	Gas Boiler	AFUE=94%	AFUE=80%	New	759	14.9%	18	$3,183	NA	NA	0.42	26,280
Single Family	Central Heat Boiler	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	858	3.3%	30	$75	55%	60%	6.60	75,496
Single Family	Central Heat Boiler	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	743	3.3%	30	$10	25%	75%	42.91	1,050
Single Family	Central Heat Boiler	Construction - ICF	Concrete Framing	Standard Wood Framing	New	743	44.0%	30	$10,717	95%	45%	0.54	0
Single Family	Central Heat Boiler	Construction - SIP	Specialty Framing	Standard Wood Framing	New	743	14.0%	30	$7,567	95%	45%	0.24	0
Single Family	Central Heat Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	858	2.0%	12	$80	55%	85%	1.77	53,925
Single Family	Central Heat Boiler	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	743	3.0%	12	$80	55%	85%	2.29	2,285
Single Family	Central Heat Boiler	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	858	1.3%	3	$69	45%	80%	0.33	24,198

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Boiler	Gas Boiler - Early Retirement	AFUE=80%	Existing Boiler	Existing	858	7.5%	20	$5,498	10%	95%	0.15	54,818
Single Family	Central Heat Boiler	Gas Boiler - Proper Sizing	Proper Sizing	Oversized Boiler	Existing	858	5.0%	18	$1	85%	39%	757.89	126,254
Single Family	Central Heat Boiler	Gas Boiler - Proper Sizing	Proper Sizing	Oversized Boiler	New	743	5.0%	18	$1	85%	39%	656.42	2,897
Single Family	Central Heat Boiler	Green Roof	ecoroof	Standard Roof	New	743	6.5%	40	$19,604	98%	0%	0.05	9
Single Family	Central Heat Boiler	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	858	10.0%	15	$406	75%	85%	2.12	393,277
Single Family	Central Heat Boiler	Insulation (Basement - Wall) 2*4	R-13	R-0	Existing	858	14.9%	25	$827	7%	14%	2.38	8,410
Single Family	Central Heat Boiler	Insulation (Basement - Wall) 2*4	R-13	R-7 (Average Existing Insulation Value)	Existing	858	6.9%	25	$827	63%	14%	1.10	33,795
Single Family	Central Heat Boiler	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	Existing	858	6.1%	25	$436	95%	14%	1.84	45,984
Single Family	Central Heat Boiler	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	New	743	6.1%	25	$438	95%	14%	1.59	1,260
Single Family	Central Heat Boiler	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	858	15.0%	25	$492	7%	87%	4.04	57,475
Single Family	Central Heat Boiler	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	858	10.5%	25	$492	59%	95%	2.83	382,296
Single Family	Central Heat Boiler	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	858	1.0%	25	$136	85%	87%	0.98	40,553
Single Family	Central Heat Boiler	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	743	2.0%	25	$137	85%	87%	1.68	2,350
Single Family	Central Heat Boiler	Insulation (Floor)	R-19 (state code)	R-0	Existing	858	6.0%	25	$719	4%	55%	1.11	7,386
Single Family	Central Heat Boiler	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	858	1.9%	25	$719	16%	55%	0.35	8,581
Single Family	Central Heat Boiler	Insulation (Floor)	R-30	R-19 (state code)	Existing	858	2.0%	25	$449	40%	55%	0.59	22,851
Single Family	Central Heat Boiler	Insulation (Floor)	R-30	R-19 (state code)	New	743	2.0%	25	$453	40%	55%	0.51	659

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Boiler	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	858	3.0%	25	$120	45%	60%	3.31	54,418
Single Family	Central Heat Boiler	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	743	3.0%	25	$121	45%	80%	2.86	1,735
Single Family	Central Heat Boiler	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	858	7.0%	25	$139	75%	60%	6.70	228,947
Single Family	Central Heat Boiler	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	743	7.0%	25	$139	75%	80%	5.79	7,141
Single Family	Central Heat Boiler	Insulation (Slab)	R-10 (state code)	R-0	Existing	858	4.3%	25	$808	60%	28%	0.71	37,789
Single Family	Central Heat Boiler	Insulation (Slab)	R-15	R-10 (state code)	Existing	858	1.4%	25	$196	87%	28%	0.97	19,006
Single Family	Central Heat Boiler	Insulation (Slab)	R-15	R-10 (state code)	New	743	1.4%	25	$197	64%	28%	0.83	386
Single Family	Central Heat Boiler	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	858	40.0%	25	$1,281	10%	75%	4.14	188,020
Single Family	Central Heat Boiler	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	858	17.7%	25	$1,584	90%	10%	1.48	72,351
Single Family	Central Heat Boiler	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	743	17.7%	25	$1,590	90%	10%	1.28	2,478
Single Family	Central Heat Boiler	Insulation (Wall) 2*6	R-20	R-0	Existing	858	45.0%	25	$2,089	50%	75%	2.86	112,452
Single Family	Central Heat Boiler	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	Existing	858	2.8%	25	$1,534	85%	95%	0.24	0
Single Family	Central Heat Boiler	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	New	743	2.8%	25	$1,540	85%	95%	0.21	0
Single Family	Central Heat Boiler	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	858	5.0%	2	$150	75%	95%	0.39	193,242
Single Family	Central Heat Boiler	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	858	2.0%	5	$7	60%	95%	8.89	83,812
Single Family	Central Heat Boiler	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	743	2.0%	5	$7	40%	95%	7.70	1,302
Single Family	Central Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	858	2.0%	30	$270	97%	65%	1.13	70,035

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	743	2.0%	30	$272	97%	85%	0.97	2,519
Single Family	Central Heat Boiler	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	743	3.0%	25	$2,820	95%	95%	0.12	0
Single Family	Central Heat Boiler	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-37	2*6Wall R-20	New	743	11.0%	25	$3,949	95%	95%	0.32	0
Single Family	Central Heat Boiler	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	858	6.8%	15	$26	37%	85%	22.55	160,665
Single Family	Central Heat Boiler	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	743	6.8%	15	$26	37%	0%	19.53	0
Single Family	Central Heat Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Existing	858	7.0%	12	$1,349	95%	65%	0.37	0
Single Family	Central Heat Boiler	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	New	743	7.0%	12	$1,349	95%	65%	0.32	0
Single Family	Central Heat Boiler	Windows	U = 0.35	U=0.4 (existing windows)	Existing	858	1.7%	25	$9,871	56%	75%	0.02	35,279
Single Family	Central Heat Boiler	Windows	U = 0.35	U=0.65 (existing windows)	Existing	858	13.0%	25	$9,871	24%	75%	0.17	119,179
Single Family	Central Heat Boiler	Windows	U=0.19	U=0.35	Existing	858	6.2%	25	$4,918	95%	75%	0.17	32,959
Single Family	Central Heat Boiler	Windows	U=0.19	U=0.35	New	743	18.4%	25	$4,941	95%	95%	0.43	3,717
Single Family	Central Heat Boiler	Windows	U=0.30	U=0.35	Existing	858	1.6%	25	$931	85%	75%	0.23	44,544
Single Family	Central Heat Boiler	Windows	U=0.30	U=0.35	New	743	2.4%	25	$935	85%	95%	0.29	2,397
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	Existing	678	2.5%	18	$200	NA	NA	1.00	0
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 80%	AFUE = 78%	New	584	2.5%	18	$200	NA	NA	0.86	0
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	Existing	678	13.3%	18	$750	NA	NA	1.42	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 90%	AFUE = 78%	New	584	13.3%	18	$750	NA	NA	1.22	0
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	Existing	678	18.7%	18	$1,050	NA	NA	1.42	17,048,523
Single Family	Central Heat Furnace	Gas Furnace	AFUE = 96%	AFUE = 78%	New	584	18.7%	18	$1,050	NA	NA	1.23	1,255,717
Single Family	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	Existing	709	10.0%	15	$942	95%	0%	0.76	0
Single Family	Central Heat Furnace	Air-to-Air Heat Exchangers	Air-to-Air Heat Exchangers	No Air to Air Heat Exchangers	New	563	10.0%	15	$942	95%	0%	0.60	0
Single Family	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	Existing	709	3.3%	30	$75	55%	60%	5.47	3,236,185
Single Family	Central Heat Furnace	Canned Lighting Air Tight Sealing	Canned Lighting Air Tight Sealing	No Air tight Sealing	New	563	3.3%	30	$10	25%	75%	32.53	40,831
Single Family	Central Heat Furnace	Construction - ICF	Concrete Framing	Standard Wood Framing	New	563	44.0%	30	$10,717	95%	45%	0.41	0
Single Family	Central Heat Furnace	Construction - SIP	Specialty Framing	Standard Wood Framing	New	563	14.0%	30	$7,567	95%	45%	0.19	0
Single Family	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	Existing	709	2.0%	12	$80	55%	85%	1.46	2,283,295
Single Family	Central Heat Furnace	Doors	R-5 (Composite Doors with foam core)	Standard non-thermal wood door (R-2)	New	563	3.0%	12	$80	55%	85%	1.74	87,558
Single Family	Central Heat Furnace	Doors - Weatherization	Weatherstripping And Adding Door Sweeps	Existing Non-Efficient door	Existing	709	1.3%	3	$69	45%	80%	0.27	998,751
Single Family	Central Heat Furnace	Duct Location	Conditioned Space Design - Duct Loss Is Not A Concern	Ducts in Unconditioned Space (Duct loss)	New	563	8.0%	30	$203	15%	85%	3.94	64,335

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	Existing	709	6.0%	20	$424	65%	60%	1.29	3,911,702
Single Family	Central Heat Furnace	Duct Sealing	Duct Sealing	No Duct Sealing	New	563	6.0%	20	$424	65%	0%	1.02	0
Single Family	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	No Duct Sealing	New	563	19.0%	25	$899	95%	10%	1.84	10,743
Single Family	Central Heat Furnace	Duct Sealing - Aerosol-Based	Spray-in ductwork sealant to minimize duct leaks	Older homes with AFUE HVAC, SEER 9	Existing	709	19.0%	25	$899	95%	50%	2.32	2,378,898
Single Family	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	Existing	709	10.0%	25	$6,149	90%	10%	0.18	1,888,850
Single Family	Central Heat Furnace	Duct: Increase duct sizes or add new ducts	Duct: Increase duct sizes or add new ducts = 16"	Standard duct - small < 12"	New	563	10.0%	25	$418	75%	30%	2.08	137,002
Single Family	Central Heat Furnace	Gas Furnace - Early Retirement	AFUE=78	Existing Furance	Existing	709	7.7%	20	$2,549	10%	95%	0.28	2,419,470
Single Family	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	Existing	709	5.0%	18	$1	85%	39%	457.93	5,432,116
Single Family	Central Heat Furnace	Gas Furnace - Proper Sizing	Proper Sizing	Oversized Furnace	New	563	5.0%	18	$1	85%	39%	363.09	112,605
Single Family	Central Heat Furnace	Green Roof	ecoroof	Standard Roof	New	563	6.5%	40	$19,604	98%	0%	0.04	340
Single Family	Central Heat Furnace	Infiltration Control (Caulk, Weather Strip, etc.) Blower-Door test	Install Caulking And Weatherstripping, perform blower-door test	Existing Infiltration Conditions	Existing	709	10.0%	15	$406	75%	85%	1.76	16,652,196
Single Family	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13	R-0	Existing	709	14.9%	25	$827	7%	14%	1.97	356,078
Single Family	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13	R-7 (Average Existing Insulation Value)	Existing	709	6.9%	25	$827	63%	14%	0.91	1,394,856

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	Existing	709	6.1%	25	$436	95%	14%	1.52	1,947,067
Single Family	Central Heat Furnace	Insulation (Basement - Wall) 2*4	R-13 + R-5 sheathing	R-13	New	563	6.1%	25	$438	95%	14%	1.20	47,110
Single Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-0	Existing	709	15.0%	25	$492	7%	87%	3.34	2,458,583
Single Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-38 (state code)	R-11 (Average Existing Insulation Level)	Existing	709	10.5%	25	$492	59%	95%	2.34	16,334,642
Single Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	Existing	709	1.0%	25	$136	85%	87%	0.81	1,614,195
Single Family	Central Heat Furnace	Insulation (Ceiling/Attic)	R-49	R-38 (state code)	New	563	2.0%	25	$137	85%	87%	1.27	87,871
Single Family	Central Heat Furnace	Insulation (Duct)	R-6	R-0	Existing	709	3.5%	25	$287	75%	12%	1.35	748,737
Single Family	Central Heat Furnace	Insulation (Duct)	R-8	R-0	Existing	709	4.3%	25	$316	95%	12%	1.47	1,162,666
Single Family	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-0	Existing	709	6.0%	25	$719	4%	55%	0.92	304,835
Single Family	Central Heat Furnace	Insulation (Floor)	R-19 (state code)	R-13 (Average Existing Insulation Level)	Existing	709	1.9%	25	$719	16%	55%	0.29	354,165
Single Family	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	Existing	709	2.0%	25	$449	40%	55%	0.49	943,147
Single Family	Central Heat Furnace	Insulation (Floor)	R-30	R-19 (state code)	New	563	2.0%	25	$453	40%	55%	0.38	24,632
Single Family	Central Heat Furnace	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	Existing	709	3.0%	25	$120	45%	60%	2.74	2,327,804

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Insulation (Rim And Band Joist)	R-10	No Rim And Band Joist Insulation	New	563	3.0%	25	$121	45%	80%	2.17	66,479
Single Family	Central Heat Furnace	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	Existing	709	7.0%	25	$139	75%	60%	5.55	9,814,020
Single Family	Central Heat Furnace	Insulation (Rim And Band Joist)	R-19	No Rim And Band Joist Insulation	New	563	7.0%	25	$139	75%	80%	4.39	276,523
Single Family	Central Heat Furnace	Insulation (Slab)	R-10 (state code)	R-0	Existing	709	4.3%	25	$808	60%	28%	0.58	1,559,743
Single Family	Central Heat Furnace	Insulation (Slab)	R-15	R-10 (state code)	Existing	709	1.4%	25	$196	87%	28%	0.80	756,517
Single Family	Central Heat Furnace	Insulation (Slab)	R-15	R-10 (state code)	New	563	1.4%	25	$197	64%	28%	0.63	14,416
Single Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 (state code)	R-0	Existing	709	43.0%	25	$1,281	10%	75%	3.68	8,664,136
Single Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	Existing	709	19.1%	25	$1,584	90%	10%	1.32	3,213,324
Single Family	Central Heat Furnace	Insulation (Wall) 2*4	R-13 + R5 Sheathing	R-13 (state code)	New	563	19.1%	25	$1,590	90%	10%	1.04	99,602
Single Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20	R-0	Existing	709	48.0%	25	$2,089	50%	75%	2.52	5,130,998
Single Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	Existing	709	2.8%	25	$1,534	85%	95%	0.20	0
Single Family	Central Heat Furnace	Insulation (Wall) 2*6	R-20 + R5 Sheathing	R-20	New	563	2.8%	25	$1,540	85%	95%	0.16	0
Single Family	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	Existing	709	13.3%	15	$175	95%	60%	5.45	1,191,826

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Integrated Space and Water Heating	Premium Efficiency AFUE = 90 - Condensing Furnace	Standard Efficiency AFUE = 78- Condensing Furnace	New	563	13.3%	15	$175	95%	60%	4.32	25,114
Single Family	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	Existing	709	15.0%	30	$271	95%	10%	7.00	890,473
Single Family	Central Heat Furnace	Leak Proof Duct Fittings	Quick connect fittings that do not require mastic or drawbands (6 per unit)	3-ton AC/furnace, 13 SEER	New	563	15.0%	30	$121	95%	0%	12.38	0
Single Family	Central Heat Furnace	O&M Tune-up	O&M Tune-up	No Tune-up	Existing	709	5.0%	2	$100	75%	95%	0.48	8,166,538
Single Family	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	Existing	709	2.0%	5	$7	60%	95%	7.36	3,616,709
Single Family	Central Heat Furnace	Outlet Gasket	Install Outlet Gasket (Reduce Air Leakage)	No Outlet Gasket	New	563	2.0%	5	$7	40%	95%	5.84	50,613
Single Family	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	Existing	709	2.0%	30	$270	97%	65%	0.94	2,787,688
Single Family	Central Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier	No Radiant Barrier	New	563	2.0%	30	$272	97%	85%	0.74	94,103
Single Family	Central Heat Furnace	Spray in insulation 2*4 Wall	2*4Wall - closed cell foam insulation R-23	2*4Wall R-13 (state code)	New	563	3.0%	25	$2,820	95%	95%	0.09	0
Single Family	Central Heat Furnace	Spray in insulation 2*6 Wall	2*6Wall - closed cell foam insulation R-37	2*6Wall R-20	New	563	11.0%	25	$3,949	95%	95%	0.24	0
Single Family	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	Existing	709	6.8%	15	$26	32%	85%	18.67	5,978,531
Single Family	Central Heat Furnace	Thermostat - Clock/Programmable	Programmable Thermostat	Manual Thermostat	New	563	6.8%	15	$26	32%	0%	14.81	0
Single Family	Central Heat Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	Existing	709	7.0%	12	$1,349	95%	65%	0.30	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Central Heat Furnace	Thermostat - Multi-Zone	Individual Room Temperature Control for Major Occupied Rooms	Programmable Thermostat - Central Control Only	New	563	7.0%	12	$1,349	95%	65%	0.24	0
Single Family	Central Heat Furnace	Windows	U = 0.35	U=0.4 (existing windows)	Existing	709	2.0%	25	$9,871	56%	75%	0.02	1,685,067
Single Family	Central Heat Furnace	Windows	U = 0.35	U=0.65 (existing windows)	Existing	709	15.5%	25	$9,871	24%	75%	0.17	5,802,735
Single Family	Central Heat Furnace	Windows	U=0.19	U=0.35	Existing	709	7.3%	25	$4,918	95%	75%	0.16	1,577,388
Single Family	Central Heat Furnace	Windows	U=0.19	U=0.35	New	563	18.4%	25	$4,941	95%	95%	0.32	138,831
Single Family	Central Heat Furnace	Windows	U=0.30	U=0.35	Existing	709	1.9%	25	$931	85%	75%	0.22	2,183,243
Single Family	Central Heat Furnace	Windows	U=0.30	U=0.35	New	563	2.4%	25	$935	85%	95%	0.22	89,525
Single Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	Existing	19	8.0%	15	$320	45%	44%	0.05	45,516
Single Family	Cooking Oven	Combination Ovens - High Efficiency	High Efficiency Combination Oven	Standard Combination Oven	New	19	8.0%	15	$320	45%	44%	0.05	1,301
Single Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	Existing	19	23.0%	15	$290	85%	85%	0.15	473,906
Single Family	Cooking Oven	Convection Oven	Convection Oven (wall oven)	Standard Oven (wall oven)	New	19	23.0%	15	$290	85%	85%	0.15	13,550
Single Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	Existing	36	15.0%	18	$55	NA	NA	1.13	118,858
Single Family	Dryer	Clothes Dryer With Moisture Sensor	High-Efficiency Clothes Dryer With Moisture Sensor	Standard Dryer Without Moisture Sensor	New	36	15.0%	18	$55	NA	NA	1.13	11,492
Single Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	Existing	35	23.0%	9	$200	99%	70%	0.25	935,252
Single Family	Dryer	Clothes Dryer Duct Heat Recovery	Clothes Dryer Duct Heat Recovery	No Heat Recovery	New	34	23.0%	9	$200	99%	70%	0.24	24,670
Single Family	Pool Heat	Pool Heaters	Energy Efficient Heaters - 88% efficiency	Standard Heaters - 83% efficiency	Existing	251	5.7%	8	$460	65%	85%	0.16	47,098

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Pool Heat	Pool Heaters	Energy Efficient Heaters - 88% efficiency	Standard Heaters - 83% efficiency	New	251	5.7%	8	$460	65%	85%	0.16	1,347
Single Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	Existing	190	4.8%	13	$77	NA	NA	1.03	0
Single Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.62	EF = 0.59	New	190	4.8%	13	$77	NA	NA	1.03	0
Single Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	Existing	190	26.3%	13	$1,154	NA	NA	0.37	3,672,393
Single Family	Water Heat	Water Heater (40 Gallon Gas)	EF=0.8	EF = 0.59	New	190	26.3%	13	$1,154	NA	NA	0.37	322,577
Single Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	Existing	190	5.2%	14	$92	68%	16%	0.99	327,896
Single Family	Water Heat	Clothes Washer	Energy Star MEF = 1.83 (top Load)	Standard Clothes Washer (1.66)	New	186	5.2%	14	$92	68%	18%	0.97	8,425
Single Family	Water Heat	Clothes Washer	Standard Clothes Washer (1.66)	Existing Clothes Washer (MEF = 1.26)	Existing	190	9.9%	14	$735	25%	35%	0.24	702,255
Single Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	Existing	190	12.9%	14	$227	77%	16%	0.99	391,763
Single Family	Water Heat	Clothes Washer	Tier 2. MEF = 2.07 (front load)	Standard Clothes Washer (1.66)	New	186	12.9%	14	$227	77%	18%	0.97	10,066
Single Family	Water Heat	Dishwasher	EF = 0.65 (ENERGY STAR)	EF = 0.46 Existing Dishwasher	Existing	190	4.1%	13	$174	15%	30%	0.38	148,645
Single Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	Existing	190	2.2%	13	$489	35%	16%	0.07	99,571
Single Family	Water Heat	Dishwasher	EF = 0.72	EF = 0.65 (ENERGY STAR)	New	186	2.2%	13	$489	35%	16%	0.07	2,388
Single Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	Existing	190	3.5%	30	$600	95%	45%	0.19	838,380
Single Family	Water Heat	Drain Water Heat Recovery	Drain Water Heat Recovery (GFX or Power-Pipe)	No Drain Water Heat Recovery	New	186	3.5%	30	$600	95%	50%	0.19	25,428
Single Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	Existing	190	6.8%	9	$1	95%	95%	19.75	2,462,079
Single Family	Water Heat	Faucet Aerators	0.5 GPM	2.2 GPM	New	186	6.9%	9	$1	95%	95%	19.75	60,590
Single Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	Existing	190	2.8%	9	$1	55%	95%	9.98	586,935
Single Family	Water Heat	Faucet Aerators	1.5 GPM	2.2 GPM	New	186	2.9%	9	$1	55%	95%	9.98	14,444
Single Family	Water Heat	Faucet Aerators	2.2 GPM	Existing Faucet Aerator (3.0 GPM)	Existing	190	3.2%	9	$1	10%	95%	16.73	243,921
Single Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	Existing	190	30.0%	10	$239	90%	5%	1.60	837,172
Single Family	Water Heat	Heat_Pump - Ground or Water-Source (Desuperheater)	Desuperheater	No Desupheater	New	186	30.0%	10	$239	90%	5%	1.57	22,093

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therm	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	Existing	190	1.2%	15	$7	38%	65%	3.09	180,737
Single Family	Water Heat	Hot Water Pipe Insulation	R-4 Wrap	No insulation	New	186	1.2%	15	$7	37%	85%	3.02	6,078
Single Family	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	Existing	190	4.8%	15	$67	95%	60%	1.33	248,059
Single Family	Water Heat	Integrated Space and Water Heating	High Efficiency Water Heater EF =0.62	Standard efficiency Water Heater EF = 0.59	New	186	4.8%	15	$67	95%	60%	1.30	6,546
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	Existing	190	15.4%	10	$5	85%	95%	20.40	10,034,788
Single Family	Water Heat	Low-Flow Showerheads	2.0 GPM	2.5 GPM	New	186	15.8%	10	$5	65%	95%	20.40	188,844
Single Family	Water Heat	Low-Flow Showerheads	2.5 GPM	Existing Showerhead 3.0 GPM	Existing	190	10.3%	10	$12	33%	95%	5.61	2,557,887
Single Family	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	Existing	190	24.4%	20	$1,527	97%	26%	0.38	0
Single Family	Water Heat	Tankless Water_Heater	EF = 0.78, 4.3 gpm	EF = 0.59	New	186	24.4%	20	$1,409	97%	26%	0.40	0
Single Family	Water Heat	Water Heater (Gas) Early Retirement	EF = 0.59	EF=0.54	Existing	190	8.5%	13	$718	10%	95%	0.19	649,847
Single Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	Existing	190	8.5%	9	$130	90%	40%	0.75	1,827,174
Single Family	Water Heat	Water Heater, Timer	Water Heater, Timer	No Water Heater, Timer	New	186	8.5%	9	$130	75%	40%	0.74	40,184
Single Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	Existing	190	5.0%	18	$136	80%	80%	0.80	1,852,301
Single Family	Water Heat	Water Heating, Heat Trap	Water Heating, Heat Trap	Water Heating, No Heat Trap	New	186	5.0%	18	$136	10%	80%	0.78	6,143
Single Family	Water Heat	Water_Heater Tank Blanket/Insulation	Install Insulation (R-5)	No Tank Insulation	Existing	190	6.5%	10	$18	63%	0%	4.61	2,497
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	Existing	190	6.0%	5	$0	43%	95%	3,824.57	1,532,175
Single Family	Water Heat	Water_Heater Thermostat Setback	120 degrees	135 degrees	New	186	6.0%	5	$0	43%	95%	3,739.03	40,466

Table D.3. Commercial Electric Measure Details

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooking	Convection Oven	Convection Oven	Standard Oven	Existing	7,226	0.6%	15	$44	40%	26%	0.84	4
Education	Cooking	Convection Oven	Convection Oven	Standard Oven	New	7,226	0.6%	15	$44	40%	26%	0.85	0
Education	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	Existing	7,226	0.1%	12	$28	70%	18%	0.25	1
Education	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	New	7,226	0.1%	12	$28	70%	18%	0.25	0
Education	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	Existing	7,226	1.3%	12	$40	21%	75%	1.60	13
Education	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	New	7,226	1.3%	12	$40	21%	75%	1.60	0
Education	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	Existing	7,226	1.4%	10	$56	75%	14%	1.07	9
Education	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	New	7,226	1.4%	10	$56	75%	14%	1.07	0
Education	Cooling Chillers	Centrifugal Chiller, 300 ton - High Efficiency	0.507 kW/ton	0.576 kW/ton	Existing	64,205	12.0%	20	$9,064	NA	NA	1.48	0
Education	Cooling Chillers	Centrifugal Chiller, 300 ton - High Efficiency	0.507 kW/ton	0.576 kW/ton	New	41,264	12.0%	20	$9,064	NA	NA	0.95	0
Education	Cooling Chillers	Centrifugal Chiller, VSD Control, 300 tons	0.461 kW/ton	0.576 kW/ton	Existing	64,205	17.5%	20	$18,216	NA	NA	1.08	898
Education	Cooling Chillers	Centrifugal Chiller, VSD Control, 300 tons	0.461 kW/ton	0.576 kW/ton	New	41,264	17.5%	20	$18,216	NA	NA	0.69	62
Education	Cooling Chillers	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	69,554	1.0%	10	$26,600	75%	1%	0.02	1
Education	Cooling Chillers	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	39,767	1.0%	10	$26,600	75%	1%	0.01	0
Education	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	69,554	10.0%	15	$10,000	94%	25%	0.96	389
Education	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	39,767	10.0%	15	$5,332	94%	25%	1.02	7
Education	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	Existing	69,554	1.3%	10	$6,812	95%	95%	0.12	128
Education	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	New	39,767	1.3%	10	$6,812	95%	95%	0.07	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for Secondary Chilled Water Loop	Primary Loop Only w/ Constant Speed Pump	Existing	69,554	7.6%	10	$41,944	70%	25%	0.12	148
Education	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for Secondary Chilled Water Loop	Primary Loop Only w/ Constant Speed Pump	New	39,767	7.6%	10	$41,944	70%	25%	0.07	2
Education	Cooling Chillers	Chilled Water Reset	Install Chilled Water Reset	No Chilled Water Reset	Existing	69,554	5.0%	10	$27,232	85%	95%	0.12	476
Education	Cooling Chillers	Chilled Water Reset	Install Chilled Water Reset	No Chilled Water Reset	New	39,767	5.0%	10	$27,232	85%	95%	0.07	7
Education	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	Existing	69,554	5.0%	10	$97,384	90%	45%	0.03	219
Education	Cooling Chillers	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	39,767	12.5%	3	$29,200	80%	90%	0.04	14
Education	Cooling Chillers	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	69,554	12.5%	3	$7,884	40%	90%	0.28	659
Education	Cooling Chillers	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	69,554	10.0%	20	$27,200	98%	65%	0.45	890
Education	Cooling Chillers	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	39,767	10.0%	20	$27,200	98%	65%	0.26	12
Education	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	Existing	69,554	8.0%	15	$4,148	94%	50%	1.84	669
Education	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	New	39,767	8.0%	15	$3,732	94%	50%	1.17	11
Education	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Two-Speed Tower Fans replace Single-Speed	Cooling Tower-One-Speed Fan Motor	Existing	69,554	14.0%	10	$464	35%	95%	19.70	601
Education	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Two-Speed Tower Fans replace Single-Speed	Cooling Tower-One-Speed Fan Motor	New	39,767	14.0%	10	$416	35%	95%	12.57	10
Education	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	Existing	69,554	4.0%	10	$3,752	75%	95%	0.70	138
Education	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	New	39,767	4.0%	10	$3,376	75%	95%	0.44	2
Education	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	69,554	15.0%	5	$12,504	34%	5%	0.38	19
Education	Cooling Chillers	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	69,554	10.0%	5	$7,000	80%	75%	0.45	962

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling Chillers	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	39,767	10.0%	5	$7,000	80%	75%	0.26	13
Education	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	69,554	15.0%	5	$5,052	80%	50%	0.93	514
Education	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	39,767	15.0%	5	$5,052	80%	50%	0.53	8
Education	Cooling Chillers	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	69,554	2.5%	18	$9,600	45%	45%	0.29	66
Education	Cooling Chillers	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	39,767	2.5%	18	$9,600	45%	45%	0.17	1
Education	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	69,554	4.5%	10	$5,448	85%	73%	0.54	419
Education	Cooling Chillers	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	39,767	4.5%	10	$5,448	85%	73%	0.31	6
Education	Cooling Chillers	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	69,554	10.0%	30	$405,200	98%	4%	0.04	36
Education	Cooling Chillers	Green Roof	Vegetation on Roof	Standard roofing techniques	New	39,767	10.0%	30	$405,200	98%	4%	0.02	0
Education	Cooling Chillers	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	69,554	5.0%	10	$724	10%	10%	4.51	9
Education	Cooling Chillers	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	69,554	2.0%	25	$26,000	45%	75%	0.11	37
Education	Cooling Chillers	Insulation (Ceiling)	R-38	R-20 (Code)	New	39,767	2.0%	25	$26,000	45%	75%	0.06	1
Education	Cooling Chillers	Insulation (Ceiling)	R-38	R-20 (Code)	New	39,767	2.0%	25	$26,000	45%	75%	0.06	1
Education	Cooling Chillers	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	69,554	2.0%	25	$32,800	85%	75%	0.09	69
Education	Cooling Chillers	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	69,554	5.0%	25	$2,640	35%	10%	2.73	31
Education	Cooling Chillers	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	39,767	3.0%	25	$4,240	95%	95%	0.58	7
Education	Cooling Chillers	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	69,554	0.5%	25	$10,800	35%	35%	0.07	7

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling Chillers	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	39,767	1.0%	25	$10,800	35%	35%	0.08	0
Education	Cooling Chillers	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	69,554	3.0%	25	$20,800	35%	35%	0.21	44
Education	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	39,767	10.0%	40	$40,000	61%	95%	0.28	11
Education	Cooling Chillers	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	39,767	0.9%	30	$14,180	90%	75%	0.06	1
Education	Cooling Chillers	Pipe Insulation	R-4	R-0	Existing	69,554	1.0%	15	$820	45%	65%	1.16	49
Education	Cooling Chillers	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	39,767	15.0%	20	$16,748	80%	90%	0.62	30
Education	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	69,554	25.0%	10	$84,400	98%	25%	0.19	798
Education	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	New	39,767	25.0%	10	$84,400	98%	25%	0.11	11
Education	Cooling Chillers	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	69,554	3.0%	15	$140	1%	1%	20.47	0
Education	Cooling Chillers	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	39,767	3.0%	15	$140	1%	1%	11.70	0
Education	Cooling Chillers	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	69,554	30.0%	10	$121,600	70%	15%	0.16	385
Education	Cooling Chillers	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	39,767	8.5%	30	$13,020	75%	75%	0.61	11
Education	Cooling Chillers	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	69,554	12.9%	25	$192,964	98%	15%	0.10	105
Education	Cooling Chillers	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	39,767	12.9%	25	$192,964	98%	80%	0.06	7
Education	Cooling Chillers	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	69,554	1.1%	40	$57,828	60%	80%	0.04	28
Education	Cooling Chillers	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	39,767	8.1%	40	$57,828	60%	80%	0.15	3
Education	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	58,700	10.4%	15	$29,868	NA	NA	0.28	2,485

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	49,126	10.4%	15	$23,892	NA	NA	0.29	176
Education	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	58,700	2.6%	15	$8,356	NA	NA	0.25	0
Education	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	49,126	2.6%	15	$6,684	NA	NA	0.26	0
Education	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	58,700	6.7%	15	$16,532	NA	NA	0.33	0
Education	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	49,126	6.7%	15	$13,228	NA	NA	0.34	0
Education	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	65,700	15.0%	15	$32,428	99%	2%	0.42	8
Education	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	47,481	15.0%	15	$25,940	99%	70%	0.38	6
Education	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	65,700	3.0%	15	$176	3%	44%	15.38	23
Education	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	47,481	3.0%	15	$144	50%	44%	13.58	8
Education	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	65,700	1.0%	10	$26,600	75%	1%	0.02	4
Education	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	47,481	1.0%	10	$26,600	75%	1%	0.02	0
Education	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	65,700	10.0%	15	$10,000	94%	25%	0.90	1,172
Education	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	47,481	10.0%	15	$5,332	94%	25%	1.22	27
Education	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	47,481	12.5%	3	$29,200	80%	90%	0.05	59
Education	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	65,700	12.5%	3	$7,884	40%	90%	0.27	2,046
Education	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	65,700	10.0%	20	$27,200	98%	65%	0.42	2,766
Education	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	47,481	10.0%	20	$27,200	98%	65%	0.31	49
Education	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	65,700	15.0%	15	$30,240	60%	10%	0.45	413
Education	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	65,700	10.0%	3	$8,532	95%	95%	0.20	3,669

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	65,700	25.0%	15	$83,352	85%	50%	0.27	3,930
Education	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	47,481	25.0%	15	$83,352	85%	50%	0.20	80
Education	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	65,700	15.0%	5	$12,504	34%	5%	0.35	29
Education	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	65,700	10.0%	5	$7,000	80%	75%	0.42	1,461
Education	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	47,481	10.0%	5	$7,000	80%	75%	0.31	27
Education	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	65,700	15.0%	5	$5,052	80%	50%	0.88	760
Education	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	47,481	15.0%	5	$5,052	80%	50%	0.63	17
Education	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	65,700	2.5%	18	$9,600	45%	45%	0.27	167
Education	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	47,481	2.5%	18	$9,600	45%	45%	0.20	3
Education	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	65,700	4.5%	10	$5,448	85%	73%	0.51	1,314
Education	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	47,481	4.5%	10	$5,448	85%	73%	0.37	24
Education	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	65,700	10.0%	30	$405,200	98%	4%	0.04	106
Education	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	47,481	10.0%	30	$405,200	98%	4%	0.03	2
Education	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	65,700	5.0%	10	$724	10%	10%	4.26	25
Education	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	65,700	2.0%	25	$26,000	45%	75%	0.10	105
Education	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	47,481	2.0%	25	$26,000	45%	75%	0.08	2
Education	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	65,700	3.0%	25	$32,800	85%	75%	0.12	301
Education	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	47,481	3.0%	25	$32,800	85%	75%	0.09	6
Education	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	65,700	2.4%	25	$24,400	13%	75%	0.13	74
Education	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	65,700	3.0%	25	$4,036	15%	10%	1.01	11

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	65,700	4.4%	25	$6,460	15%	10%	0.93	16
Education	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	47,481	3.3%	25	$1,804	15%	10%	1.80	0
Education	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	65,700	5.0%	25	$2,640	35%	10%	2.58	89
Education	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	47,481	3.0%	25	$4,240	95%	95%	0.70	26
Education	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	65,700	1.0%	25	$10,800	35%	35%	0.13	39
Education	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	47,481	1.0%	25	$10,800	35%	35%	0.09	1
Education	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	65,700	3.0%	25	$20,800	35%	35%	0.20	117
Education	Cooling DX	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	47,481	10.0%	40	$40,000	61%	95%	0.33	46
Education	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	65,700	15.4%	15	$5,760	50%	0%	2.42	3
Education	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	47,481	5.7%	15	$12,972	85%	0%	0.29	0
Education	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	65,700	20.3%	15	$21,972	85%	0%	0.83	8
Education	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	65,700	15.1%	15	$196,908	25%	0%	0.07	2
Education	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	65,700	10.5%	15	$3,628	50%	0%	2.61	2
Education	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	47,481	0.9%	30	$14,180	90%	75%	0.07	3
Education	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	47,481	15.0%	20	$16,748	80%	90%	0.74	118
Education	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	65,700	16.4%	10	$80,852	5%	2%	0.12	3
Education	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	65,700	1.8%	10	$16,852	25%	2%	0.07	2
Education	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	47,481	1.8%	10	$13,484	25%	2%	0.06	0
Education	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	65,700	7.6%	10	$38,400	50%	2%	0.12	13
Education	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	47,481	7.6%	10	$30,720	50%	2%	0.11	0
Education	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	65,700	3.0%	5	$5,628	20%	20%	0.16	2
Education	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	47,481	3.0%	5	$4,504	20%	20%	0.14	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	65,700	3.0%	15	$140	73%	95%	19.33	530
Education	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	47,481	3.0%	15	$140	73%	95%	13.97	12
Education	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	65,700	30.0%	10	$121,600	70%	15%	0.15	1,032
Education	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	47,481	8.5%	30	$13,020	75%	75%	0.73	45
Education	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	65,700	12.9%	25	$192,964	98%	15%	0.09	296
Education	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	47,481	12.9%	25	$192,964	98%	80%	0.07	30
Education	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	65,700	8.1%	40	$57,828	60%	15%	0.26	120
Education	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	47,481	8.1%	40	$57,828	60%	80%	0.19	13
Education	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	63,837	20.0%	10	$8,172	85%	10%	1.06	334
Education	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	18,987	20.0%	10	$8,172	85%	10%	0.31	3
Education	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	63,837	0.3%	18	$2,592	85%	60%	0.10	280
Education	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	18,987	0.5%	18	$2,592	85%	60%	0.04	4
Education	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	63,837	7.0%	20	$8,116	75%	85%	0.70	5,236
Education	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	18,987	7.0%	20	$8,116	75%	85%	0.21	51
Education	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	63,837	0.9%	10	$296	81%	85%	1.31	976
Education	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	18,987	0.9%	10	$296	81%	85%	0.39	10
Education	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	63,837	5.3%	20	$5,404	75%	85%	0.79	1,327
Education	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	18,987	5.3%	20	$5,404	75%	85%	0.24	13
Education	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	63,837	8.8%	10	$14,608	77%	50%	0.26	628

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	18,987	8.8%	10	$14,608	77%	65%	0.08	8
Education	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	63,837	7.0%	5	$8,000	65%	4%	0.18	147
Education	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	18,987	7.0%	5	$8,000	65%	4%	0.05	1
Education	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	63,837	7.0%	5	$8,000	65%	90%	0.18	3,313
Education	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	18,987	7.0%	5	$8,000	65%	90%	0.05	32
Education	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	63,837	12.0%	10	$121,600	70%	15%	0.04	1,884
Education	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	200,562	2.7%	9	$13,544	75%	50%	0.22	5,249
Education	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	129,731	2.7%	9	$13,544	75%	50%	0.14	111
Education	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	200,562	15.0%	9	$16,000	81%	20%	1.01	2,092
Education	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	129,731	15.0%	9	$16,000	81%	20%	0.65	53
Education	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	200,562	11.3%	9	$12,000	100%	75%	1.01	7,390
Education	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	129,731	13.5%	13	$12,000	99%	75%	1.12	224
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.2	Existing	200,562	15.0%	14	$6,072	70%	90%	3.62	10,904
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.2	New	129,731	15.0%	14	$3,600	70%	90%	3.95	231
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.2	Existing	200,562	20.0%	14	$15,312	85%	75%	1.84	14,123
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.2	New	129,731	20.0%	14	$12,000	85%	75%	1.52	299
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.2	Existing	200,562	25.0%	14	$24,288	90%	70%	1.39	16,719
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.2	New	129,731	25.0%	14	$20,160	90%	70%	1.08	354
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.2	Existing	200,562	5.3%	14	$19,272	95%	65%	0.34	3,142

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.2	New	129,731	5.3%	14	$15,600	95%	65%	0.27	67
Education	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.2	Existing Lighting Design	Existing	200,562	36.0%	14	$37,312	40%	95%	1.50	67,182
Education	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	Existing	200,562	14.6%	20	$7,500	90%	50%	4.16	32,567
Education	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	New	129,731	14.6%	20	$5,832	90%	60%	3.46	828
Education	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	200,562	1.4%	11	$640	65%	95%	3.06	2,195
Education	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	200,562	1.8%	11	$640	65%	95%	3.90	2,793
Education	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	200,562	7.0%	5	$10,800	85%	90%	0.36	17,524
Education	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	200,562	4.0%	9	$748	65%	90%	5.52	3,962
Education	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	129,731	4.0%	10	$748	65%	90%	3.96	135
Education	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	200,562	0.8%	13	$2,520	100%	65%	0.48	2,660
Education	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	200,562	4.9%	9	$968	95%	85%	5.42	5,087
Education	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	129,762	0.1%	7	$32	90%	20%	1.58	53
Education	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	129,762	0.1%	7	$32	90%	20%	1.58	2
Education	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	129,762	10.9%	4	$20	25%	64%	170.93	4,652
Education	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	129,762	10.6%	4	$20	25%	64%	166.89	149
Education	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	129,762	0.9%	6	$156	45%	90%	2.75	1,186
Education	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	129,762	0.9%	6	$156	45%	90%	2.75	39
Education	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	129,762	0.1%	4	$1	45%	90%	41.21	177
Education	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	129,762	0.1%	4	$1	45%	90%	41.21	6
Education	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	129,762	3.0%	4	$3,000	15%	64%	0.32	776
Education	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	129,762	3.0%	4	$3,000	15%	64%	0.32	25

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	129,762	0.1%	5	$16	40%	75%	3.13	125
Education	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	129,762	0.1%	5	$16	40%	75%	3.13	4
Education	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	129,762	0.1%	4	$1	45%	90%	17.39	75
Education	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	129,762	0.1%	4	$1	45%	90%	17.39	2
Education	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	129,762	0.3%	10	$1	75%	10%	233.33	71
Education	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	129,762	0.3%	10	$1	75%	10%	233.33	2
Education	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	129,762	1.8%	5	$336	30%	95%	0.08	334
Education	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	129,762	1.8%	5	$336	30%	95%	0.08	11
Education	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	Existing	129,762	5.4%	10	$148	25%	5%	30.27	226
Education	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	New	129,762	5.4%	10	$148	25%	5%	30.27	7
Education	Plug Load	Pool Pumps - VSD			Existing	129,762	3.4%	20	$3,380	50%	5%	1.57	286
Education	Plug Load	Pool Pumps - VSD			New	129,762	3.4%	20	$3,380	50%	5%	1.57	9
Education	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	129,762	0.1%	13	$120	65%	40%	0.55	55
Education	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	129,762	0.1%	13	$120	65%	40%	0.55	2
Education	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	129,762	0.7%	7	$552	35%	25%	0.76	216
Education	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	129,762	1.4%	14	$160	80%	75%	9.69	2,725
Education	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	129,762	1.4%	14	$160	80%	75%	9.69	89
Education	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	129,762	0.9%	3	$284	25%	75%	0.74	572
Education	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	Existing	20,071	6.2%	10	$348	100%	67%	2.24	2,139
Education	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	New	20,071	6.2%	10	$348	100%	67%	2.24	70

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	Existing	20,071	1.3%	10	$72	68%	5%	2.26	23
Education	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	New	20,071	1.3%	10	$72	68%	5%	2.26	1
Education	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Existing	20,071	0.7%	15	$1,136	65%	90%	0.12	95
Education	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	New	20,071	0.7%	15	$1,140	65%	90%	0.12	3
Education	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	Existing	20,071	1.8%	15	$360	75%	15%	0.92	52
Education	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	New	20,071	1.8%	15	$60	75%	15%	5.50	2
Education	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Existing	20,071	8.4%	10	$1,152	72%	15%	0.91	205
Education	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	New	20,071	8.4%	10	$1,156	72%	15%	0.91	7
Education	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	Existing	20,071	1.0%	15	$148	75%	92%	1.19	150
Education	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	New	20,071	1.0%	15	$148	75%	92%	1.19	5
Education	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	Existing	20,071	1.8%	10	$116	86%	85%	1.94	677
Education	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	New	20,071	1.8%	10	$116	86%	85%	1.94	22
Education	Refrigeration	Parallel Unequal Compressor	Multiple Compressors in Parallel	Parallel Equal Compressors (2)	Existing	20,071	8.4%	15	$1,000	90%	35%	1.54	1,230
Education	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	Existing	20,071	6.0%	10	$52	70%	40%	14.44	395
Education	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	New	20,071	6.0%	10	$52	70%	40%	14.44	13
Education	Refrigeration	Refrigeration - Retro Commissioning	Refrigeration Retro Commissioning (Refrigeration System Diagnostics / Operations And Maintenance)	No Re-commissioning	Existing	20,071	6.7%	3	$208	90%	10%	1.11	141
Education	Refrigeration	Refrigeration - Commissioning	Commissioning (Refrigeration System Diagnostics / Operations and Maintenance for a new unit)	No Commissioning	New	20,071	3.8%	3	$80	90%	5%	1.62	3
Education	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	20,071	1.2%	10	$156	95%	75%	0.92	424
Education	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	20,071	1.2%	10	$160	95%	75%	0.90	14

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	20,071	3.2%	16	$216	77%	95%	2.87	1,203
Education	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	20,071	3.2%	16	$216	77%	95%	2.87	39
Education	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	Existing	20,071	2.0%	4	$180	20%	95%	0.52	197
Education	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	New	20,071	2.0%	4	$180	20%	95%	0.52	6
Education	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	417,952	10.0%	15	$10,000	94%	25%	3.41	3,005
Education	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	417,952	12.5%	3	$7,884	40%	90%	1.02	5,159
Education	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	417,952	15.0%	5	$12,504	34%	5%	1.35	133
Education	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	417,952	10.0%	5	$7,000	80%	75%	1.61	6,740
Education	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	417,952	15.0%	5	$5,052	80%	50%	3.35	3,549
Education	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	502,225	15.0%	5	$5,052	80%	50%	4.02	128
Education	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	417,952	2.5%	18	$9,600	45%	45%	1.04	550
Education	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	417,952	15.0%	10	$36,280	94%	5%	0.96	772
Education	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	417,952	4.5%	10	$5,448	85%	73%	1.92	3,285
Education	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	417,952	10.0%	10	$724	10%	10%	32.16	132
Education	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	417,952	2.0%	25	$26,000	45%	75%	0.40	339
Education	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	502,225	2.0%	25	$26,000	45%	75%	0.48	14
Education	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	502,225	3.0%	25	$32,800	85%	75%	0.58	40
Education	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	417,952	2.4%	25	$24,400	15%	75%	0.51	272
Education	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	417,952	3.0%	25	$4,036	15%	10%	3.89	28

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	417,952	4.4%	25	$6,460	15%	10%	3.56	41
Education	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	417,952	12.5%	25	$2,640	35%	10%	24.78	578
Education	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	502,225	6.0%	25	$4,240	95%	95%	8.90	272
Education	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	417,952	1.0%	25	$10,800	35%	35%	0.48	123
Education	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	417,952	3.0%	25	$20,800	35%	35%	0.75	372
Education	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	502,225	10.0%	40	$40,000	61%	95%	2.16	268
Education	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	502,225	0.6%	30	$14,180	90%	75%	0.29	14
Education	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	502,225	5.0%	20	$16,748	80%	90%	1.57	157
Education	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	502,225	5.3%	10	$18,560	95%	75%	0.79	195
Education	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	417,952	3.0%	5	$5,628	20%	20%	0.60	6
Education	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	502,225	3.0%	5	$4,504	20%	20%	0.90	0
Education	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	417,952	25.0%	10	$84,400	98%	25%	0.69	6,625
Education	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	417,952	3.0%	15	$140	73%	95%	73.14	274
Education	Space Heat	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	417,952	13.0%	10	$121,600	70%	15%	0.25	1,353
Education	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	417,952	12.9%	25	$192,964	98%	15%	0.35	951
Education	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	502,225	12.9%	25	$192,964	98%	80%	0.42	420
Education	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	417,952	8.1%	40	$57,828	60%	15%	1.00	369
Education	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	20,039	3.3%	20	$892	NA	NA	0.83	817
Education	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	20,060	3.3%	20	$892	NA	NA	0.83	88
Education	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	20,971	2.6%	9	$128	80%	27%	2.28	109

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Education	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	20,971	5.0%	15	$11,112	94%	55%	0.08	439
Education	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	20,971	2.1%	10	$2,572	95%	60%	0.10	23
Education	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	20,971	0.3%	13	$600	25%	35%	0.09	3
Education	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	20,971	0.1%	13	$28	25%	35%	0.85	1
Education	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	20,971	10.0%	25	$1,668	92%	5%	1.67	79
Education	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	20,971	3.2%	10	$8	25%	95%	49.44	145
Education	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	20,971	4.5%	10	$28	15%	95%	19.98	123
Education	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	20,971	50.0%	15	$13,124	94%	19%	0.69	118
Education	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	20,971	1.0%	15	$72	8%	80%	2.52	11
Education	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	20,971	0.5%	5	$12	35%	90%	2.37	28
Education	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	20,971	3.4%	10	$44	75%	45%	9.53	219
Education	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	20,971	7.5%	10	$84	20%	45%	11.10	130
Education	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	20,971	3.5%	20	$24,648	95%	20%	0.03	13
Education	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	20,971	4.0%	10	$520	35%	15%	0.96	36
Education	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	20,971	7.7%	11	$820	15%	75%	1.28	149
Education	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	20,971	61.7%	15	$12,276	94%	2%	0.91	8
Education	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	20,053	61.7%	15	$12,276	94%	21%	0.87	2
Education	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	20,971	8.5%	20	$1,040	75%	85%	1.90	1,041
Education	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	20,053	8.5%	20	$1,040	45%	10%	1.82	2
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	13,088	10.4%	15	$2,800	NA	NA	0.61	1,438

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	9,258	10.4%	15	$2,240	NA	NA	0.54	86
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	13,088	2.6%	15	$784	NA	NA	0.55	0
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	9,258	2.6%	15	$627	NA	NA	0.49	0
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	13,088	6.7%	15	$1,550	NA	NA	0.71	0
Grocery	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	9,258	6.7%	15	$1,240	NA	NA	0.63	0
Grocery	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	13,406	15.0%	15	$3,040	99%	2%	0.83	4
Grocery	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	8,948	15.0%	15	$2,432	99%	70%	0.70	3
Grocery	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	13,406	3.0%	15	$17	3%	44%	30.72	12
Grocery	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	8,948	3.0%	15	$14	50%	44%	25.06	4
Grocery	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	13,406	1.0%	10	$3,325	75%	1%	0.03	2
Grocery	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	8,948	1.0%	10	$3,325	75%	1%	0.02	0
Grocery	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	8,948	12.5%	3	$3,650	80%	90%	0.07	34
Grocery	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	13,406	12.5%	3	$986	40%	90%	0.39	1,150
Grocery	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	13,406	10.0%	20	$3,400	98%	95%	0.63	2,068
Grocery	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	8,948	10.0%	20	$3,400	98%	95%	0.42	40
Grocery	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	13,406	15.0%	15	$2,835	90%	10%	0.89	367
Grocery	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	13,406	10.0%	3	$800	95%	95%	0.39	2,203
Grocery	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	13,406	25.0%	15	$10,419	85%	50%	0.41	2,140
Grocery	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	8,948	25.0%	15	$10,419	85%	50%	0.27	45

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	13,406	15.0%	5	$1,563	61%	75%	0.53	445
Grocery	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	13,406	10.0%	5	$875	80%	75%	0.63	804
Grocery	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	8,948	10.0%	5	$875	80%	75%	0.42	15
Grocery	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	13,406	15.0%	5	$632	80%	50%	1.30	415
Grocery	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	8,948	15.0%	5	$632	80%	50%	0.87	8
Grocery	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	13,406	2.5%	18	$1,200	45%	45%	0.41	91
Grocery	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	8,948	2.5%	18	$1,200	45%	45%	0.27	2
Grocery	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	13,406	4.5%	10	$5,450	85%	64%	0.10	429
Grocery	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	8,948	4.5%	10	$5,450	85%	64%	0.06	8
Grocery	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	13,406	10.0%	30	$50,650	98%	4%	0.06	58
Grocery	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	8,948	10.0%	30	$50,650	98%	4%	0.04	1
Grocery	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	13,406	5.0%	10	$69	10%	10%	8.42	14
Grocery	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	13,406	2.0%	25	$3,250	45%	75%	0.16	59
Grocery	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	8,948	2.0%	25	$3,250	45%	75%	0.10	1
Grocery	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	13,406	3.0%	25	$4,100	85%	75%	0.19	170
Grocery	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	8,948	3.0%	25	$4,100	85%	75%	0.12	3
Grocery	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	13,406	2.4%	25	$3,050	10%	75%	0.20	32
Grocery	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	13,406	3.0%	25	$505	15%	10%	1.51	6
Grocery	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	13,406	4.4%	25	$808	15%	10%	1.39	9
Grocery	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	8,948	3.3%	25	$226	15%	10%	2.49	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	13,406	5.0%	25	$934	35%	10%	1.36	48
Grocery	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	8,948	3.0%	25	$1,499	95%	95%	0.34	12
Grocery	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	13,406	1.0%	25	$1,350	45%	35%	0.19	28
Grocery	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	8,948	1.0%	25	$1,350	45%	35%	0.13	1
Grocery	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	13,406	3.0%	25	$2,600	45%	35%	0.29	85
Grocery	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	13,406	15.4%	15	$540	50%	0%	4.83	2
Grocery	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	8,948	5.7%	15	$1,216	85%	0%	0.53	0
Grocery	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	13,406	20.3%	15	$2,060	85%	0%	1.66	4
Grocery	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	13,406	15.1%	15	$18,460	25%	0%	0.14	1
Grocery	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	13,406	10.5%	15	$340	50%	0%	5.22	1
Grocery	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	8,948	0.0%	30	$1,773	90%	75%	0.00	0
Grocery	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	8,948	15.0%	20	$2,094	80%	90%	1.03	59
Grocery	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	13,406	16.4%	10	$7,580	5%	2%	0.25	2
Grocery	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	13,406	1.8%	10	$1,580	25%	2%	0.13	1
Grocery	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	8,948	1.8%	10	$1,264	25%	2%	0.11	0
Grocery	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	13,406	7.6%	10	$3,600	50%	2%	0.24	7
Grocery	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	8,948	7.6%	10	$2,880	50%	2%	0.20	0
Grocery	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	13,406	3.0%	5	$528	20%	20%	0.31	1
Grocery	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	8,948	3.0%	5	$422	20%	20%	0.26	0
Grocery	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	13,406	3.0%	15	$139	46%	95%	3.66	183
Grocery	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	8,948	3.0%	15	$139	46%	95%	2.44	4
Grocery	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	8,948	0.5%	30	$1,403	75%	75%	0.07	1
Grocery	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	13,406	4.3%	25	$18,193	98%	15%	0.06	54

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	8,948	4.3%	25	$18,193	98%	80%	0.04	6
Grocery	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	13,406	2.7%	40	$5,453	85%	15%	0.17	30
Grocery	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	8,948	2.7%	40	$5,453	85%	80%	0.11	3
Grocery	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	10,626	20.0%	10	$1,022	85%	5%	1.33	49
Grocery	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	4,444	20.0%	10	$1,022	85%	5%	0.56	1
Grocery	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	10,626	1.8%	18	$2,304	65%	60%	0.09	326
Grocery	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	4,444	2.6%	18	$2,304	65%	60%	0.06	7
Grocery	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	10,626	7.0%	20	$1,015	75%	85%	0.88	1,527
Grocery	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	4,444	7.0%	20	$1,015	75%	85%	0.37	21
Grocery	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	10,626	0.9%	10	$37	81%	85%	1.65	285
Grocery	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	4,444	0.9%	10	$37	81%	85%	0.69	4
Grocery	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	10,626	5.3%	20	$676	75%	85%	1.00	387
Grocery	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	4,444	5.3%	20	$676	75%	85%	0.42	5
Grocery	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	10,626	8.8%	10	$1,826	77%	10%	0.33	37
Grocery	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	4,444	8.8%	10	$1,826	77%	20%	0.14	1
Grocery	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	10,626	7.0%	5	$1,000	65%	4%	0.23	43
Grocery	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	4,444	7.0%	5	$1,000	65%	4%	0.10	1
Grocery	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	10,626	7.0%	5	$1,000	65%	90%	0.23	970

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	4,444	7.0%	5	$1,000	65%	90%	0.10	13
Grocery	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	55,135	2.7%	9	$847	75%	75%	1.08	3,745
Grocery	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	55,135	2.7%	9	$847	75%	75%	1.08	123
Grocery	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	55,135	6.0%	9	$5,000	96%	30%	0.41	468
Grocery	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	55,135	6.0%	9	$5,000	96%	30%	0.41	22
Grocery	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	55,135	4.5%	9	$3,750	100%	75%	0.41	909
Grocery	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	55,135	11.3%	13	$3,750	99%	75%	1.45	107
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	55,135	15.0%	14	$1,221	70%	90%	5.67	5,187
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.5	New	55,135	15.0%	14	$810	70%	90%	8.54	170
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	55,135	20.0%	14	$2,706	85%	75%	3.27	6,719
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.5	New	55,135	20.0%	14	$2,160	85%	75%	4.10	220
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	55,135	25.0%	14	$4,224	90%	70%	2.51	7,954
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.5	New	55,135	25.0%	14	$3,540	90%	70%	3.00	261
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.5	Existing	55,135	31.5%	14	$1,749	95%	65%	6.98	8,969
Grocery	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.5	New	55,135	31.5%	14	$1,290	95%	65%	9.46	294
Grocery	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.5	Existing Lighting Design	Existing	55,135	35.0%	14	$5,830	40%	95%	2.95	31,073
Grocery	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	55,135	1.4%	11	$80	65%	95%	7.71	1,044

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	55,135	1.8%	11	$80	65%	95%	9.81	1,329
Grocery	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	Existing	55,135	29.7%	13	$22,349	80%	95%	0.64	55,575
Grocery	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	New	55,135	29.9%	13	$22,474	80%	95%	0.64	1,831
Grocery	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	55,135	7.0%	5	$1,350	85%	90%	0.90	5,865
Grocery	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	55,135	4.0%	9	$94	90%	45%	13.89	891
Grocery	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	55,135	4.0%	10	$94	90%	45%	15.43	53
Grocery	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	55,135	5.1%	13	$2,520	90%	65%	0.97	7,289
Grocery	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	55,135	4.9%	9	$757	81%	85%	2.18	2,071
Grocery	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	11,899	0.1%	7	$3	90%	20%	1.54	8
Grocery	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	11,899	0.1%	7	$3	90%	20%	1.54	0
Grocery	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	11,899	2.7%	4	$1	25%	64%	78.82	186
Grocery	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	11,899	2.7%	4	$1	25%	64%	76.84	6
Grocery	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	11,899	9.4%	6	$157	45%	35%	2.68	784
Grocery	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	11,899	9.4%	6	$157	45%	35%	2.68	26
Grocery	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	11,899	1.4%	4	$1	45%	35%	40.47	117
Grocery	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	11,899	1.4%	4	$1	45%	35%	40.47	4
Grocery	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	11,899	1.6%	4	$150	15%	64%	0.31	66
Grocery	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	11,899	1.6%	4	$150	15%	64%	0.31	2
Grocery	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	11,899	0.1%	5	$15	40%	75%	0.31	20
Grocery	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	11,899	0.1%	5	$15	40%	75%	0.31	1
Grocery	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	11,899	0.6%	4	$1	45%	35%	17.08	49
Grocery	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	11,899	0.6%	4	$1	45%	35%	17.08	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	11,899	3.0%	10	$1	75%	15%	229.17	180
Grocery	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	11,899	3.0%	10	$1	75%	15%	229.17	6
Grocery	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	11,899	1.8%	5	$42	30%	95%	0.65	53
Grocery	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	11,899	1.8%	5	$42	30%	95%	0.65	2
Grocery	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	11,899	0.7%	13	$120	65%	3%	0.55	6
Grocery	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	11,899	0.7%	13	$120	65%	3%	0.55	0
Grocery	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	11,899	7.9%	7	$550	35%	25%	0.77	367
Grocery	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	11,899	14.5%	14	$158	80%	75%	9.64	4,632
Grocery	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	11,899	14.5%	14	$158	80%	75%	9.64	152
Grocery	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	11,899	9.8%	3	$284	25%	75%	0.73	972
Grocery	Refrigeration	Air-cooled multiplex system w/extensive refrigeration equipment maintenance, normal setpoints	Normal setpoints, representing tighter control	Standard air-cooled multiplex, SST setpoint reduced 3°F, SCT setpoint raised 3°F	Existing	101,150	4.6%	4	$411	75%	95%	2.65	5,395
Grocery	Refrigeration	Ambient following SCT setpoint, 70°F minimum	Control SCT to ambient + 12°F TD, 70°F min, backflood setpoint of 68°F	Standard air-cooled multiplex system, SCT controlled to 80°F	Existing	101,150	6.1%	16	$423	75%	95%	14.04	12,004
Grocery	Refrigeration	Ambient following SCT setpoint, 70°F minimum, variable-spd condenser fan	Control SCT to ambient + 12°F TD, 70°F min, backflood setpt of 68°F, var-spd cond	Standard air-cooled multiplex system, SCT controlled to 80°F	Existing	101,150	11.5%	16	$3,199	75%	95%	3.51	7,369
Grocery	Refrigeration	Anti-Sweat (Humidistat) Controls	Variable Temp. Controls (Humidistat)	Constant Controls	Existing	101,150	4.8%	8	$418	45%	90%	5.75	7,294
Grocery	Refrigeration	Anti-Sweat (Humidistat) Controls	Variable Temp. Controls (Humidistat)	Constant Controls	New	101,150	4.8%	8	$420	45%	90%	5.75	247
Grocery	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	Existing	101,150	1.2%	10	$349	100%	67%	2.19	3,636
Grocery	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	New	101,150	1.2%	10	$349	100%	67%	2.19	119

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Refrigeration	Compressor VSD Retrofit	Compressor VSD Retrofit	Standard Compressor	Existing	101,150	11.2%	10	$2,212	77%	60%	3.19	16,283
Grocery	Refrigeration	Compressor, Multiplex	Replace single-compressor system with air-cooled, subcooled multiplex	Standard air-cooled multiplex system, 80°F SCT, 50°F LT subcooling	Existing	101,150	22.4%	10	$23,863	80%	45%	0.59	10,281
Grocery	Refrigeration	Compressor, Multiplex	Replace single-compressor system with evap-cooled, subcooled multiplex	Standard air-cooled multiplex system, 80°F SCT, 50°F LT subcooling	Existing	101,150	28.3%	10	$22,183	80%	45%	0.80	13,674
Grocery	Refrigeration	Cycle fan off with thermostat; duty cycle occasionally when off	Evaporator fan cycles w/ thermostat; when off cycles on peridoically	Evaporator fan runs continuously, psc or sp motor based on vintage	Existing	101,150	1.7%	16	$547	75%	75%	3.11	2,856
Grocery	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	Existing	101,150	1.3%	10	$367	68%	95%	2.24	3,761
Grocery	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	New	101,150	1.3%	10	$367	68%	95%	2.24	123
Grocery	Refrigeration	Display Cases	High-Efficiency Display Cases	Display Cases - Standard	Existing	101,150	3.6%	15	$2,028	90%	47%	1.64	3,411
Grocery	Refrigeration	Display Cases	High-Efficiency Display Cases	Display Cases - Standard	New	101,150	3.6%	15	$1,997	90%	47%	1.67	112
Grocery	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Existing	101,150	0.7%	15	$5,764	65%	90%	0.12	515
Grocery	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	New	101,150	0.7%	15	$5,797	65%	90%	0.11	22
Grocery	Refrigeration	Floating Head Pressure Control	Install Floating Head Pressure Control	No Floating Head Pressure Control	Existing	101,150	8.7%	15	$950	81%	50%	8.49	3,355
Grocery	Refrigeration	Floating Head Pressure Control	Install Floating Head Pressure Control	No Floating Head Pressure Control	New	101,150	8.8%	15	$955	81%	50%	8.49	467
Grocery	Refrigeration	Floating SCT controlled to 70°F	SCT controlled to 70°F	SCT controlled to 80°F	Existing	101,150	4.6%	16	$463	81%	50%	9.75	3,581
Grocery	Refrigeration	Floating SCT controlled to 70°F	SCT controlled to 70°F	Standard evap-cooled multiplex system, SCT controlled to 80°F	Existing	101,150	7.0%	16	$463	81%	50%	14.88	5,715
Grocery	Refrigeration	Floating SST control on LT and MT suction groups	SST setpoint reset based on worst-case demand	Standard air-cooled multiplex system, SST controlled to fixed setpoint	Existing	101,150	2.3%	16	$331	81%	50%	6.93	877
Grocery	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	Existing	101,150	1.8%	15	$1,819	75%	95%	0.91	2,893
Grocery	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	New	101,150	1.8%	15	$298	75%	95%	5.58	95
Grocery	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Existing	101,150	8.4%	10	$5,842	72%	85%	0.91	7,110

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	New	101,150	8.4%	10	$5,874	72%	85%	0.90	278
Grocery	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	Existing	101,150	1.0%	15	$750	75%	92%	1.18	916
Grocery	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	New	101,150	1.0%	15	$754	75%	92%	1.18	36
Grocery	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	Existing	101,150	0.4%	10	$124	86%	90%	1.89	1,290
Grocery	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	New	101,150	0.4%	10	$124	86%	90%	1.89	42
Grocery	Refrigeration	Motor - Case Fans with ECM motors	ECM motors on evaporator fan, on display cases	48 cf 2-door reach-in commercial refrigerator	Existing	101,150	5.0%	12	$1,181	50%	80%	3.18	1,463
Grocery	Refrigeration	Motor - Case Fans with ECM motors	ECM motors on evaporator fan, on display cases	48 cf 2-door reach-in commercial refrigerator	New	101,150	5.0%	12	$1,181	50%	80%	3.18	56
Grocery	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	Existing	101,150	3.2%	5	$516	85%	95%	1.87	11,560
Grocery	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	New	101,150	3.0%	5	$494	85%	95%	1.87	363
Grocery	Refrigeration	Parallel Unequal Compressor	Multiple Compressors in Parallel	Parallel Equal Compressors (2)	Existing	101,150	8.4%	15	$2,000	90%	35%	3.88	8,609
Grocery	Refrigeration	Reduce design SCT by ~5°F and improve efficiency	Same capacity condenser but ~5°F lower SCT, 200 Btu/Watt, 80°F SCT	Multiplex evaporative condenser of T24 efficiency, 80°F SCT	Existing	101,150	12.0%	15	$5,435	25%	95%	2.04	4,115
Grocery	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	Existing	101,150	6.0%	10	$266	70%	75%	14.25	6,437
Grocery	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	New	101,150	6.0%	10	$267	70%	75%	14.17	211
Grocery	Refrigeration	Refrigeration - Retro Commissioning	Refrigeration Retro Commissioning (Refrigeration System Diagnostics / Operations And Maintenance)	No Re-commissioning	Existing	101,150	6.6%	3	$1,061	90%	95%	1.09	8,092
Grocery	Refrigeration	Refrigeration - Commissioning	Commissioning (Refrigeration System Diagnostics / Operations and Maintenance for a new unit)	No Commissioning	New	101,150	3.8%	3	$414	90%	80%	1.58	301
Grocery	Refrigeration	Refrigeration with Heat Recovery	Heat Recovery from Refrigeration System. Applied to Water Heating	No Heat Recovery	Existing	101,150	25.2%	16	$4,550	55%	75%	5.41	38,190
Grocery	Refrigeration	Refrigeration with Heat Recovery	Heat Recovery from Refrigeration System. Applied to Water Heating	No Heat Recovery	New	101,150	25.2%	16	$3,900	55%	75%	6.31	1,292
Grocery	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	101,150	1.2%	10	$801	95%	75%	0.91	3,697
Grocery	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	101,150	1.2%	10	$805	95%	75%	0.90	121

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	101,150	3.2%	16	$1,098	77%	95%	2.85	10,493
Grocery	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	101,150	3.2%	16	$1,104	77%	95%	2.83	344
Grocery	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	Existing	101,150	2.0%	4	$180	20%	95%	2.64	1,714
Grocery	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	New	101,150	2.0%	4	$180	20%	95%	2.64	56
Grocery	Refrigeration	Wetbulb following SCT setpoint, 70°F minimum	Control SCT to wetbulb + 17°F TD, 70°F min, backflood setpoint of 68°F	Standard evap-cooled multiplex system, SCT controlled to 80°F	Existing	101,150	2.4%	16	$413	25%	95%	5.68	526
Grocery	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	537	3.3%	20	$185	NA	NA	0.12	50
Grocery	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	537	3.3%	20	$185	NA	NA	0.12	5
Grocery	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	562	5.0%	15	$1,389	94%	75%	0.02	36
Grocery	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	562	16.8%	10	$2,570	95%	53%	0.02	10
Grocery	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	562	11.9%	13	$600	25%	24%	0.10	4
Grocery	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	562	5.4%	13	$30	25%	24%	0.89	2
Grocery	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	562	10.0%	25	$46	92%	5%	1.86	5
Grocery	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	562	3.2%	10	$2	25%	95%	6.06	9
Grocery	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	562	4.5%	10	$8	15%	95%	2.28	8
Grocery	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	562	50.0%	15	$2,715	94%	19%	0.10	7
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	562	1.0%	15	$26	90%	80%	0.22	8
Grocery	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	562	1.2%	5	$5	40%	75%	0.43	4
Grocery	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	562	1.1%	10	$5	75%	15%	0.86	2
Grocery	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	562	2.5%	10	$9	20%	15%	1.06	1
Grocery	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	562	19.3%	20	$5,100	95%	20%	0.03	4

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Grocery	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	562	4.0%	10	$130	35%	15%	0.12	2
Grocery	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	562	7.7%	11	$205	50%	75%	0.16	31
Grocery	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	562	61.7%	15	$12,275	94%	2%	0.03	0
Grocery	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	537	61.7%	15	$12,275	94%	45%	0.03	0
Grocery	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	562	8.5%	20	$260	75%	85%	0.23	64
Grocery	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	537	8.5%	20	$260	45%	10%	0.22	0
Health	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	21,478	10.4%	15	$4,480	NA	NA	0.61	4,548
Health	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	15,719	10.4%	15	$3,584	NA	NA	0.56	281
Health	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	21,478	2.6%	15	$1,254	NA	NA	0.55	0
Health	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	15,719	2.6%	15	$1,002	NA	NA	0.50	0
Health	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	21,478	6.7%	15	$2,480	NA	NA	0.71	0
Health	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	15,719	6.7%	15	$1,984	NA	NA	0.65	0
Health	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	21,566	15.0%	15	$4,864	99%	2%	0.81	13
Health	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	15,192	15.0%	15	$3,891	99%	70%	0.72	10
Health	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	21,566	3.0%	15	$26	3%	44%	29.95	39
Health	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	15,192	3.0%	15	$22	50%	44%	25.79	12
Health	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	21,566	1.0%	10	$5,320	75%	1%	0.03	7
Health	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	15,192	1.0%	10	$5,320	75%	1%	0.02	0
Health	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	21,566	10.0%	15	$2,000	94%	5%	1.32	394

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	15,192	10.0%	15	$1,066	94%	5%	1.74	9
Health	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	15,192	12.5%	3	$5,840	80%	90%	0.07	114
Health	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	21,566	12.5%	3	$1,577	40%	90%	0.39	3,612
Health	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	21,566	10.0%	20	$5,440	98%	15%	0.62	1,025
Health	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	15,192	10.0%	20	$5,440	98%	15%	0.43	20
Health	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	21,566	15.0%	15	$4,536	30%	10%	0.87	375
Health	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	21,566	10.0%	3	$1,280	95%	95%	0.38	6,918
Health	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	21,566	25.0%	15	$16,670	85%	50%	0.40	7,301
Health	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	15,192	25.0%	15	$16,670	85%	50%	0.28	156
Health	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	21,566	15.0%	5	$2,501	26%	35%	0.52	273
Health	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	21,566	10.0%	5	$1,400	80%	75%	0.61	2,491
Health	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	15,192	10.0%	5	$1,400	80%	75%	0.43	47
Health	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	21,566	15.0%	5	$1,010	80%	75%	1.28	1,933
Health	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	15,192	15.0%	5	$1,010	80%	75%	0.90	41
Health	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	21,566	2.5%	18	$1,920	45%	45%	0.40	311
Health	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	15,192	2.5%	18	$1,920	45%	45%	0.28	7
Health	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	21,566	4.5%	10	$5,450	85%	62%	0.15	1,388
Health	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	15,192	4.5%	10	$5,450	85%	62%	0.10	31
Health	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	21,566	10.0%	30	$81,040	98%	4%	0.06	193

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	15,192	10.0%	30	$81,040	98%	4%	0.04	4
Health	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	21,566	5.0%	10	$142	10%	10%	6.32	43
Health	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	21,566	2.0%	25	$5,200	45%	75%	0.15	191
Health	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	15,192	2.0%	25	$5,200	45%	75%	0.11	4
Health	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	21,566	3.0%	25	$6,560	85%	75%	0.18	549
Health	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	15,192	3.0%	25	$6,560	85%	75%	0.13	11
Health	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	21,566	2.4%	25	$4,880	13%	75%	0.20	135
Health	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	21,566	3.0%	25	$807	15%	10%	1.48	19
Health	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	21,566	4.4%	25	$1,292	15%	10%	1.35	28
Health	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	15,192	3.3%	25	$361	15%	10%	2.56	0
Health	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	21,566	5.0%	25	$1,181	35%	10%	1.68	147
Health	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	15,192	3.0%	25	$1,896	95%	95%	0.44	41
Health	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	21,566	1.0%	25	$2,160	35%	35%	0.18	70
Health	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	15,192	1.0%	25	$2,160	35%	35%	0.13	1
Health	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	21,566	3.0%	25	$4,160	35%	35%	0.29	217
Health	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	21,566	15.4%	15	$864	50%	0%	4.71	6
Health	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	15,192	5.7%	15	$1,946	85%	0%	0.55	0
Health	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	21,566	20.3%	15	$3,296	85%	0%	1.62	13
Health	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	21,566	15.1%	15	$29,536	25%	0%	0.13	3
Health	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	21,566	10.5%	15	$544	50%	0%	5.09	4
Health	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	15,192	0.2%	30	$2,836	90%	75%	0.03	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	15,192	15.0%	20	$3,350	80%	90%	1.06	190
Health	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	21,566	16.4%	10	$12,128	5%	2%	0.24	5
Health	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	21,566	1.8%	10	$2,528	25%	2%	0.13	3
Health	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	15,192	1.8%	10	$2,022	25%	2%	0.11	0
Health	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	21,566	7.6%	10	$5,760	50%	2%	0.24	22
Health	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	15,192	7.6%	10	$4,608	50%	2%	0.21	1
Health	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	21,566	3.0%	5	$845	20%	20%	0.31	4
Health	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	15,192	3.0%	5	$675	20%	20%	0.27	0
Health	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	21,566	3.0%	15	$138	71%	95%	5.71	875
Health	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	15,192	3.0%	15	$138	71%	95%	4.02	18
Health	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	21,566	30.0%	10	$24,320	70%	15%	0.22	1,925
Health	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,566	7.3%	25	$37,940	98%	15%	0.08	304
Health	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	15,192	7.3%	25	$37,940	98%	80%	0.05	32
Health	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,566	4.6%	40	$11,370	60%	15%	0.22	117
Health	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	15,192	4.6%	40	$11,370	60%	80%	0.15	13
Health	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	16,120	20.0%	10	$1,634	85%	20%	1.29	513
Health	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	5,186	20.0%	10	$1,634	85%	20%	0.42	5
Health	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	16,120	1.4%	18	$1,428	85%	35%	0.18	532
Health	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	5,186	1.9%	18	$1,512	85%	35%	0.07	7
Health	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	16,120	7.0%	20	$1,623	75%	85%	0.86	4,016

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	5,186	7.0%	20	$1,623	75%	85%	0.28	42
Health	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	16,120	0.9%	10	$59	81%	85%	1.61	751
Health	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	5,186	0.9%	10	$59	81%	85%	0.52	8
Health	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	16,120	5.3%	20	$1,081	75%	85%	0.97	1,018
Health	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	5,186	5.3%	20	$1,081	75%	85%	0.31	11
Health	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	16,120	8.8%	10	$2,922	77%	50%	0.32	482
Health	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	5,186	8.8%	10	$2,922	77%	65%	0.10	7
Health	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	16,120	7.0%	5	$1,600	65%	4%	0.22	113
Health	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	5,186	7.0%	5	$1,600	65%	4%	0.07	1
Health	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	16,120	7.0%	5	$1,600	65%	90%	0.22	2,553
Health	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	5,186	7.0%	5	$1,600	65%	90%	0.07	27
Health	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	16,120	12.0%	10	$24,320	70%	15%	0.05	1,445
Health	Heat Pump	Air-Source Heat Pump - High Efficiency	High-Efficiency EER=11.0, COP=3.5	EER=11, COP=3.3 (IECC 2009)	Existing	45,971	2.8%	15	$4,971	NA	NA	0.27	0
Health	Heat Pump	Air-Source Heat Pump - High Efficiency	High-Efficiency EER=11.0, COP=3.5	EER=11, COP=3.3 (IECC 2009)	New	38,529	2.8%	15	$3,977	NA	NA	0.28	0
Health	Heat Pump	Air-Source Heat Pump - Premium Efficiency	Premium-Efficiency EER=11.8, COP=3.8	EER=11, COP=3.3 (IECC 2009)	Existing	45,971	9.9%	15	$10,645	NA	NA	0.44	2,901
Health	Heat Pump	Air-Source Heat Pump - Premium Efficiency	Premium-Efficiency EER=11.8, COP=3.8	EER=11, COP=3.3 (IECC 2009)	New	38,529	9.9%	15	$8,516	NA	NA	0.46	191
Health	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF	Existing	46,548	7.9%	20	$31,111	99%	2%	0.16	5
Health	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF	New	37,531	7.9%	20	$24,889	99%	2%	0.16	0
Health	Heat Pump	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	46,548	0.5%	10	$5,320	75%	1%	0.03	3
Health	Heat Pump	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	37,531	0.3%	10	$5,320	75%	1%	0.02	0
Health	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	46,548	10.0%	15	$2,000	94%	5%	2.40	348

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Heat Pump	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	37,531	10.0%	15	$1,066	94%	5%	3.62	9
Health	Heat Pump	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	37,531	12.5%	3	$5,840	80%	90%	0.15	154
Health	Heat Pump	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	46,548	12.5%	3	$1,577	40%	90%	0.71	3,288
Health	Heat Pump	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	46,548	5.1%	20	$5,440	98%	15%	0.57	519
Health	Heat Pump	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	37,531	3.1%	20	$5,440	98%	15%	0.28	7
Health	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	46,548	15.0%	5	$2,501	26%	35%	0.94	50
Health	Heat Pump	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	46,548	10.0%	5	$1,400	80%	75%	1.12	441
Health	Heat Pump	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	37,531	10.0%	5	$1,400	80%	75%	0.90	11
Health	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	46,548	15.0%	5	$1,010	80%	75%	2.32	334
Health	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	37,531	15.0%	5	$1,010	80%	75%	1.87	8
Health	Heat Pump	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	46,548	2.5%	18	$1,920	45%	45%	0.73	353
Health	Heat Pump	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	37,531	2.5%	18	$1,920	45%	45%	0.59	9
Health	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	46,548	7.4%	10	$13,760	94%	5%	0.18	222
Health	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	37,531	7.4%	10	$13,760	94%	5%	0.14	5
Health	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	46,548	4.5%	10	$5,450	85%	62%	0.27	1,616
Health	Heat Pump	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	37,531	4.5%	10	$5,450	85%	62%	0.22	41
Health	Heat Pump	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	46,548	4.9%	30	$81,040	98%	4%	0.05	107
Health	Heat Pump	Green Roof	Vegetation on Roof	Standard roofing techniques	New	37,531	4.9%	30	$81,040	98%	4%	0.04	2
Health	Heat Pump	Heat Pump - Ground Water Source (Closed Loop)	GSHP: COP=3.1, EER=13.4	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	Existing	46,548	9.1%	20	$57,658	92%	2%	0.10	6

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Heat Pump	Heat Pump - Ground Water Source (Closed Loop)	GSHP: COP=3.1, EER=13.4	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	New	37,531	9.1%	20	$46,126	92%	16%	0.10	1
Health	Heat Pump	Heat Pump - Water Source (Closed Loop)	WSHP: COP=4.2, EER=12.0	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	Existing	46,548	15.9%	20	$11,598	92%	2%	0.84	10
Health	Heat Pump	Heat Pump - Water Source (Closed Loop)	WSHP: COP=4.2, EER=12.0	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	New	37,531	15.9%	20	$12,254	92%	16%	0.64	2
Health	Heat Pump	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	46,548	8.3%	10	$142	10%	10%	18.94	63
Health	Heat Pump	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	46,548	2.0%	25	$5,200	45%	75%	0.28	217
Health	Heat Pump	Insulation (Ceiling)	R-38	R-20 (Code)	New	37,531	2.0%	25	$5,200	45%	75%	0.23	5
Health	Heat Pump	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	46,548	3.0%	25	$6,560	85%	75%	0.33	639
Health	Heat Pump	Insulation (Ceiling)	R-49	R-20 (Code)	New	37,531	3.0%	25	$6,560	85%	75%	0.27	15
Health	Heat Pump	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	46,548	2.4%	25	$4,880	13%	75%	0.36	157
Health	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	46,548	3.0%	25	$807	15%	10%	2.71	17
Health	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	46,548	4.4%	25	$1,292	15%	10%	2.48	24
Health	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	37,531	3.3%	25	$361	15%	10%	5.37	0
Health	Heat Pump	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	46,548	10.0%	25	$1,181	35%	10%	6.17	261
Health	Heat Pump	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	37,531	5.0%	25	$1,896	95%	95%	1.53	83
Health	Heat Pump	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	46,548	1.0%	25	$2,160	35%	35%	0.34	82
Health	Heat Pump	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	37,531	1.0%	25	$2,160	35%	35%	0.27	2
Health	Heat Pump	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	46,548	3.0%	25	$4,160	35%	35%	0.52	253
Health	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=2.9, EER=10.2	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	46,548	4.0%	15	$30,240	50%	0%	0.06	3
Health	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=2.9, EER=10.2	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	46,548	4.0%	15	$352	50%	0%	5.45	4
Health	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=3.4, EER=11.0	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	46,548	15.0%	15	$3,021	85%	0%	2.38	11

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=3.49, EER=11.95	COP=2.94, EER=10.17 (IECC 2009) 10,000 Bth/h	New	37,531	15.3%	15	$2,880	85%	0%	2.06	1
Health	Heat Pump	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	37,531	0.0%	30	$2,836	90%	75%	0.01	0
Health	Heat Pump	Room Heat Pump - Existing to Code (10,000 Btu/h)	EER=11.0 and COP = 3.2 (State Code)	Existing Room Heat Pump (EER = 9.4, COP = 2.7)	Existing	46,548	10.2%	10	$31,219	5%	1%	0.11	3
Health	Heat Pump	Room Heat Pump - High-Efficiency (10,000 Btu/h)	EER=12 and COP=3.5	EER=11.0 and COP = 3.2 (State Code)	Existing	46,548	5.6%	10	$7,007	25%	1%	0.26	7
Health	Heat Pump	Room Heat Pump - High-Efficiency (10,000 Btu/h)	EER=12 and COP=3.5	EER=11.0 and COP = 3.2 (State Code)	New	37,531	4.4%	10	$5,606	25%	1%	0.21	0
Health	Heat Pump	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	46,548	3.0%	5	$845	20%	20%	0.56	4
Health	Heat Pump	Scheduled AHU	Reduce AHU runtime	No schedule	New	37,531	3.0%	5	$675	20%	20%	0.56	0
Health	Heat Pump	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	46,548	3.0%	15	$138	71%	95%	10.39	1,377
Health	Heat Pump	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	37,531	3.0%	15	$138	71%	95%	8.38	35
Health	Heat Pump	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	46,548	16.0%	10	$24,320	70%	15%	0.22	1,100
Health	Heat Pump	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	46,548	7.3%	25	$37,940	98%	15%	0.14	344
Health	Heat Pump	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	37,531	7.3%	25	$37,940	98%	80%	0.11	43
Health	Heat Pump	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	46,548	4.2%	40	$11,370	60%	80%	0.37	672
Health	Heat Pump	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	37,531	4.6%	40	$11,370	60%	80%	0.32	17
Health	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	73,108	2.7%	9	$2,709	75%	85%	0.41	13,015
Health	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	46,294	2.7%	9	$1,354	75%	85%	0.52	270
Health	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	73,108	6.0%	9	$7,155	51%	30%	0.35	1,222
Health	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	46,294	6.0%	9	$7,155	51%	30%	0.22	30
Health	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	73,108	13.5%	9	$5,366	100%	75%	1.04	14,561
Health	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	46,294	11.3%	13	$5,366	99%	75%	0.78	280

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.1	Existing	73,108	15.0%	14	$1,214	70%	90%	6.97	21,206
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.1	New	46,294	15.0%	14	$720	70%	90%	7.44	440
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.1	Existing	73,108	20.0%	14	$3,062	85%	75%	3.54	27,467
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.1	New	46,294	20.0%	14	$2,400	85%	75%	2.86	570
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.1	Existing	73,108	25.0%	14	$4,858	90%	70%	2.67	32,516
Health	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.1	New	46,294	25.0%	14	$4,032	90%	70%	2.04	675
Health	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.1	Existing Lighting Design	Existing	73,108	15.0%	14	$7,462	40%	95%	1.21	40,831
Health	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	Existing	73,108	13.6%	20	$1,500	90%	2%	7.49	1,777
Health	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	New	46,294	13.6%	20	$1,166	90%	2%	6.10	37
Health	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	73,108	1.4%	11	$128	65%	95%	5.89	3,201
Health	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	73,108	1.8%	11	$128	65%	95%	7.50	4,074
Health	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	Existing	73,108	0.9%	13	$928	80%	15%	0.57	804
Health	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	New	46,294	1.4%	13	$933	80%	15%	0.57	26
Health	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	73,108	7.0%	5	$2,160	85%	90%	0.69	28,824
Health	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	73,108	4.0%	9	$150	70%	90%	10.62	7,026
Health	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	46,294	4.0%	10	$150	70%	90%	7.46	219
Health	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	73,108	4.3%	13	$2,520	90%	65%	1.01	19,048
Health	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	73,108	4.9%	9	$821	100%	85%	2.46	7,811
Health	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	30,855	0.1%	7	$7	90%	20%	1.67	50

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	30,855	0.1%	7	$7	90%	20%	1.67	2
Health	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	30,855	4.3%	4	$4	25%	64%	81.32	1,771
Health	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	30,855	4.2%	4	$4	25%	64%	79.26	57
Health	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	30,855	3.8%	6	$157	45%	90%	2.78	4,835
Health	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	30,855	3.8%	6	$157	45%	90%	2.78	158
Health	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	30,855	0.6%	4	$1	45%	90%	52.48	723
Health	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	30,855	0.6%	4	$1	45%	90%	52.48	24
Health	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	30,855	2.6%	4	$600	15%	64%	0.32	632
Health	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	30,855	2.6%	4	$600	15%	64%	0.32	21
Health	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	30,855	0.1%	5	$15	40%	75%	0.78	119
Health	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	30,855	0.1%	5	$15	40%	75%	0.78	4
Health	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	30,855	0.2%	4	$1	45%	90%	22.15	305
Health	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	30,855	0.2%	4	$1	45%	90%	22.15	10
Health	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	30,855	1.2%	10	$1	75%	45%	297.13	1,294
Health	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	30,855	1.2%	10	$1	75%	45%	297.13	42
Health	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	30,855	1.8%	5	$403	30%	95%	0.07	317
Health	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	30,855	1.8%	5	$403	30%	95%	0.07	10
Health	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	Existing	30,855	5.4%	10	$150	25%	5%	7.12	215
Health	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	New	30,855	5.4%	10	$150	25%	5%	7.12	7
Health	Plug Load	Pool Pumps - VSD			Existing	30,855	3.4%	20	$3,380	50%	5%	0.37	272
Health	Plug Load	Pool Pumps - VSD			New	30,855	3.4%	20	$3,380	50%	5%	0.37	9
Health	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	30,855	0.3%	13	$120	65%	13%	0.55	74
Health	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	30,855	0.3%	13	$120	65%	13%	0.55	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	30,855	3.2%	7	$550	35%	25%	0.77	880
Health	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	30,855	5.8%	14	$158	80%	10%	9.98	1,481
Health	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	30,855	5.8%	14	$158	80%	10%	9.98	49
Health	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	30,855	3.9%	3	$283	25%	10%	0.75	311
Health	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	2,060	3.3%	20	$830	NA	NA	0.10	896
Health	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	2,061	3.3%	20	$830	NA	NA	0.10	97
Health	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	2,155	3.0%	9	$15	80%	12%	2.37	59
Health	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	2,155	5.0%	15	$2,222	94%	55%	0.04	463
Health	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	2,155	10.5%	10	$2,570	95%	18%	0.05	37
Health	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,155	3.2%	13	$600	25%	11%	0.09	9
Health	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,155	1.5%	13	$30	25%	11%	0.83	4
Health	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	2,155	10.0%	25	$169	92%	5%	1.75	87
Health	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	2,155	3.2%	10	$4	25%	95%	10.55	159
Health	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	2,155	4.5%	10	$14	15%	95%	4.14	135
Health	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	2,155	50.0%	15	$12,218	94%	19%	0.08	129
Health	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	2,155	1.0%	15	$69	70%	80%	0.28	106
Health	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	2,155	0.5%	5	$10	45%	15%	0.32	7
Health	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	2,155	2.6%	10	$27	75%	35%	1.28	145

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Health	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	2,155	5.8%	10	$50	20%	35%	1.53	86
Health	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	2,155	33.3%	20	$22,950	95%	20%	0.04	133
Health	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	2,155	4.0%	10	$455	35%	15%	0.12	38
Health	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	2,155	7.7%	11	$716	80%	75%	0.16	869
Health	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	2,155	61.7%	15	$12,275	94%	2%	0.10	9
Health	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	2,060	61.7%	15	$12,275	94%	21%	0.09	2
Health	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	2,155	8.5%	20	$910	75%	85%	0.23	1,142
Health	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	2,060	8.5%	20	$910	45%	10%	0.22	2
Large Office	Cooling Chillers	Centrifugal Chiller, 300 ton - High Efficiency	0.507 kW/ton	0.576 kW/ton	Existing	181,520	12.0%	20	$16,990	NA	NA	2.02	0
Large Office	Cooling Chillers	Centrifugal Chiller, 300 ton - High Efficiency	0.507 kW/ton	0.576 kW/ton	New	110,352	12.0%	20	$16,990	NA	NA	1.23	0
Large Office	Cooling Chillers	Centrifugal Chiller, VSD Control, 300 tons	0.461 kW/ton	0.576 kW/ton	Existing	181,520	17.5%	20	$34,160	NA	NA	1.47	1,409
Large Office	Cooling Chillers	Centrifugal Chiller, VSD Control, 300 tons	0.461 kW/ton	0.576 kW/ton	New	110,352	17.5%	20	$34,160	NA	NA	0.90	92
Large Office	Cooling Chillers	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	196,374	0.3%	10	$16,630	75%	1%	0.03	1
Large Office	Cooling Chillers	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	106,366	0.3%	10	$16,630	75%	1%	0.01	0
Large Office	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	196,374	10.0%	15	$25,000	94%	75%	0.98	1,801
Large Office	Cooling Chillers	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	106,366	10.0%	15	$13,330	94%	75%	0.99	30
Large Office	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	Existing	196,374	1.3%	10	$17,030	95%	95%	0.12	198
Large Office	Cooling Chillers	Chilled Water / Condenser Water Settings-Optimization	Additional Control Features	EMS already installed - No Optimization	New	106,366	1.3%	10	$17,030	95%	95%	0.07	3
Large Office	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for Secondary Chilled Water Loop	Primary Loop Only w/ Constant Speed Pump	Existing	196,374	7.6%	10	$78,640	70%	25%	0.16	247

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling Chillers	Chilled Water Piping Loop w/ VSD Control	VSD for Secondary Chilled Water Loop	Primary Loop Only w/ Constant Speed Pump	New	106,366	7.6%	10	$78,640	70%	25%	0.09	4
Large Office	Cooling Chillers	Chilled Water Reset	Install Chilled Water Reset	No Chilled Water Reset	Existing	196,374	5.0%	10	$68,080	95%	95%	0.12	830
Large Office	Cooling Chillers	Chilled Water Reset	Install Chilled Water Reset	No Chilled Water Reset	New	106,366	5.0%	10	$68,080	95%	95%	0.07	13
Large Office	Cooling Chillers	Chiller-Water Side Economizer	Install Economizer	No Economizer	Existing	196,374	5.0%	10	$182,590	45%	45%	0.05	176
Large Office	Cooling Chillers	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	106,366	12.5%	3	$73,000	80%	90%	0.04	24
Large Office	Cooling Chillers	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	196,374	12.5%	3	$19,710	40%	90%	0.29	995
Large Office	Cooling Chillers	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	196,374	2.5%	20	$17,000	98%	95%	0.46	492
Large Office	Cooling Chillers	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	106,366	2.5%	20	$17,000	98%	95%	0.25	7
Large Office	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	Existing	196,374	8.0%	15	$7,780	94%	50%	2.51	1,059
Large Office	Cooling Chillers	Cooling Tower-Decrease Approach Temperature	6 Deg F	10 Deg F	New	106,366	8.0%	15	$7,000	94%	50%	1.51	17
Large Office	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Two-Speed Tower Fans replace Single-Speed	Cooling Tower-One-Speed Fan Motor	Existing	196,374	14.0%	10	$870	35%	95%	26.83	949
Large Office	Cooling Chillers	Cooling Tower-Two-Speed Fan Motor	Two-Speed Tower Fans replace Single-Speed	Cooling Tower-One-Speed Fan Motor	New	106,366	14.0%	10	$780	35%	95%	16.21	15
Large Office	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	Existing	196,374	4.0%	10	$7,040	75%	95%	0.95	220
Large Office	Cooling Chillers	Cooling Tower-VSD Fan Control	Variable-Speed Tower Fans replace Two-Speed	Cooling Tower-Two-Speed Fan Motor	New	106,366	4.0%	10	$6,330	75%	95%	0.57	3
Large Office	Cooling Chillers	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	196,374	15.0%	5	$31,260	28%	45%	0.38	210
Large Office	Cooling Chillers	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	196,374	10.0%	5	$17,500	80%	75%	0.46	1,425
Large Office	Cooling Chillers	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	106,366	10.0%	5	$17,500	80%	75%	0.25	21

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	196,374	15.0%	5	$12,630	80%	75%	0.95	1,218
Large Office	Cooling Chillers	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	106,366	15.0%	5	$12,630	80%	75%	0.51	18
Large Office	Cooling Chillers	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	196,374	2.5%	18	$24,000	45%	45%	0.30	104
Large Office	Cooling Chillers	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	106,366	2.5%	18	$24,000	45%	45%	0.16	2
Large Office	Cooling Chillers	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	196,374	2.5%	30	$253,250	98%	4%	0.04	15
Large Office	Cooling Chillers	Green Roof	Vegetation on Roof	Standard roofing techniques	New	106,366	2.5%	30	$253,250	98%	4%	0.02	0
Large Office	Cooling Chillers	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	196,374	5.0%	10	$2,230	10%	10%	3.74	14
Large Office	Cooling Chillers	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	196,374	0.5%	25	$16,250	25%	75%	0.11	8
Large Office	Cooling Chillers	Insulation (Ceiling)	R-38	R-20 (Code)	New	106,366	0.5%	25	$16,250	25%	75%	0.06	0
Large Office	Cooling Chillers	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	196,374	0.5%	25	$20,500	65%	75%	0.09	21
Large Office	Cooling Chillers	Insulation (Ceiling)	R-49	R-20 (Code)	New	106,366	0.5%	25	$20,500	65%	75%	0.05	0
Large Office	Cooling Chillers	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	196,374	0.6%	25	$15,250	4%	75%	0.14	3
Large Office	Cooling Chillers	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	196,374	5.0%	25	$8,350	35%	10%	2.20	47
Large Office	Cooling Chillers	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	106,366	3.0%	25	$13,410	95%	95%	0.45	10
Large Office	Cooling Chillers	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	196,374	0.3%	25	$6,750	15%	35%	0.14	2
Large Office	Cooling Chillers	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	106,366	0.3%	25	$6,750	15%	35%	0.07	0
Large Office	Cooling Chillers	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	196,374	0.8%	25	$13,000	15%	35%	0.21	7

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling Chillers	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	106,366	10.0%	40	$100,000	61%	95%	0.27	19
Large Office	Cooling Chillers	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	106,366	0.4%	30	$35,450	90%	75%	0.03	1
Large Office	Cooling Chillers	Pipe Insulation	R-4	R-0	Existing	196,374	1.0%	15	$2,050	45%	65%	1.19	76
Large Office	Cooling Chillers	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	106,366	3.8%	20	$10,470	80%	90%	0.60	10
Large Office	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	196,374	25.0%	10	$211,000	98%	25%	0.20	1,257
Large Office	Cooling Chillers	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	New	106,366	25.0%	10	$211,000	98%	25%	0.11	19
Large Office	Cooling Chillers	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	196,374	3.0%	15	$140	1%	1%	52.25	0
Large Office	Cooling Chillers	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	106,366	3.0%	15	$140	1%	1%	28.30	0
Large Office	Cooling Chillers	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	196,374	30.0%	10	$304,000	70%	15%	0.16	607
Large Office	Cooling Chillers	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	106,366	3.1%	30	$2,290	75%	75%	3.10	8
Large Office	Cooling Chillers	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	196,374	5.7%	25	$594,390	98%	15%	0.04	72
Large Office	Cooling Chillers	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	106,366	5.7%	25	$594,390	98%	80%	0.02	5
Large Office	Cooling Chillers	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	196,374	0.5%	40	$178,130	95%	80%	0.01	31
Large Office	Cooling Chillers	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	106,366	3.6%	40	$178,130	95%	80%	0.05	3
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	217,122	10.4%	15	$56,000	NA	NA	0.50	831
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	157,450	10.4%	15	$44,800	NA	NA	0.45	73
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	217,122	2.6%	15	$15,670	NA	NA	0.45	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	157,450	2.6%	15	$12,530	NA	NA	0.41	0
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	217,122	6.7%	15	$31,000	NA	NA	0.58	0
Large Office	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	157,450	6.7%	15	$24,800	NA	NA	0.53	0
Large Office	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	232,753	15.0%	15	$60,800	99%	2%	0.71	2
Large Office	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	146,139	15.0%	15	$48,640	99%	70%	0.56	2
Large Office	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	232,753	3.0%	15	$330	3%	44%	26.27	7
Large Office	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	146,139	3.0%	15	$270	50%	44%	20.16	2
Large Office	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	232,753	0.3%	10	$16,630	75%	1%	0.03	0
Large Office	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	146,139	0.3%	10	$16,630	75%	1%	0.02	0
Large Office	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	232,753	10.0%	15	$25,000	94%	75%	1.16	1,132
Large Office	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	146,139	10.0%	15	$13,330	94%	75%	1.36	20
Large Office	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	146,139	12.5%	3	$73,000	80%	90%	0.06	18
Large Office	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	232,753	12.5%	3	$19,710	40%	90%	0.34	649
Large Office	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	232,753	2.5%	20	$17,000	98%	95%	0.54	292
Large Office	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	146,139	2.5%	20	$17,000	98%	95%	0.34	5
Large Office	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	232,753	15.0%	15	$56,700	20%	10%	0.76	45
Large Office	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	232,753	10.0%	3	$16,000	95%	95%	0.34	1,243
Large Office	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	232,753	25.0%	15	$208,380	85%	50%	0.35	1,300
Large Office	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	146,139	25.0%	15	$208,380	85%	50%	0.22	23

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	232,753	15.0%	5	$31,260	28%	5%	0.46	8
Large Office	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	232,753	10.0%	5	$17,500	80%	75%	0.54	446
Large Office	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	146,139	10.0%	5	$17,500	80%	75%	0.34	7
Large Office	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	232,753	15.0%	5	$12,630	80%	75%	1.13	370
Large Office	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	146,139	15.0%	5	$12,630	80%	75%	0.71	6
Large Office	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	232,753	2.5%	18	$24,000	45%	45%	0.35	55
Large Office	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	146,139	2.5%	18	$24,000	45%	45%	0.22	1
Large Office	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	232,753	2.5%	30	$253,250	98%	4%	0.05	9
Large Office	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	146,139	2.5%	30	$253,250	98%	4%	0.03	0
Large Office	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	232,753	5.0%	10	$2,230	10%	10%	4.43	8
Large Office	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	232,753	0.5%	25	$16,250	25%	75%	0.13	5
Large Office	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	146,139	0.5%	25	$16,250	25%	75%	0.08	0
Large Office	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	232,753	0.8%	25	$20,500	65%	75%	0.16	19
Large Office	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	146,139	0.8%	25	$20,500	65%	75%	0.10	0
Large Office	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	232,753	0.6%	25	$15,250	4%	75%	0.17	2
Large Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	232,753	3.0%	25	$10,090	15%	10%	1.30	3
Large Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	232,753	4.4%	25	$16,150	15%	10%	1.19	5
Large Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	146,139	3.3%	25	$4,510	15%	10%	2.00	0
Large Office	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	232,753	5.0%	25	$8,350	35%	10%	2.61	29
Large Office	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	146,139	3.0%	25	$13,410	95%	95%	0.61	7
Large Office	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	232,753	0.3%	25	$6,750	15%	35%	0.16	1

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	146,139	0.3%	25	$6,750	15%	35%	0.10	0
Large Office	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	232,753	0.8%	25	$13,000	15%	35%	0.25	4
Large Office	Cooling DX	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	146,139	10.0%	40	$100,000	61%	95%	0.37	14
Large Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	232,753	15.4%	15	$10,800	50%	0%	4.13	1
Large Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	146,139	5.7%	15	$24,320	85%	0%	0.43	0
Large Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	232,753	20.3%	15	$41,200	85%	0%	1.42	3
Large Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	232,753	15.1%	15	$369,200	25%	0%	0.12	1
Large Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	232,753	10.5%	15	$6,800	50%	0%	4.47	1
Large Office	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	146,139	0.4%	30	$35,450	90%	75%	0.04	1
Large Office	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	146,139	3.8%	20	$10,470	80%	90%	0.83	7
Large Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	232,753	16.4%	10	$151,600	5%	2%	0.21	1
Large Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	232,753	1.8%	10	$31,600	25%	2%	0.11	0
Large Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	146,139	1.8%	10	$25,280	25%	2%	0.09	0
Large Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	232,753	7.6%	10	$72,000	50%	2%	0.21	4
Large Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	146,139	7.6%	10	$57,600	50%	2%	0.16	0
Large Office	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	232,753	3.0%	5	$10,560	20%	20%	0.27	1
Large Office	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	146,139	3.0%	5	$8,440	20%	20%	0.21	0
Large Office	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	232,753	3.0%	15	$140	67%	95%	61.93	159
Large Office	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	146,139	3.0%	15	$140	67%	95%	38.89	3
Large Office	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	232,753	30.0%	10	$304,000	70%	15%	0.20	343
Large Office	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	146,139	3.1%	30	$2,290	75%	75%	4.26	5
Large Office	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	232,753	5.7%	25	$594,390	98%	15%	0.04	44

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	146,139	5.7%	25	$594,390	98%	80%	0.03	4
Large Office	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	232,753	3.6%	40	$178,130	95%	15%	0.12	27
Large Office	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	146,139	3.6%	40	$178,130	95%	80%	0.07	2
Large Office	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	122,265	20.0%	10	$20,430	85%	20%	0.83	243
Large Office	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	17,486	20.0%	10	$20,430	85%	20%	0.12	1
Large Office	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	122,265	7.0%	20	$20,290	75%	85%	0.55	1,900
Large Office	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	17,486	7.0%	20	$20,290	75%	85%	0.08	9
Large Office	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	122,265	0.9%	10	$740	81%	85%	1.03	355
Large Office	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	17,486	0.9%	10	$740	81%	85%	0.15	2
Large Office	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	122,265	5.3%	20	$13,510	75%	85%	0.62	482
Large Office	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	17,486	5.3%	20	$13,510	75%	85%	0.09	2
Large Office	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	122,265	8.8%	10	$36,520	77%	50%	0.20	228
Large Office	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	17,486	8.8%	10	$36,520	77%	65%	0.03	1
Large Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	122,265	7.0%	5	$20,000	65%	4%	0.14	53
Large Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	17,486	7.0%	5	$20,000	65%	4%	0.02	0
Large Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	122,265	7.0%	5	$20,000	65%	90%	0.14	1,203
Large Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	17,486	7.0%	5	$20,000	65%	90%	0.02	6
Large Office	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	122,265	12.0%	10	$304,000	70%	15%	0.03	684
Large Office	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	581,995	2.7%	9	$33,860	75%	85%	0.27	4,826

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	364,077	2.7%	9	$33,860	75%	85%	0.17	99
Large Office	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	581,995	15.0%	9	$12,650	78%	30%	4.02	1,667
Large Office	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	364,077	15.0%	9	$12,650	78%	30%	2.51	41
Large Office	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	581,995	11.3%	9	$9,490	100%	75%	4.01	3,974
Large Office	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	364,077	11.3%	13	$9,490	99%	75%	3.58	101
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	581,995	15.0%	14	$12,960	70%	90%	5.34	7,864
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	New	364,077	15.0%	14	$7,800	70%	90%	5.55	161
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	581,995	20.0%	14	$32,100	85%	75%	2.76	10,185
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	New	364,077	20.0%	14	$25,200	85%	75%	2.20	209
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	581,995	25.0%	14	$51,240	90%	70%	2.07	12,058
Large Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	New	364,077	25.0%	14	$42,600	90%	70%	1.56	247
Large Office	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.0	Existing Lighting Design	Existing	581,995	39.5%	14	$77,380	40%	95%	2.51	39,871
Large Office	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	Existing	581,995	12.5%	20	$18,750	90%	15%	4.49	4,530
Large Office	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	New	364,077	12.5%	20	$14,580	90%	15%	3.61	93
Large Office	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	581,995	1.4%	11	$1,600	65%	95%	3.85	1,187
Large Office	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	581,995	1.8%	11	$1,600	65%	95%	4.91	1,511
Large Office	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	581,995	7.0%	5	$27,000	85%	90%	0.45	9,480
Large Office	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	581,995	4.0%	9	$1,870	87%	90%	6.95	2,894

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	364,077	4.0%	10	$1,870	87%	90%	4.83	98
Large Office	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	581,995	1.5%	13	$28,080	75%	65%	0.26	2,072
Large Office	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	581,995	4.9%	9	$2,620	88%	85%	6.30	2,559
Large Office	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	310,959	0.1%	7	$80	90%	20%	1.51	24
Large Office	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	310,959	0.1%	7	$80	90%	20%	1.51	1
Large Office	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	310,959	14.8%	4	$100	25%	64%	111.71	2,834
Large Office	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	310,959	14.4%	4	$100	25%	64%	108.44	90
Large Office	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	310,959	1.4%	6	$630	45%	90%	2.61	849
Large Office	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	310,959	1.4%	6	$630	45%	90%	2.61	28
Large Office	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	310,959	0.2%	4	$4	45%	90%	39.58	127
Large Office	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	310,959	0.2%	4	$4	45%	90%	39.58	4
Large Office	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	310,959	6.1%	4	$15,000	15%	64%	0.30	694
Large Office	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	310,959	6.1%	4	$15,000	15%	64%	0.30	23
Large Office	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	310,959	0.1%	5	$60	40%	75%	2.00	56
Large Office	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	310,959	0.1%	5	$60	40%	75%	2.00	2
Large Office	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	310,959	0.1%	4	$4	45%	90%	16.70	54
Large Office	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	310,959	0.1%	4	$4	45%	90%	16.70	2
Large Office	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	310,959	0.5%	10	$4	75%	65%	224.10	328
Large Office	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	310,959	0.5%	10	$4	75%	65%	224.10	11
Large Office	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	310,959	1.8%	5	$5,040	30%	95%	0.01	149
Large Office	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	310,959	1.8%	5	$5,040	30%	95%	0.01	5
Large Office	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	310,959	0.0%	13	$120	65%	19%	0.55	5

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	310,959	0.0%	13	$120	65%	19%	0.55	0
Large Office	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	310,959	0.3%	7	$550	35%	25%	0.77	39
Large Office	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	310,959	0.5%	14	$160	80%	10%	9.31	65
Large Office	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	310,959	0.5%	14	$160	80%	10%	9.31	2
Large Office	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	310,959	0.4%	3	$280	25%	10%	0.72	14
Large Office	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	266,962	10.0%	15	$25,000	94%	75%	0.89	2,871
Large Office	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	266,962	12.5%	3	$19,710	40%	90%	0.27	1,609
Large Office	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	266,962	15.0%	5	$31,260	28%	5%	0.35	34
Large Office	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	266,962	10.0%	5	$17,500	80%	75%	0.42	2,043
Large Office	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	266,962	15.0%	5	$12,630	80%	75%	0.86	1,719
Large Office	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	739,293	15.0%	5	$12,630	80%	75%	2.39	143
Large Office	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	266,962	2.5%	18	$24,000	45%	45%	0.27	172
Large Office	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	266,962	15.0%	10	$90,700	94%	5%	0.25	241
Large Office	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	266,962	10.0%	10	$2,230	10%	10%	6.77	43
Large Office	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	266,962	0.5%	25	$16,250	25%	75%	0.10	15
Large Office	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	739,293	0.5%	25	$16,250	25%	75%	0.29	1
Large Office	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	266,962	0.8%	25	$20,500	65%	75%	0.12	58
Large Office	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	739,293	0.8%	25	$20,500	65%	75%	0.34	6
Large Office	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	266,962	0.6%	25	$15,250	4%	75%	0.13	6

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	266,962	3.0%	25	$10,090	15%	10%	1.01	9
Large Office	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	266,962	4.4%	25	$16,150	15%	10%	0.93	12
Large Office	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	266,962	12.5%	25	$8,350	35%	10%	5.09	186
Large Office	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	739,293	6.0%	25	$13,410	95%	95%	4.21	202
Large Office	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	266,962	0.3%	25	$6,750	15%	35%	0.13	4
Large Office	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	266,962	0.8%	25	$13,000	15%	35%	0.20	12
Large Office	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	739,293	10.0%	40	$100,000	61%	95%	1.29	196
Large Office	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	739,293	0.9%	30	$35,450	90%	75%	0.27	19
Large Office	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	739,293	1.3%	20	$10,470	80%	90%	0.94	29
Large Office	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	739,293	5.3%	10	$46,400	95%	75%	0.47	145
Large Office	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	266,962	3.0%	5	$10,560	20%	20%	0.21	2
Large Office	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	739,293	3.0%	5	$8,440	20%	20%	0.72	0
Large Office	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	266,962	25.0%	10	$211,000	98%	25%	0.18	2,066
Large Office	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	266,962	3.0%	15	$140	67%	95%	47.50	82
Large Office	Space Heat	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	266,962	13.0%	10	$304,000	70%	15%	0.06	431
Large Office	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	266,962	5.7%	25	$594,390	98%	15%	0.03	130
Large Office	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	739,293	5.7%	25	$594,390	98%	80%	0.09	140
Large Office	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	266,962	3.6%	40	$178,130	95%	15%	0.09	79
Large Office	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	26,814	3.3%	20	$1,940	NA	NA	0.54	435
Large Office	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	26,891	3.3%	20	$1,940	NA	NA	0.54	47

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Large Office	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	28,062	5.0%	15	$27,780	80%	55%	0.05	200
Large Office	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	28,062	0.8%	10	$2,570	95%	7%	0.06	1
Large Office	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	28,062	0.9%	13	$2,400	25%	8%	0.09	1
Large Office	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	28,062	0.4%	13	$120	25%	8%	0.80	0
Large Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	28,062	10.0%	25	$2,330	92%	5%	1.67	43
Large Office	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	28,062	3.2%	10	$20	25%	95%	27.77	77
Large Office	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	28,062	4.5%	10	$70	15%	95%	11.22	66
Large Office	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	28,062	50.0%	15	$28,510	94%	19%	0.45	63
Large Office	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	28,062	1.0%	15	$160	30%	80%	1.59	23
Large Office	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	28,062	1.1%	10	$10	75%	15%	19.64	13
Large Office	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	28,062	2.5%	10	$10	20%	15%	43.65	8
Large Office	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	28,062	27.9%	20	$53,550	95%	20%	0.17	54
Large Office	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	28,062	4.0%	10	$1,040	35%	15%	0.67	19
Large Office	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	28,062	7.7%	11	$1,640	40%	75%	0.90	215
Large Office	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	28,062	61.7%	15	$12,270	94%	2%	1.28	4
Large Office	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	26,881	61.7%	15	$12,270	94%	21%	1.23	1
Large Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	28,062	8.5%	20	$2,080	75%	85%	1.33	554
Large Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	26,881	8.5%	20	$2,080	45%	10%	1.28	1
Lodging	Cooking	Convection Oven	Convection Oven	Standard Oven	Existing	7,071	1.8%	15	$135	55%	19%	0.84	8
Lodging	Cooking	Convection Oven	Convection Oven	Standard Oven	New	7,071	1.8%	15	$137	55%	19%	0.84	0
Lodging	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	Existing	7,071	1.0%	12	$87	70%	23%	0.58	7

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	New	7,071	1.0%	12	$87	70%	23%	0.58	0
Lodging	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	Existing	7,071	3.8%	12	$117	21%	55%	1.67	19
Lodging	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	New	7,071	3.9%	12	$119	21%	55%	1.66	1
Lodging	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	Existing	7,071	4.3%	10	$170	75%	11%	1.08	15
Lodging	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	New	7,071	4.3%	10	$172	75%	11%	1.07	0
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	18,684	10.4%	15	$5,880	NA	NA	0.43	1,544
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	11,634	10.4%	15	$4,704	NA	NA	0.34	81
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	18,684	2.6%	15	$1,645	NA	NA	0.39	0
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	11,634	2.6%	15	$1,316	NA	NA	0.30	0
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	18,684	6.7%	15	$3,255	NA	NA	0.50	0
Lodging	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	11,634	6.7%	15	$2,604	NA	NA	0.39	0
Lodging	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	18,765	15.0%	15	$6,384	99%	2%	0.57	3
Lodging	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	11,033	15.0%	15	$5,107	99%	70%	0.42	2
Lodging	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	18,765	3.0%	15	$35	3%	44%	21.16	9
Lodging	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	11,033	3.0%	15	$28	50%	44%	15.21	2
Lodging	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	18,765	1.0%	10	$6,983	75%	1%	0.02	2
Lodging	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	11,033	1.0%	10	$6,983	75%	1%	0.01	0
Lodging	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	18,765	2.0%	15	$2,625	94%	50%	0.19	119
Lodging	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	11,033	2.0%	15	$1,400	94%	50%	0.21	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	11,033	12.5%	3	$7,665	80%	90%	0.04	17
Lodging	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	18,765	12.5%	3	$2,070	40%	90%	0.27	774
Lodging	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	18,765	10.0%	20	$7,140	98%	45%	0.44	659
Lodging	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	11,033	10.0%	20	$7,140	98%	45%	0.26	10
Lodging	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	18,765	15.0%	15	$5,954	30%	10%	0.62	80
Lodging	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	18,765	10.0%	3	$1,680	95%	95%	0.27	1,482
Lodging	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	18,765	25.0%	15	$21,880	85%	50%	0.28	1,517
Lodging	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	11,033	25.0%	15	$21,880	85%	50%	0.16	23
Lodging	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	18,765	15.0%	5	$3,282	52%	5%	0.36	17
Lodging	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	18,765	10.0%	5	$1,838	80%	75%	0.43	532
Lodging	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	11,033	10.0%	5	$1,838	80%	75%	0.25	8
Lodging	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	18,765	15.0%	5	$1,326	80%	50%	0.90	303
Lodging	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	11,033	15.0%	5	$1,326	80%	50%	0.53	5
Lodging	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	18,765	2.5%	18	$2,520	45%	45%	0.28	65
Lodging	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	11,033	2.5%	18	$2,520	45%	45%	0.17	1
Lodging	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	18,765	4.5%	10	$5,450	85%	58%	0.14	276
Lodging	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	11,033	4.5%	10	$5,450	85%	58%	0.08	4
Lodging	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	18,765	10.0%	30	$106,365	98%	4%	0.04	41
Lodging	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	11,033	10.0%	30	$106,365	98%	4%	0.02	1

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Cooling DX	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	Existing	18,765	18.0%	15	$4,071	95%	60%	1.08	2,038
Lodging	Cooling DX	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	New	11,033	18.0%	15	$4,071	95%	60%	0.64	35
Lodging	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	18,765	5.0%	10	$385	10%	10%	2.16	10
Lodging	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	18,765	2.0%	25	$6,825	45%	75%	0.11	41
Lodging	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	11,033	2.0%	25	$6,825	45%	75%	0.06	1
Lodging	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	18,765	3.0%	25	$8,610	85%	75%	0.13	116
Lodging	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	11,033	3.0%	25	$8,610	85%	75%	0.08	2
Lodging	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	18,765	2.4%	25	$6,405	25%	75%	0.14	55
Lodging	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	18,765	3.0%	25	$1,059	15%	10%	1.04	4
Lodging	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	18,765	4.4%	25	$1,696	15%	10%	0.95	6
Lodging	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	11,033	3.3%	25	$474	15%	10%	1.51	0
Lodging	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	18,765	5.0%	25	$1,352	35%	10%	1.36	35
Lodging	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	11,033	3.0%	25	$2,172	95%	95%	0.30	7
Lodging	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	18,765	1.0%	25	$2,835	35%	35%	0.13	15
Lodging	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	11,033	1.0%	25	$2,835	35%	35%	0.08	0
Lodging	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	18,765	3.0%	25	$5,460	35%	35%	0.20	46
Lodging	Cooling DX	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	11,033	10.0%	40	$10,500	61%	95%	0.28	14
Lodging	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	18,765	15.4%	15	$1,134	50%	35%	3.33	142
Lodging	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	11,033	5.7%	15	$2,554	85%	35%	0.32	6
Lodging	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	18,765	20.3%	15	$4,326	85%	35%	1.15	318

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	18,765	15.1%	15	$38,766	25%	35%	0.09	69
Lodging	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	18,765	10.5%	15	$714	50%	35%	3.60	97
Lodging	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	11,033	0.6%	30	$3,722	90%	75%	0.04	1
Lodging	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	11,033	15.0%	20	$4,396	80%	90%	0.62	33
Lodging	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	18,765	16.4%	10	$15,918	5%	2%	0.17	1
Lodging	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	18,765	1.8%	10	$3,318	25%	2%	0.09	1
Lodging	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	11,033	1.8%	10	$2,654	25%	2%	0.07	0
Lodging	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	18,765	7.6%	10	$7,560	50%	2%	0.17	5
Lodging	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	11,033	7.6%	10	$6,048	50%	2%	0.12	0
Lodging	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	18,765	3.0%	5	$1,109	20%	20%	0.21	1
Lodging	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	11,033	3.0%	5	$886	20%	20%	0.16	0
Lodging	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	18,765	3.0%	15	$139	78%	95%	5.29	227
Lodging	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	11,033	3.0%	15	$139	78%	95%	3.11	4
Lodging	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	11,033	9.6%	30	$10,039	75%	75%	0.23	12
Lodging	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	18,765	9.9%	25	$102,527	98%	15%	0.04	87
Lodging	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	11,033	7.3%	25	$102,527	98%	80%	0.02	5
Lodging	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	18,765	6.2%	40	$30,726	50%	15%	0.10	28
Lodging	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	11,033	4.6%	40	$30,726	50%	80%	0.04	2
Lodging	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	5,525	20.0%	10	$2,145	85%	20%	0.30	41
Lodging	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	4,480	20.0%	10	$2,145	85%	20%	0.25	1
Lodging	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	5,525	1.1%	18	$5,040	45%	60%	0.01	29

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	4,480	1.1%	18	$5,040	45%	60%	0.01	1
Lodging	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	5,525	7.0%	20	$2,130	75%	85%	0.20	318
Lodging	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	4,480	7.0%	20	$2,130	75%	85%	0.16	8
Lodging	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	5,525	0.9%	10	$78	81%	85%	0.38	59
Lodging	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	4,480	0.9%	10	$78	81%	85%	0.31	2
Lodging	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	5,525	5.3%	20	$1,419	75%	85%	0.23	81
Lodging	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	4,480	5.3%	20	$1,419	75%	85%	0.19	2
Lodging	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	5,525	7.0%	5	$2,100	65%	4%	0.05	9
Lodging	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	4,480	7.0%	5	$2,100	65%	4%	0.04	0
Lodging	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	5,525	7.0%	5	$2,100	65%	90%	0.05	202
Lodging	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	4,480	7.0%	5	$2,100	65%	90%	0.04	5
Lodging	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	52,492	2.7%	9	$3,555	75%	85%	0.22	1,671
Lodging	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	24,724	2.7%	9	$1,778	75%	85%	0.20	26
Lodging	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	52,492	6.0%	9	$8,197	92%	30%	0.21	196
Lodging	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	24,724	6.0%	9	$8,197	92%	30%	0.10	4
Lodging	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	52,492	4.5%	9	$6,149	100%	75%	0.21	399
Lodging	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	24,724	4.5%	13	$6,149	99%	75%	0.14	9
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	52,492	15.0%	14	$1,361	70%	90%	4.27	2,722
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	New	24,724	15.0%	14	$819	70%	90%	3.34	42

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	52,492	20.0%	14	$3,371	85%	75%	2.21	3,526
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	New	24,724	20.0%	14	$2,646	85%	75%	1.32	54
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	52,492	25.0%	14	$5,380	90%	70%	1.66	4,174
Lodging	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	New	24,724	25.0%	14	$4,473	90%	70%	0.94	64
Lodging	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.0	Existing Lighting Design	Existing	52,492	53.0%	14	$8,125	40%	95%	2.69	18,520
Lodging	Lighting	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	Existing	52,492	31.5%	15	$4,071	95%	60%	3.57	10,961
Lodging	Lighting	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	New	24,724	31.5%	15	$4,071	95%	60%	1.68	229
Lodging	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	52,492	1.4%	11	$168	65%	95%	3.08	411
Lodging	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	52,492	1.8%	11	$168	65%	95%	3.92	523
Lodging	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	Existing	52,492	1.3%	13	$731	80%	10%	0.70	98
Lodging	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	New	24,724	2.7%	13	$737	80%	10%	0.70	3
Lodging	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	52,492	7.0%	5	$2,835	85%	90%	0.36	2,575
Lodging	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	52,492	4.0%	9	$196	98%	90%	5.54	1,053
Lodging	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	24,724	4.0%	10	$196	98%	90%	2.90	29
Lodging	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	52,492	3.6%	13	$2,520	90%	65%	0.58	2,049
Lodging	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	52,492	4.9%	9	$839	100%	85%	1.65	1,003
Lodging	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	22,478	0.1%	7	$5	90%	20%	1.66	7
Lodging	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	22,478	0.1%	7	$5	90%	20%	1.66	0
Lodging	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	22,478	7.5%	4	$5	25%	64%	78.27	400
Lodging	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	22,478	7.3%	4	$5	25%	64%	76.03	13

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	22,478	5.0%	6	$156	45%	90%	2.73	845
Lodging	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	22,478	5.0%	6	$156	45%	90%	2.73	28
Lodging	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	22,478	0.8%	4	$1	45%	90%	39.06	126
Lodging	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	22,478	0.8%	4	$1	45%	90%	39.06	4
Lodging	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	22,478	4.6%	4	$788	15%	64%	0.32	145
Lodging	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	22,478	4.6%	4	$788	15%	64%	0.32	5
Lodging	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	22,478	0.1%	5	$15	40%	75%	0.59	16
Lodging	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	22,478	0.1%	5	$15	40%	75%	0.59	1
Lodging	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	22,478	0.3%	4	$1	45%	90%	16.48	53
Lodging	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	22,478	0.3%	4	$1	45%	90%	16.48	2
Lodging	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	22,478	1.6%	10	$1	75%	5%	221.16	25
Lodging	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	22,478	1.6%	10	$1	75%	5%	221.16	1
Lodging	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	22,478	1.8%	5	$88	30%	95%	0.31	41
Lodging	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	22,478	1.8%	5	$88	30%	95%	0.31	1
Lodging	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	Existing	22,478	5.4%	10	$150	25%	25%	5.17	140
Lodging	Plug Load	Pool Pump Timers	Timer-controlled pool pump	Constant duty pool pump	New	22,478	5.4%	10	$150	25%	25%	5.17	5
Lodging	Plug Load	Pool Pumps - VSD			Existing	22,478	3.4%	20	$3,380	50%	25%	0.27	177
Lodging	Plug Load	Pool Pumps - VSD			New	22,478	3.4%	20	$3,380	50%	25%	0.27	6
Lodging	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	22,478	0.4%	13	$120	65%	24%	0.55	23
Lodging	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	22,478	0.4%	13	$120	65%	24%	0.55	1
Lodging	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	22,478	4.2%	7	$550	35%	25%	0.77	154
Lodging	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	22,478	7.8%	14	$158	80%	90%	9.80	2,328

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	22,478	7.8%	14	$158	80%	90%	9.80	76
Lodging	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	22,478	5.2%	3	$284	25%	90%	0.74	489
Lodging	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	Existing	3,119	19.9%	10	$174	95%	67%	2.22	723
Lodging	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	New	3,119	19.9%	10	$174	95%	67%	2.22	24
Lodging	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	Existing	3,119	1.3%	10	$12	68%	5%	2.19	3
Lodging	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	New	3,119	1.3%	10	$62	68%	5%	0.41	0
Lodging	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Existing	3,119	0.7%	15	$179	65%	30%	0.11	3
Lodging	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	New	3,119	0.7%	15	$181	65%	30%	0.11	0
Lodging	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	Existing	3,119	1.8%	15	$57	75%	15%	0.90	6
Lodging	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	New	3,119	1.8%	15	$11	75%	15%	4.88	0
Lodging	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Existing	3,119	8.4%	10	$182	72%	15%	0.90	21
Lodging	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	New	3,119	8.4%	10	$183	72%	15%	0.89	1
Lodging	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	Existing	3,119	1.0%	15	$23	75%	92%	1.18	15
Lodging	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	New	3,119	1.0%	15	$23	75%	92%	1.18	1
Lodging	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	Existing	3,119	3.2%	10	$138	86%	100%	0.45	157
Lodging	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	New	3,119	3.2%	10	$138	86%	100%	0.45	5
Lodging	Refrigeration	Parallel Unequal Compressor	Multiple Compressors in Parallel	Parallel Equal Compressors (2)	Existing	3,119	8.4%	15	$1,000	90%	35%	0.24	121
Lodging	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	Existing	3,119	6.0%	10	$8	70%	40%	13.89	39
Lodging	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	New	3,119	6.0%	10	$8	70%	40%	13.89	1

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Refrigeration	Refrigeration - Retro Commissioning	Refrigeration Retro Commissioning (Refrigeration System Diagnostics / Operations And Maintenance)	No Re-commissioning	Existing	3,119	6.8%	3	$33	90%	10%	1.12	28
Lodging	Refrigeration	Refrigeration - Commissioning	Commissioning (Refrigeration System Diagnostics / Operations and Maintenance for a new unit)	No Commissioning	New	3,119	3.8%	3	$13	90%	5%	1.60	0
Lodging	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	3,119	1.2%	10	$25	95%	75%	0.89	47
Lodging	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	3,119	1.2%	10	$25	95%	75%	0.89	2
Lodging	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	3,119	3.2%	16	$34	77%	95%	2.87	134
Lodging	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	3,119	3.2%	16	$35	77%	95%	2.78	4
Lodging	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	Existing	3,119	2.0%	4	$180	20%	10%	0.08	2
Lodging	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	New	3,119	2.0%	4	$180	20%	10%	0.08	0
Lodging	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	39,672	2.0%	15	$2,625	94%	25%	0.24	241
Lodging	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	39,672	12.5%	3	$2,070	40%	90%	0.36	2,603
Lodging	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	39,672	15.0%	5	$3,282	52%	5%	0.46	103
Lodging	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	39,672	10.0%	5	$1,838	80%	75%	0.55	3,307
Lodging	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	39,672	15.0%	5	$1,326	80%	50%	1.15	1,895
Lodging	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	59,836	15.0%	5	$1,326	80%	50%	1.74	91
Lodging	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	39,672	2.5%	18	$2,520	45%	45%	0.36	278
Lodging	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	39,672	15.0%	10	$9,524	94%	5%	0.33	389
Lodging	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	39,672	4.5%	10	$5,450	85%	58%	0.17	1,121
Lodging	Space Heat	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	Existing	39,672	18.0%	15	$4,071	95%	60%	1.37	7,006

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	39,672	10.0%	10	$385	10%	10%	5.48	71
Lodging	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	39,672	2.0%	25	$6,825	45%	75%	0.14	165
Lodging	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	59,836	2.0%	25	$6,825	45%	75%	0.21	9
Lodging	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	39,672	3.0%	25	$8,610	85%	75%	0.17	472
Lodging	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	59,836	3.0%	25	$8,610	85%	75%	0.25	27
Lodging	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	39,672	2.4%	25	$6,405	25%	75%	0.18	224
Lodging	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	39,672	3.0%	25	$1,059	15%	10%	1.34	14
Lodging	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	39,672	4.4%	25	$1,696	15%	10%	1.23	20
Lodging	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	39,672	12.5%	25	$1,352	35%	10%	4.39	308
Lodging	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	59,836	6.0%	25	$2,172	95%	95%	1.98	177
Lodging	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	39,672	1.0%	25	$2,835	35%	35%	0.17	61
Lodging	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	39,672	3.0%	25	$5,460	35%	35%	0.26	187
Lodging	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	59,836	10.0%	40	$10,500	61%	95%	0.93	179
Lodging	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	59,836	0.0%	30	$3,722	90%	75%	0.01	0
Lodging	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	59,836	5.0%	20	$4,396	80%	90%	0.68	105
Lodging	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	59,836	5.3%	10	$4,872	95%	75%	0.34	131
Lodging	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	39,672	3.0%	5	$1,109	20%	20%	0.28	3
Lodging	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	59,836	3.0%	5	$886	20%	20%	0.52	0
Lodging	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	39,672	25.0%	10	$22,155	98%	25%	0.24	3,342
Lodging	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	39,672	3.0%	15	$139	78%	95%	6.71	157
Lodging	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	39,672	9.9%	25	$102,527	98%	15%	0.05	353

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Lodging	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	59,836	7.3%	25	$102,527	98%	80%	0.05	159
Lodging	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	39,672	6.2%	40	$30,726	50%	15%	0.13	113
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	6,070	10.4%	15	$1,391	NA	NA	0.70	8,587
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	4,136	10.4%	15	$1,113	NA	NA	0.60	493
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	6,070	2.6%	15	$389	NA	NA	0.63	0
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	4,136	2.6%	15	$311	NA	NA	0.53	0
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	6,070	6.7%	15	$770	NA	NA	0.81	0
Miscellaneous	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	4,136	6.7%	15	$616	NA	NA	0.69	0
Miscellaneous	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	6,353	15.0%	15	$1,510	99%	2%	0.97	25
Miscellaneous	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	3,994	15.0%	15	$1,208	99%	70%	0.76	17
Miscellaneous	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	6,353	3.0%	15	$8	3%	44%	35.50	74
Miscellaneous	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	3,994	3.0%	15	$7	50%	44%	27.71	21
Miscellaneous	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	6,353	1.0%	10	$1,530	75%	1%	0.04	12
Miscellaneous	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	3,994	1.0%	10	$1,530	75%	1%	0.03	0
Miscellaneous	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	6,353	10.0%	15	$575	94%	50%	1.70	7,594
Miscellaneous	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	3,994	10.0%	15	$307	94%	50%	2.01	148
Miscellaneous	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	3,994	12.5%	3	$1,679	80%	90%	0.08	169
Miscellaneous	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	6,353	12.5%	3	$453	40%	90%	0.49	6,562
Miscellaneous	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	6,353	10.0%	20	$1,564	98%	45%	0.80	5,587

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	3,994	10.0%	20	$1,564	98%	45%	0.50	101
Miscellaneous	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	6,353	15.0%	15	$1,409	70%	10%	1.04	1,567
Miscellaneous	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	6,353	10.0%	3	$397	95%	95%	0.45	12,568
Miscellaneous	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	6,353	25.0%	15	$4,793	85%	50%	0.51	12,866
Miscellaneous	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	3,994	25.0%	15	$4,793	85%	50%	0.32	239
Miscellaneous	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	6,353	15.0%	5	$719	66%	45%	0.66	1,630
Miscellaneous	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	6,353	10.0%	5	$403	80%	75%	0.79	4,617
Miscellaneous	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	3,994	10.0%	5	$403	80%	75%	0.50	78
Miscellaneous	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	6,353	15.0%	5	$290	80%	50%	1.64	2,483
Miscellaneous	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	3,994	15.0%	5	$290	80%	50%	1.03	45
Miscellaneous	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	6,353	2.5%	18	$552	45%	45%	0.52	548
Miscellaneous	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	3,994	2.5%	18	$552	45%	45%	0.33	10
Miscellaneous	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	6,353	10.0%	30	$23,299	98%	4%	0.07	348
Miscellaneous	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	3,994	10.0%	30	$23,299	98%	4%	0.04	6
Miscellaneous	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	6,353	5.0%	10	$21	10%	10%	16.16	83
Miscellaneous	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	6,353	2.0%	25	$1,495	45%	75%	0.20	344
Miscellaneous	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	3,994	2.0%	25	$1,495	45%	75%	0.12	6
Miscellaneous	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	6,353	3.0%	25	$1,886	85%	75%	0.23	985
Miscellaneous	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	3,994	3.0%	25	$1,886	85%	75%	0.15	16
Miscellaneous	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	6,353	2.4%	25	$1,403	30%	75%	0.25	560

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	6,353	3.0%	25	$232	15%	10%	1.90	35
Miscellaneous	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	6,353	4.4%	25	$371	15%	10%	1.74	51
Miscellaneous	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	3,994	3.3%	25	$104	15%	10%	2.94	1
Miscellaneous	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	6,353	5.0%	25	$633	35%	10%	1.16	258
Miscellaneous	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	3,994	3.0%	25	$1,017	95%	95%	0.27	54
Miscellaneous	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	6,353	1.0%	25	$621	50%	35%	0.24	181
Miscellaneous	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	3,994	1.0%	25	$621	50%	35%	0.15	3
Miscellaneous	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	6,353	3.0%	25	$1,196	50%	35%	0.37	547
Miscellaneous	Cooling DX	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	3,994	10.0%	40	$2,300	61%	95%	0.54	141
Miscellaneous	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	6,353	15.4%	15	$268	50%	0%	5.64	11
Miscellaneous	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	3,994	5.7%	15	$604	85%	0%	0.58	1
Miscellaneous	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	6,353	20.3%	15	$1,024	85%	0%	1.94	25
Miscellaneous	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	6,353	15.1%	15	$9,171	25%	0%	0.16	5
Miscellaneous	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	6,353	10.5%	15	$169	50%	0%	6.10	8
Miscellaneous	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	3,994	15.0%	20	$963	80%	90%	1.22	316
Miscellaneous	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	6,353	16.4%	10	$3,766	5%	2%	0.29	9
Miscellaneous	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	6,353	1.8%	10	$785	25%	2%	0.15	5
Miscellaneous	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	3,994	1.8%	10	$628	25%	2%	0.12	0
Miscellaneous	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	6,353	7.6%	10	$1,788	50%	2%	0.28	42
Miscellaneous	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	3,994	7.6%	10	$1,431	50%	2%	0.22	1
Miscellaneous	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	6,353	3.0%	5	$262	20%	20%	0.36	7
Miscellaneous	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	3,994	3.0%	5	$210	20%	20%	0.29	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	6,353	3.0%	15	$138	63%	95%	2.12	1,454
Miscellaneous	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	3,994	3.0%	15	$138	63%	95%	1.33	26
Miscellaneous	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	6,353	30.0%	10	$6,992	70%	15%	0.29	3,392
Miscellaneous	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	6,353	3.2%	25	$5,518	98%	15%	0.09	240
Miscellaneous	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	3,994	9.9%	25	$5,518	98%	80%	0.17	75
Miscellaneous	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	6,353	2.0%	40	$1,654	70%	15%	0.24	108
Miscellaneous	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	3,994	6.2%	40	$1,654	70%	80%	0.46	40
Miscellaneous	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	5,058	20.0%	10	$470	85%	20%	1.52	1,130
Miscellaneous	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	2,403	20.0%	10	$470	85%	20%	0.72	18
Miscellaneous	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	5,058	7.0%	20	$467	75%	85%	1.00	8,840
Miscellaneous	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	2,403	7.0%	20	$467	75%	85%	0.48	138
Miscellaneous	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	5,058	0.9%	10	$17	81%	85%	1.89	1,652
Miscellaneous	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	2,403	0.9%	10	$17	81%	85%	0.90	26
Miscellaneous	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	5,058	5.3%	20	$311	75%	85%	1.14	2,241
Miscellaneous	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	2,403	5.3%	20	$311	75%	85%	0.54	35
Miscellaneous	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	5,058	8.8%	10	$840	77%	10%	0.37	212
Miscellaneous	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	2,403	8.8%	10	$840	77%	20%	0.18	7
Miscellaneous	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	5,058	7.0%	5	$460	65%	4%	0.26	249
Miscellaneous	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	2,403	7.0%	5	$460	65%	4%	0.12	4
Miscellaneous	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	5,058	7.0%	5	$460	65%	90%	0.26	5,595

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	2,403	7.0%	5	$460	65%	90%	0.12	87
Miscellaneous	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	5,058	12.0%	10	$6,992	70%	15%	0.06	3,192
Miscellaneous	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	19,469	2.7%	9	$389	75%	25%	0.86	6,191
Miscellaneous	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	14,944	2.7%	9	$389	75%	25%	0.66	156
Miscellaneous	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	19,469	15.0%	9	$2,300	84%	30%	0.81	6,925
Miscellaneous	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	14,944	15.0%	9	$2,300	84%	30%	0.62	245
Miscellaneous	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	19,469	11.3%	9	$1,725	100%	75%	0.81	15,807
Miscellaneous	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	14,944	11.3%	13	$1,725	99%	75%	0.88	553
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.23	Existing	19,469	15.0%	14	$392	70%	90%	6.45	34,296
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.23	New	14,944	15.0%	14	$245	70%	90%	7.91	862
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.23	Existing	19,469	20.0%	14	$928	85%	75%	3.49	44,422
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.23	New	14,944	20.0%	14	$733	85%	75%	3.39	1,117
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.23	Existing	19,469	25.0%	14	$1,466	90%	70%	2.64	52,588
Miscellaneous	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.23	New	14,944	25.0%	14	$1,222	90%	70%	2.43	1,322
Miscellaneous	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.23	Existing Lighting Design	Existing	19,469	34.2%	14	$2,151	40%	95%	2.85	150,657
Miscellaneous	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	Existing	19,469	14.3%	20	$431	90%	5%	8.16	7,544
Miscellaneous	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	New	14,944	14.3%	20	$335	90%	5%	8.05	190
Miscellaneous	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	19,469	1.4%	11	$37	65%	95%	6.12	5,177
Miscellaneous	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	19,469	1.8%	11	$37	65%	95%	7.79	6,589

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	19,469	7.0%	5	$621	85%	90%	0.72	40,612
Miscellaneous	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	19,469	4.0%	9	$43	83%	90%	11.03	11,438
Miscellaneous	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	14,944	4.0%	10	$43	83%	90%	9.41	514
Miscellaneous	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	19,469	13.7%	13	$2,520	90%	65%	0.96	97,949
Miscellaneous	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	19,469	4.9%	9	$247	100%	85%	2.44	12,633
Miscellaneous	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	5,733	0.1%	7	$1	90%	20%	1.62	57
Miscellaneous	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	5,733	0.1%	7	$1	90%	20%	1.62	2
Miscellaneous	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,733	6.7%	4	$1	25%	64%	80.51	3,062
Miscellaneous	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	5,733	6.5%	4	$1	25%	64%	78.55	98
Miscellaneous	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	5,733	20.0%	6	$157	45%	10%	2.76	3,230
Miscellaneous	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	5,733	20.0%	6	$157	45%	10%	2.76	106
Miscellaneous	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,733	3.0%	4	$1	45%	10%	45.18	483
Miscellaneous	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	5,733	3.0%	4	$1	45%	10%	45.18	16
Miscellaneous	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,733	4.0%	4	$173	15%	64%	0.32	1,093
Miscellaneous	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	5,733	4.0%	4	$173	15%	64%	0.32	36
Miscellaneous	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,733	0.1%	5	$15	40%	75%	0.15	135
Miscellaneous	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	5,733	0.1%	5	$15	40%	75%	0.15	4
Miscellaneous	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,733	1.3%	4	$1	45%	10%	19.07	204
Miscellaneous	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	5,733	1.3%	4	$1	45%	10%	19.07	7
Miscellaneous	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	5,733	6.4%	10	$1	75%	10%	255.81	1,729
Miscellaneous	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	5,733	6.4%	10	$1	75%	10%	255.81	57
Miscellaneous	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	5,733	1.8%	5	$19	30%	95%	1.41	358

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	5,733	1.8%	5	$19	30%	95%	1.41	12
Miscellaneous	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	5,733	16.8%	7	$550	35%	25%	0.77	5,293
Miscellaneous	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	5,733	31.0%	14	$158	80%	10%	9.90	8,906
Miscellaneous	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	5,733	31.0%	14	$158	80%	10%	9.90	292
Miscellaneous	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	5,733	20.8%	3	$283	25%	10%	0.75	1,869
Miscellaneous	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	Existing	469	1.3%	10	$56	68%	5%	0.07	13
Miscellaneous	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	New	469	1.3%	10	$56	68%	5%	0.07	0
Miscellaneous	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	Existing	469	1.8%	15	$8	75%	15%	0.93	30
Miscellaneous	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	New	469	1.8%	15	$2	75%	15%	4.78	1
Miscellaneous	Refrigeration	Parallel Unequal Compressor	Multiple Compressors in Parallel	Parallel Equal Compressors (2)	Existing	469	8.4%	15	$1,000	90%	35%	0.04	757
Miscellaneous	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	469	3.2%	16	$5	77%	95%	2.86	683
Miscellaneous	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	469	3.2%	16	$5	77%	95%	2.86	22
Miscellaneous	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	21,036	10.0%	15	$575	94%	50%	3.13	19,350
Miscellaneous	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	21,036	12.5%	3	$453	40%	90%	0.96	16,361
Miscellaneous	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	21,036	15.0%	5	$719	66%	45%	1.26	7,383
Miscellaneous	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	21,036	10.0%	5	$403	80%	75%	1.50	21,175
Miscellaneous	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	21,036	15.0%	5	$290	80%	50%	3.11	11,445
Miscellaneous	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	19,897	15.0%	5	$290	80%	50%	2.94	343

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	21,036	2.5%	18	$552	45%	45%	0.95	1,758
Miscellaneous	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	21,036	15.0%	10	$3,956	94%	5%	0.47	2,274
Miscellaneous	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	21,036	10.0%	10	$21	10%	10%	59.44	426
Miscellaneous	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	21,036	2.0%	25	$1,495	45%	75%	0.37	1,062
Miscellaneous	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	19,897	2.0%	25	$1,495	45%	75%	0.35	33
Miscellaneous	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	21,036	3.0%	25	$1,886	85%	75%	0.44	3,041
Miscellaneous	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	19,897	3.0%	25	$1,886	85%	75%	0.41	94
Miscellaneous	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	21,036	2.4%	25	$1,403	30%	75%	0.47	1,730
Miscellaneous	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	21,036	3.0%	25	$232	15%	10%	3.55	88
Miscellaneous	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	21,036	4.4%	25	$371	15%	10%	3.25	129
Miscellaneous	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	21,036	12.5%	25	$633	35%	10%	5.42	1,863
Miscellaneous	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	19,897	6.0%	25	$1,017	95%	95%	1.53	670
Miscellaneous	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	21,036	1.0%	25	$621	50%	35%	0.44	557
Miscellaneous	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	21,036	3.0%	25	$1,196	50%	35%	0.69	1,702
Miscellaneous	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	19,897	10.0%	40	$2,300	61%	95%	1.55	678
Miscellaneous	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	19,897	5.0%	20	$963	80%	90%	1.13	397
Miscellaneous	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	19,897	5.3%	10	$1,067	95%	75%	0.57	495
Miscellaneous	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	21,036	3.0%	5	$262	20%	20%	0.69	21
Miscellaneous	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	19,897	3.0%	5	$210	20%	20%	0.82	1
Miscellaneous	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	21,036	25.0%	10	$4,853	98%	25%	0.63	21,158
Miscellaneous	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	21,036	3.0%	15	$138	63%	95%	3.89	736

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Space Heat	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	21,036	13.0%	10	$6,992	70%	15%	0.23	4,280
Miscellaneous	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,036	3.2%	25	$5,518	98%	15%	0.16	732
Miscellaneous	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	19,897	9.9%	25	$5,518	98%	80%	0.46	821
Miscellaneous	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,036	2.0%	40	$1,654	70%	15%	0.46	333
Miscellaneous	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	1,527	3.3%	20	$92	NA	NA	0.72	2,521
Miscellaneous	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	1,527	3.3%	20	$92	NA	NA	0.72	272
Miscellaneous	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	1,598	34.5%	9	$129	80%	4%	2.68	636
Miscellaneous	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	1,598	5.0%	15	$639	94%	75%	0.13	1,806
Miscellaneous	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,598	4.3%	13	$600	25%	5%	0.10	17
Miscellaneous	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,598	2.0%	13	$30	25%	5%	0.94	8
Miscellaneous	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	1,598	10.0%	25	$126	92%	5%	1.96	247
Miscellaneous	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	1,598	3.2%	10	$2	25%	95%	15.42	448
Miscellaneous	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	1,598	4.5%	10	$7	15%	95%	6.81	380
Miscellaneous	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	1,598	50.0%	15	$1,357	94%	19%	0.60	364
Miscellaneous	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	1,598	1.0%	15	$26	90%	80%	0.64	372
Miscellaneous	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	1,598	0.5%	5	$5	50%	50%	0.50	69
Miscellaneous	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	1,598	1.1%	10	$5	75%	15%	2.48	75
Miscellaneous	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	1,598	2.5%	10	$9	20%	15%	3.03	44
Miscellaneous	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	1,598	31.2%	20	$2,550	95%	20%	0.25	351

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	1,598	4.0%	10	$65	35%	15%	0.68	109
Miscellaneous	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	1,598	7.7%	11	$102	55%	75%	0.92	1,695
Miscellaneous	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	1,598	61.7%	15	$12,275	94%	2%	0.08	24
Miscellaneous	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	1,527	61.7%	15	$12,275	94%	21%	0.08	6
Miscellaneous	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	1,598	8.5%	20	$130	75%	85%	1.36	3,213
Miscellaneous	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	1,527	8.5%	20	$130	45%	10%	1.30	6
Restaurant	Cooking	Convection Oven	Convection Oven	Standard Oven	Existing	17,524	10.6%	15	$1,957	45%	40%	0.85	959
Restaurant	Cooking	Convection Oven	Convection Oven	Standard Oven	New	17,524	10.7%	15	$1,976	45%	40%	0.85	32
Restaurant	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	Existing	17,524	5.7%	12	$1,259	70%	32%	0.59	653
Restaurant	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer	Non-Energy Star Fryer	New	17,524	5.8%	12	$1,271	70%	32%	0.59	22
Restaurant	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	Existing	17,524	22.3%	12	$1,697	21%	35%	1.68	839
Restaurant	Cooking	Hot Food Holding Cabinets - Commercial	Energy Star Commercial Hot Food Holding Cabinets	Non-Energy Star Commercial Hot Food Holding Cabinets	New	17,524	22.5%	12	$1,713	21%	35%	1.68	28
Restaurant	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	Existing	17,524	25.0%	10	$2,466	75%	39%	1.09	3,651
Restaurant	Cooking	Steam Cookers - Commercial	Energy Star Commercial Steam Cookers (50% efficiency)	Non-Energy Star Commercial Steam Cooker (35% efficiency)	New	17,524	25.2%	10	$2,490	75%	39%	1.09	121
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	13,481	10.4%	15	$2,800	NA	NA	0.63	7,031
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	7,655	10.4%	15	$2,240	NA	NA	0.45	337
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	13,481	2.6%	15	$783	NA	NA	0.56	0
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	7,655	2.6%	15	$627	NA	NA	0.40	0
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	13,481	6.7%	15	$1,550	NA	NA	0.73	0
Restaurant	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	7,655	6.7%	15	$1,240	NA	NA	0.52	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	14,735	15.0%	15	$3,040	99%	2%	0.91	21
Restaurant	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	7,399	15.0%	15	$2,432	99%	70%	0.57	12
Restaurant	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	14,735	3.0%	15	$17	3%	44%	33.12	63
Restaurant	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	7,399	3.0%	15	$13	50%	44%	21.02	15
Restaurant	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	14,735	1.0%	10	$1,663	75%	1%	0.08	11
Restaurant	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	7,399	1.0%	10	$1,663	75%	1%	0.04	0
Restaurant	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	7,399	12.5%	3	$1,825	80%	90%	0.12	135
Restaurant	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	14,735	12.5%	3	$493	40%	90%	0.87	5,990
Restaurant	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	14,735	10.0%	20	$1,700	98%	45%	1.38	5,606
Restaurant	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	7,399	10.0%	20	$1,700	98%	45%	0.69	73
Restaurant	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	14,735	15.0%	15	$2,835	50%	10%	0.98	911
Restaurant	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	14,735	10.0%	3	$800	95%	95%	0.43	9,679
Restaurant	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	14,735	25.0%	15	$5,210	85%	50%	0.89	12,814
Restaurant	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	7,399	25.0%	15	$5,210	85%	50%	0.45	188
Restaurant	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	14,735	15.0%	5	$782	100%	5%	1.16	250
Restaurant	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	14,735	10.0%	5	$438	100%	75%	1.38	5,205
Restaurant	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	7,399	10.0%	5	$438	100%	75%	0.69	72
Restaurant	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	14,735	15.0%	5	$316	100%	50%	2.87	2,670
Restaurant	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	7,399	15.0%	5	$316	100%	50%	1.44	41

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	14,735	2.5%	18	$600	45%	45%	0.90	546
Restaurant	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	7,399	2.5%	18	$600	45%	45%	0.45	8
Restaurant	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	14,735	4.5%	10	$5,450	85%	100%	0.10	3,555
Restaurant	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	7,399	4.5%	10	$5,450	85%	100%	0.05	50
Restaurant	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	14,735	10.0%	30	$25,325	98%	4%	0.12	307
Restaurant	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	7,399	10.0%	30	$25,325	98%	4%	0.06	4
Restaurant	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	14,735	5.0%	10	$70	10%	40%	8.99	285
Restaurant	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	14,735	2.0%	25	$1,625	95%	75%	0.34	668
Restaurant	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	7,399	2.0%	25	$1,625	95%	75%	0.17	9
Restaurant	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	14,735	3.0%	25	$2,050	98%	75%	0.41	1,046
Restaurant	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	7,399	3.0%	25	$2,050	98%	75%	0.20	15
Restaurant	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	14,735	2.4%	25	$1,525	85%	75%	0.44	1,479
Restaurant	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	14,735	3.0%	25	$252	15%	10%	3.32	31
Restaurant	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	14,735	4.4%	25	$404	15%	10%	3.04	46
Restaurant	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	7,399	3.3%	25	$113	15%	10%	4.10	1
Restaurant	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	14,735	5.0%	25	$660	35%	10%	2.11	234
Restaurant	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	7,399	3.0%	25	$1,060	95%	95%	0.40	42
Restaurant	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	14,735	1.0%	25	$675	90%	35%	0.41	300
Restaurant	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	7,399	1.0%	25	$675	90%	35%	0.21	4
Restaurant	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	14,735	3.0%	25	$1,300	90%	35%	0.64	922
Restaurant	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	14,735	15.4%	15	$540	50%	0%	5.28	10

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	7,399	5.7%	15	$1,216	85%	0%	0.44	0
Restaurant	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	14,735	20.3%	15	$2,060	85%	0%	1.82	22
Restaurant	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	14,735	15.1%	15	$18,460	25%	0%	0.15	5
Restaurant	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	14,735	10.5%	15	$340	50%	0%	5.72	7
Restaurant	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	7,399	2.5%	30	$886	90%	75%	0.45	26
Restaurant	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	7,399	15.0%	20	$1,047	80%	90%	1.69	231
Restaurant	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	14,735	16.4%	10	$7,580	5%	2%	0.27	8
Restaurant	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	14,735	1.8%	10	$1,580	25%	2%	0.14	4
Restaurant	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	7,399	1.8%	10	$1,264	25%	2%	0.09	0
Restaurant	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	14,735	7.6%	10	$3,600	50%	2%	0.27	36
Restaurant	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	7,399	7.6%	10	$2,880	50%	2%	0.17	1
Restaurant	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	14,735	3.0%	5	$528	20%	20%	0.34	6
Restaurant	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	7,399	3.0%	5	$422	20%	20%	0.22	0
Restaurant	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	14,735	3.0%	15	$139	42%	95%	4.01	839
Restaurant	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	7,399	3.0%	15	$139	42%	95%	2.01	13
Restaurant	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	7,399	2.3%	30	$1,799	75%	75%	0.21	18
Restaurant	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	14,735	5.9%	25	$18,667	98%	15%	0.09	386
Restaurant	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	7,399	5.9%	25	$18,667	98%	80%	0.04	29
Restaurant	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	14,735	3.7%	40	$5,595	80%	15%	0.25	206
Restaurant	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	7,399	3.7%	40	$5,595	80%	80%	0.12	16
Restaurant	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	12,173	5.7%	18	$6,000	25%	100%	0.13	1,847

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	8,658	10.0%	18	$6,000	25%	100%	0.16	75
Restaurant	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	12,173	7.0%	20	$507	75%	85%	2.07	4,126
Restaurant	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	8,658	7.0%	20	$507	75%	85%	1.47	95
Restaurant	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	12,173	0.9%	10	$19	81%	85%	3.87	768
Restaurant	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	8,658	0.9%	10	$19	81%	85%	2.75	18
Restaurant	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	12,173	5.3%	20	$338	75%	85%	2.34	1,046
Restaurant	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	8,658	5.3%	20	$338	75%	85%	1.66	24
Restaurant	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	12,173	7.0%	5	$500	65%	4%	0.54	117
Restaurant	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	8,658	7.0%	5	$500	65%	4%	0.38	3
Restaurant	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	12,173	7.0%	5	$500	65%	90%	0.54	2,639
Restaurant	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	8,658	7.0%	5	$500	65%	90%	0.38	61
Restaurant	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	19,193	6.0%	9	$2,500	98%	30%	0.27	646
Restaurant	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	16,345	6.0%	9	$2,500	98%	30%	0.23	23
Restaurant	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	19,193	2.3%	9	$1,875	100%	75%	0.14	616
Restaurant	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	16,345	2.3%	13	$1,875	99%	75%	0.17	22
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.43	Existing	19,193	15.0%	14	$611	70%	90%	3.79	6,234
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.43	New	16,345	15.0%	14	$405	70%	90%	4.87	174
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.43	Existing	19,193	20.0%	14	$1,353	85%	75%	2.19	8,075
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.43	New	16,345	20.0%	14	$1,080	85%	75%	2.34	225

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.43	Existing	19,193	25.0%	14	$2,112	90%	70%	1.68	9,559
Restaurant	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.43	New	16,345	25.0%	14	$1,770	90%	70%	1.71	267
Restaurant	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.43	Existing Lighting Design	Existing	19,193	22.0%	14	$2,915	40%	95%	1.24	17,605
Restaurant	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	19,193	1.4%	11	$40	65%	95%	5.15	941
Restaurant	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	19,193	1.8%	11	$40	65%	95%	6.56	1,198
Restaurant	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	Existing	19,193	8.7%	13	$3,189	80%	40%	0.44	6,167
Restaurant	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	New	16,345	10.3%	13	$3,220	80%	40%	0.44	204
Restaurant	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	19,193	7.0%	5	$675	85%	90%	0.60	7,942
Restaurant	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	19,193	4.0%	9	$47	100%	45%	9.29	1,346
Restaurant	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	16,345	4.0%	10	$47	100%	45%	8.79	61
Restaurant	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	19,193	10.6%	13	$2,520	90%	65%	0.68	13,752
Restaurant	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	19,193	4.9%	9	$135	100%	85%	4.08	2,296
Restaurant	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	5,160	0.1%	7	$1	90%	20%	1.60	9
Restaurant	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	5,160	0.1%	7	$1	90%	20%	1.60	0
Restaurant	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,160	3.1%	4	$1	25%	64%	76.95	235
Restaurant	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	5,160	3.0%	4	$1	25%	64%	74.72	7
Restaurant	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	5,160	21.8%	6	$157	45%	5%	2.71	292
Restaurant	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	5,160	21.8%	6	$157	45%	5%	2.71	10
Restaurant	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,160	3.3%	4	$1	45%	5%	40.81	44
Restaurant	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	5,160	3.3%	4	$1	45%	5%	40.81	1
Restaurant	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,160	1.9%	4	$75	15%	64%	0.31	86

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	5,160	1.9%	4	$75	15%	64%	0.31	3
Restaurant	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,160	0.1%	5	$15	40%	75%	0.13	22
Restaurant	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	5,160	0.1%	5	$15	40%	75%	0.13	1
Restaurant	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	5,160	1.4%	4	$1	45%	5%	17.22	18
Restaurant	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	5,160	1.4%	4	$1	45%	5%	17.22	1
Restaurant	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	5,160	7.0%	10	$1	75%	35%	231.09	1,096
Restaurant	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	5,160	7.0%	10	$1	75%	35%	231.09	36
Restaurant	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	5,160	1.8%	5	$21	30%	95%	1.30	59
Restaurant	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	5,160	1.8%	5	$21	30%	95%	1.30	2
Restaurant	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	5,160	1.6%	13	$120	65%	19%	0.55	113
Restaurant	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	5,160	1.6%	13	$120	65%	19%	0.55	4
Restaurant	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	5,160	18.4%	7	$550	35%	25%	0.77	958
Restaurant	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	5,160	33.8%	14	$158	80%	5%	9.72	806
Restaurant	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	5,160	33.8%	14	$158	80%	5%	9.72	26
Restaurant	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	5,160	22.7%	3	$283	25%	5%	0.73	169
Restaurant	Refrigeration	Anti-Sweat (Humidistat) Controls	Variable Temp. Controls (Humidistat)	Constant Controls	Existing	13,387	4.9%	8	$57	45%	25%	5.81	745
Restaurant	Refrigeration	Anti-Sweat (Humidistat) Controls	Variable Temp. Controls (Humidistat)	Constant Controls	New	13,387	5.0%	8	$57	45%	25%	5.79	25
Restaurant	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	Existing	13,387	9.2%	10	$349	100%	67%	2.21	9,492
Restaurant	Refrigeration	Commercial Reach-In Refrigerator	Energy Star Commercial Reach-In Refrigerator	Commercial-Size Refrigerator - Standard	New	13,387	9.2%	10	$349	100%	67%	2.21	311
Restaurant	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	Existing	13,387	1.3%	10	$84	68%	5%	1.29	68

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Refrigeration	Defrost Demand Control - Hot Gas	Refrigerant Defrost w/ Hot Gas	No Defrost Demand Control - Hot Gas	New	13,387	1.3%	10	$84	68%	5%	1.29	2
Restaurant	Refrigeration	Display Cases	High-Efficiency Display Cases	Display Cases - Standard	Existing	13,387	3.6%	15	$275	90%	19%	1.60	468
Restaurant	Refrigeration	Display Cases	High-Efficiency Display Cases	Display Cases - Standard	New	13,387	3.6%	15	$305	90%	19%	1.44	15
Restaurant	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	Existing	13,387	0.7%	15	$782	65%	70%	0.11	210
Restaurant	Refrigeration	Evaporative Condenser - High-Efficiency	High-Efficiency Evaporative Condenser	Air-Cooled Condenser	New	13,387	0.7%	15	$789	65%	70%	0.11	7
Restaurant	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	Existing	13,387	1.8%	15	$247	75%	15%	0.89	157
Restaurant	Refrigeration	High-Efficiency Case Fans	High-Efficiency Case Fans, display cases	Standard Case Fans	New	13,387	1.8%	15	$46	75%	15%	4.84	5
Restaurant	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	Existing	13,387	8.4%	10	$792	72%	15%	0.89	586
Restaurant	Refrigeration	High-Efficiency Compressor	High-Efficiency Compressor (15% More Efficient)	Standard Compressor, 40% Efficiency	New	13,387	8.4%	10	$800	72%	15%	0.88	20
Restaurant	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	Existing	13,387	1.0%	15	$102	75%	92%	1.15	440
Restaurant	Refrigeration	High-Efficiency Evaporator Fans - Walk-ins	High-Efficiency Evaporator Fans, Walk-in Refrigerators	Standard Evaporator Fans	New	13,387	1.0%	15	$103	75%	92%	1.14	14
Restaurant	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	Existing	13,387	2.7%	10	$117	86%	85%	1.90	3,005
Restaurant	Refrigeration	Ice Maker	Energy Star Ice Maker - High-Efficiency	Standard Ice Maker	New	13,387	2.7%	10	$117	86%	85%	1.90	98
Restaurant	Refrigeration	Motor - Case Fans with ECM motors	ECM motors on evaporator fan, on display cases	48 cf 2-door reach-in commercial refrigerator	Existing	13,387	3.8%	12	$118	50%	10%	3.21	64
Restaurant	Refrigeration	Motor - Case Fans with ECM motors	ECM motors on evaporator fan, on display cases	48 cf 2-door reach-in commercial refrigerator	New	13,387	3.8%	12	$118	50%	10%	3.21	2
Restaurant	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	Existing	13,387	3.3%	5	$70	85%	30%	1.88	1,292
Restaurant	Refrigeration	Night Covers for Display Cases	Night Covers for Display Cases	No Night Covers	New	13,387	4.0%	5	$86	85%	30%	1.89	52
Restaurant	Refrigeration	Parallel Unequal Compressor	Multiple Compressors in Parallel	Parallel Equal Compressors (2)	Existing	13,387	8.4%	15	$1,000	90%	35%	1.03	3,501
Restaurant	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	Existing	13,387	6.0%	10	$36	70%	30%	13.91	852
Restaurant	Refrigeration	Reduced Speed or Cycling of Evaporator Fans	VFD on Evaporator Fans (Evap Fan Control on Walk-In)	Constant Speed Evaporator Fans	New	13,387	6.0%	10	$36	70%	30%	13.81	28

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Refrigeration	Refrigeration - Retro Commissioning	Refrigeration Retro Commissioning (Refrigeration System Diagnostics / Operations And Maintenance)	No Re-commissioning	Existing	13,387	6.9%	3	$144	90%	10%	1.10	826
Restaurant	Refrigeration	Refrigeration - Commissioning	Commissioning (Refrigeration System Diagnostics / Operations and Maintenance for a new unit)	No Commissioning	New	13,387	3.8%	3	$56	90%	5%	1.54	7
Restaurant	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	Existing	13,387	1.2%	10	$109	95%	75%	0.88	1,267
Restaurant	Refrigeration	Refrigerator eCube	Refrigerator eCube	No Refrigerator eCube	New	13,387	1.2%	10	$110	95%	75%	0.88	42
Restaurant	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	13,387	3.2%	16	$149	77%	95%	2.78	3,596
Restaurant	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	13,387	3.2%	16	$150	77%	95%	2.75	118
Restaurant	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	Existing	13,387	2.0%	4	$180	20%	5%	0.35	31
Restaurant	Refrigeration	Strip Curtains for Walk-Ins	Strip Curtains for Walk-Ins	No Strip Curtains for Walk-Ins	New	13,387	2.0%	4	$180	20%	5%	0.35	1
Restaurant	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	21,841	12.5%	3	$493	40%	90%	0.86	3,083
Restaurant	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	21,841	15.0%	5	$782	100%	5%	1.13	232
Restaurant	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	21,841	10.0%	5	$438	100%	75%	1.35	4,976
Restaurant	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	21,841	15.0%	5	$316	100%	50%	2.80	2,580
Restaurant	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	14,092	15.0%	5	$316	100%	50%	1.81	53
Restaurant	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	21,841	2.5%	18	$600	45%	45%	0.87	331
Restaurant	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	21,841	15.0%	10	$4,300	94%	5%	0.42	427
Restaurant	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	21,841	4.5%	10	$5,450	85%	100%	0.10	2,219
Restaurant	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	21,841	10.0%	10	$70	10%	40%	17.34	308
Restaurant	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	21,841	2.0%	25	$1,625	95%	75%	0.34	417
Restaurant	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	14,092	2.0%	25	$1,625	95%	75%	0.22	10

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	21,841	3.0%	25	$2,050	65%	75%	0.40	431
Restaurant	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	14,092	3.0%	25	$2,050	65%	75%	0.26	10
Restaurant	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	21,841	2.4%	25	$1,525	85%	75%	0.43	920
Restaurant	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	21,841	3.0%	25	$252	15%	10%	3.26	17
Restaurant	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	21,841	4.4%	25	$404	15%	10%	2.99	24
Restaurant	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	21,841	12.5%	25	$660	35%	10%	5.19	336
Restaurant	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	14,092	6.0%	25	$1,060	95%	95%	1.00	82
Restaurant	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	21,841	1.0%	25	$675	90%	35%	0.41	186
Restaurant	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	21,841	3.0%	25	$1,300	90%	35%	0.63	578
Restaurant	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	14,092	0.2%	30	$886	90%	75%	0.06	2
Restaurant	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	14,092	5.0%	20	$1,047	80%	90%	0.71	52
Restaurant	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	14,092	5.3%	10	$1,160	95%	75%	0.36	61
Restaurant	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	21,841	3.0%	5	$528	20%	20%	0.33	4
Restaurant	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	14,092	3.0%	5	$422	20%	20%	0.27	0
Restaurant	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	21,841	25.0%	10	$5,275	98%	25%	0.58	3,987
Restaurant	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	21,841	3.0%	15	$139	42%	95%	3.87	89
Restaurant	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,841	5.9%	25	$18,667	98%	15%	0.09	242
Restaurant	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	14,092	5.9%	25	$18,667	98%	80%	0.06	63
Restaurant	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	21,841	3.7%	40	$5,595	80%	15%	0.25	128
Restaurant	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	2,838	3.3%	20	$215	NA	NA	0.50	691

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Restaurant	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	2,836	3.3%	20	$215	NA	NA	0.50	74
Restaurant	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	2,971	5.0%	15	$695	94%	75%	0.19	481
Restaurant	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	2,971	33.5%	10	$2,570	95%	70%	0.23	362
Restaurant	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,971	2.3%	13	$600	25%	46%	0.09	21
Restaurant	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,971	1.0%	13	$30	25%	46%	0.80	10
Restaurant	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	2,971	10.0%	25	$239	92%	5%	1.68	67
Restaurant	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	2,971	3.2%	10	$2	25%	95%	25.40	123
Restaurant	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	2,971	4.5%	10	$7	15%	95%	11.15	104
Restaurant	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	2,971	50.0%	15	$3,168	94%	19%	0.42	100
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	2,971	1.0%	15	$26	90%	80%	1.03	104
Restaurant	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	2,971	2.3%	5	$5	25%	95%	4.05	90
Restaurant	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	2,971	1.1%	10	$5	75%	15%	4.04	21
Restaurant	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	2,971	2.5%	10	$9	20%	15%	4.85	12
Restaurant	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	2,971	19.7%	20	$5,950	95%	20%	0.11	61
Restaurant	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	2,971	4.0%	10	$130	35%	15%	0.55	29
Restaurant	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	2,971	7.7%	11	$205	75%	75%	0.74	619
Restaurant	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	2,971	61.7%	15	$12,275	94%	2%	0.13	7
Restaurant	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	2,835	61.7%	15	$12,275	94%	21%	0.13	2
Restaurant	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	2,971	8.5%	20	$260	75%	85%	1.10	881
Restaurant	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	2,835	8.5%	20	$260	45%	10%	1.05	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	19,258	10.4%	15	$7,560	NA	NA	0.41	9,382
Retail	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	15,287	10.4%	15	$6,048	NA	NA	0.41	628
Retail	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	19,258	2.6%	15	$2,115	NA	NA	0.37	0
Retail	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	15,287	2.6%	15	$1,692	NA	NA	0.36	0
Retail	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	19,258	6.7%	15	$4,185	NA	NA	0.47	0
Retail	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	15,287	6.7%	15	$3,348	NA	NA	0.47	0
Retail	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	19,406	15.0%	15	$8,208	99%	2%	0.55	27
Retail	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	14,775	15.0%	15	$6,566	99%	70%	0.52	22
Retail	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	19,406	3.0%	15	$45	3%	44%	19.95	80
Retail	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	14,775	3.0%	15	$36	50%	44%	18.99	28
Retail	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	19,406	1.0%	10	$5,985	75%	5%	0.03	67
Retail	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	14,775	1.0%	10	$5,985	75%	5%	0.03	2
Retail	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	14,775	12.5%	3	$6,570	80%	90%	0.08	244
Retail	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	19,406	12.5%	3	$1,774	40%	90%	0.38	7,510
Retail	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	19,406	10.0%	20	$6,120	98%	95%	0.62	14,661
Retail	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	14,775	10.0%	20	$6,120	98%	95%	0.47	290
Retail	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	19,406	15.0%	15	$7,655	80%	10%	0.59	1,913
Retail	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	19,406	10.0%	3	$2,160	95%	95%	0.25	12,889
Retail	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	19,406	25.0%	15	$18,754	85%	50%	0.40	13,804

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	14,775	25.0%	15	$18,754	85%	50%	0.30	328
Retail	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	19,406	15.0%	5	$2,813	59%	75%	0.52	2,826
Retail	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	19,406	10.0%	5	$1,575	80%	75%	0.62	5,249
Retail	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	14,775	10.0%	5	$1,575	80%	75%	0.47	107
Retail	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	19,406	15.0%	5	$1,137	80%	50%	1.28	2,671
Retail	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	14,775	15.0%	5	$1,137	80%	50%	0.97	61
Retail	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	19,406	2.5%	18	$2,160	45%	45%	0.40	588
Retail	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	14,775	2.5%	18	$2,160	45%	45%	0.31	14
Retail	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	19,406	4.5%	10	$5,450	85%	2%	0.17	85
Retail	Cooling DX	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	14,775	4.5%	10	$5,450	85%	2%	0.13	2
Retail	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	19,406	10.0%	30	$91,170	98%	4%	0.06	364
Retail	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	14,775	10.0%	30	$91,170	98%	4%	0.04	8
Retail	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	19,406	5.0%	10	$174	10%	10%	5.88	90
Retail	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	19,406	2.0%	25	$5,850	95%	75%	0.15	766
Retail	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	14,775	2.0%	25	$5,850	95%	75%	0.12	17
Retail	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	19,406	3.0%	25	$7,380	98%	75%	0.18	1,198
Retail	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	14,775	3.0%	25	$7,380	98%	75%	0.14	27
Retail	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	19,406	2.4%	25	$5,490	85%	75%	0.20	1,694
Retail	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	19,406	3.0%	25	$908	15%	10%	1.48	39
Retail	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	19,406	4.4%	25	$1,454	15%	10%	1.36	58

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	14,775	3.3%	25	$406	15%	10%	2.78	1
Retail	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	19,406	5.0%	25	$1,252	35%	10%	1.79	307
Retail	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	14,775	3.0%	25	$2,012	95%	95%	0.51	86
Retail	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	19,406	1.0%	25	$2,430	90%	35%	0.18	344
Retail	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	14,775	1.0%	25	$2,430	90%	35%	0.14	8
Retail	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	19,406	3.0%	25	$4,680	90%	35%	0.29	1,057
Retail	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	19,406	15.4%	15	$1,458	50%	0%	3.17	12
Retail	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	14,775	5.7%	15	$3,283	85%	0%	0.40	1
Retail	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	19,406	20.3%	15	$5,562	85%	0%	1.09	27
Retail	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	19,406	15.1%	15	$49,842	25%	0%	0.09	6
Retail	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	19,406	10.5%	15	$918	50%	0%	3.43	8
Retail	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	14,775	0.4%	30	$3,191	90%	75%	0.04	6
Retail	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	14,775	15.0%	20	$3,768	80%	90%	1.15	432
Retail	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	19,406	16.4%	10	$20,466	5%	2%	0.16	10
Retail	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	19,406	1.8%	10	$4,266	25%	2%	0.09	5
Retail	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	14,775	1.8%	10	$3,413	25%	2%	0.08	0
Retail	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	19,406	7.6%	10	$9,720	50%	2%	0.16	45
Retail	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	14,775	7.6%	10	$7,776	50%	2%	0.15	2
Retail	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	19,406	3.0%	5	$1,425	20%	20%	0.20	7
Retail	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	14,775	3.0%	5	$1,140	20%	20%	0.19	0
Retail	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	19,406	3.0%	15	$139	54%	95%	6.48	1,393
Retail	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	14,775	3.0%	15	$139	54%	95%	4.93	32
Retail	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	19,406	30.0%	10	$27,360	70%	15%	0.22	3,639

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	14,775	1.9%	30	$2,469	75%	75%	0.30	29
Retail	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	19,406	5.5%	25	$46,109	98%	15%	0.05	434
Retail	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	14,775	5.9%	25	$46,109	98%	80%	0.04	55
Retail	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	19,406	3.5%	40	$13,819	80%	15%	0.15	222
Retail	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	14,775	3.7%	40	$13,819	80%	80%	0.12	28
Retail	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	Existing	16,043	20.0%	10	$1,839	85%	5%	1.23	312
Retail	HVAC Aux	Automated Exhaust VFD Control - Parking Garage CO sensor	CO Sensors	No CO Sensors	New	8,078	20.0%	10	$1,839	85%	5%	0.62	5
Retail	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	Existing	16,043	0.5%	18	$1,080	65%	25%	0.09	241
Retail	HVAC Aux	Cooking Hood Controls	Demand Controlled Ventilation - Cooking Hood Controls, with Sensors, Variable Speed Control, And Direct Make-up Air	No Cooking Hood Controls	New	8,078	0.9%	18	$1,080	65%	25%	0.08	7
Retail	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	16,043	7.0%	20	$1,826	75%	85%	0.81	9,811
Retail	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	8,078	7.0%	20	$1,826	75%	85%	0.41	162
Retail	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	16,043	0.9%	10	$67	81%	85%	1.53	1,828
Retail	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	8,078	0.9%	10	$67	81%	85%	0.77	30
Retail	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	16,043	5.3%	20	$1,216	75%	85%	0.92	2,487
Retail	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	8,078	5.3%	20	$1,216	75%	85%	0.46	41
Retail	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	16,043	8.8%	10	$3,287	77%	10%	0.30	235
Retail	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	8,078	8.8%	10	$3,287	77%	20%	0.15	8

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	16,043	7.0%	5	$1,800	65%	4%	0.21	275
Retail	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	8,078	7.0%	5	$1,800	65%	4%	0.11	5
Retail	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	16,043	7.0%	5	$1,800	65%	90%	0.21	6,195
Retail	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	8,078	7.0%	5	$1,800	65%	90%	0.11	102
Retail	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	16,043	12.0%	10	$27,360	70%	15%	0.05	3,543
Retail	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	83,039	2.7%	9	$1,524	75%	10%	0.94	4,217
Retail	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	52,177	2.7%	9	$1,524	75%	10%	0.59	87
Retail	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	83,039	6.0%	9	$7,590	84%	30%	0.42	5,262
Retail	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	52,177	6.0%	9	$7,590	84%	30%	0.26	140
Retail	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	83,039	4.5%	9	$5,693	100%	75%	0.42	11,713
Retail	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	52,177	4.5%	13	$5,693	99%	75%	0.37	313
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	83,039	15.0%	14	$2,198	70%	90%	4.91	43,802
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.5	New	52,177	15.0%	14	$1,458	70%	90%	4.65	902
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	83,039	20.0%	14	$4,871	85%	75%	2.83	56,735
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.5	New	52,177	20.0%	14	$3,888	85%	75%	2.23	1,168
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.5	Existing	83,039	25.0%	14	$7,603	90%	70%	2.17	67,165
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.5	New	52,177	25.0%	14	$6,372	90%	70%	1.63	1,383
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.5	Existing	83,039	31.5%	14	$3,148	95%	50%	6.04	58,261
Retail	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 1.5	New	52,177	31.5%	14	$2,322	95%	50%	5.15	1,199

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.5	Existing Lighting Design	Existing	83,039	38.5%	14	$10,494	40%	95%	2.81	288,627
Retail	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	83,039	1.4%	11	$144	65%	95%	6.67	8,816
Retail	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	83,039	1.8%	11	$144	65%	95%	8.49	11,221
Retail	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	Existing	83,039	3.0%	13	$6,352	80%	10%	0.35	4,968
Retail	Lighting	LED Refrigeration Case Lights	LED Refrigeration Case Lights (28W)	Fluorescent Refrigeration Case Lights (60W)	New	52,177	4.5%	13	$6,387	80%	10%	0.33	155
Retail	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	83,039	7.0%	5	$2,430	85%	90%	0.78	75,516
Retail	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	83,039	4.0%	9	$168	88%	45%	12.03	11,200
Retail	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	52,177	4.0%	10	$168	88%	45%	8.39	382
Retail	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	83,039	2.8%	13	$2,520	90%	65%	0.84	34,196
Retail	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	83,039	4.9%	9	$1,565	86%	85%	1.64	18,521
Retail	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	19,612	0.1%	7	$5	90%	20%	1.69	77
Retail	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	19,612	0.1%	7	$4	90%	20%	2.12	3
Retail	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	19,612	2.5%	4	$2	25%	64%	65.22	1,550
Retail	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	19,612	2.4%	4	$2	25%	64%	63.58	50
Retail	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	19,612	5.9%	6	$157	45%	20%	2.79	2,607
Retail	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	19,612	7.4%	6	$157	45%	20%	3.50	107
Retail	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	19,612	0.9%	4	$1	45%	20%	46.67	390
Retail	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	19,612	1.1%	4	$1	45%	20%	58.55	16
Retail	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	19,612	1.8%	4	$270	15%	64%	0.32	690
Retail	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	19,612	2.3%	4	$270	15%	64%	0.40	28
Retail	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	19,612	0.1%	5	$15	40%	75%	0.50	184
Retail	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	19,612	0.1%	5	$15	40%	75%	0.50	6

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	19,612	0.4%	4	$1	45%	20%	19.70	165
Retail	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	19,612	0.5%	4	$1	45%	20%	24.71	7
Retail	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	19,612	1.9%	10	$1	75%	15%	264.27	1,047
Retail	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	19,612	2.4%	10	$1	75%	15%	331.53	43
Retail	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	19,612	1.8%	5	$76	30%	95%	0.36	489
Retail	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	19,612	1.8%	5	$76	30%	95%	0.36	16
Retail	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	Existing	19,612	0.4%	13	$120	65%	3%	0.55	36
Retail	Plug Load	Residential-Size Refrigerator	Energy Star Residential-Size Refrigerator	Residential-Size Refrigerator - Standard	New	19,612	0.5%	13	$120	65%	3%	0.55	1
Retail	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	19,612	5.0%	7	$550	35%	25%	0.77	2,136
Retail	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	19,612	9.2%	14	$158	80%	5%	9.98	1,797
Retail	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	19,612	11.5%	14	$158	80%	5%	12.52	74
Retail	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	19,612	6.2%	3	$284	25%	5%	0.75	377
Retail	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	128,768	12.5%	3	$1,774	40%	90%	1.51	5,697
Retail	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	128,768	15.0%	5	$2,813	59%	75%	1.97	3,912
Retail	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	128,768	10.0%	5	$1,575	80%	75%	2.34	7,450
Retail	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	128,768	15.0%	5	$1,137	80%	50%	4.87	3,830
Retail	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	148,119	15.0%	5	$1,137	80%	50%	5.60	140
Retail	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	128,768	2.5%	18	$2,160	45%	45%	1.49	612

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	128,768	15.0%	10	$15,480	94%	5%	0.73	789
Retail	Space Heat	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	128,768	4.5%	10	$5,450	85%	2%	0.62	85
Retail	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	128,768	10.0%	10	$174	10%	10%	43.36	143
Retail	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	128,768	2.0%	25	$5,850	95%	75%	0.57	768
Retail	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	148,119	2.0%	25	$5,850	95%	75%	0.66	32
Retail	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	128,768	3.0%	25	$7,380	98%	75%	0.68	1,201
Retail	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	148,119	3.0%	25	$7,380	98%	75%	0.79	50
Retail	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	128,768	2.4%	25	$5,490	85%	75%	0.74	1,698
Retail	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	128,768	3.0%	25	$908	15%	10%	5.55	31
Retail	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	128,768	4.4%	25	$1,454	15%	10%	5.09	46
Retail	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	128,768	12.5%	25	$1,252	35%	10%	16.79	623
Retail	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	148,119	6.0%	25	$2,012	95%	95%	5.77	273
Retail	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	128,768	1.0%	25	$2,430	90%	35%	0.69	344
Retail	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	128,768	3.0%	25	$4,680	90%	35%	1.08	1,067
Retail	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	148,119	1.3%	30	$3,191	90%	75%	0.90	40
Retail	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	148,119	5.0%	20	$3,768	80%	90%	2.15	172
Retail	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	148,119	5.3%	10	$4,176	95%	75%	1.09	202
Retail	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	128,768	3.0%	5	$1,425	20%	20%	0.78	7
Retail	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	148,119	3.0%	5	$1,140	20%	20%	1.12	0
Retail	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	128,768	25.0%	10	$18,990	98%	25%	0.99	7,368
Retail	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	128,768	3.0%	15	$139	54%	95%	23.81	222
Retail	Space Heat	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	128,768	13.0%	10	$27,360	70%	15%	0.36	1,460

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	128,768	5.5%	25	$46,109	98%	15%	0.20	429
Retail	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	148,119	5.9%	25	$46,109	98%	80%	0.25	207
Retail	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	128,768	3.5%	40	$13,819	80%	15%	0.58	219
Retail	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	948	3.3%	20	$154	NA	NA	0.27	667
Retail	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	948	3.3%	20	$154	NA	NA	0.27	72
Retail	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	992	5.0%	15	$2,500	94%	75%	0.02	485
Retail	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	992	9.3%	10	$2,570	95%	18%	0.03	24
Retail	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	992	7.0%	13	$600	25%	24%	0.10	33
Retail	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	992	3.2%	13	$30	25%	24%	0.96	15
Retail	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	992	10.0%	25	$77	92%	5%	1.98	66
Retail	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	992	3.2%	10	$2	25%	95%	12.24	119
Retail	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	992	4.5%	10	$7	15%	95%	4.33	101
Retail	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	992	50.0%	15	$2,263	94%	19%	0.22	96
Retail	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	992	1.0%	15	$25	90%	80%	0.40	103
Retail	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	992	2.3%	5	$5	45%	2%	1.45	3
Retail	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	992	1.1%	10	$5	75%	15%	1.44	20
Retail	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	992	2.5%	10	$9	20%	15%	1.92	12
Retail	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	992	27.8%	20	$4,250	95%	20%	0.08	83
Retail	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	992	4.0%	10	$130	35%	15%	0.21	29

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Retail	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	992	7.7%	11	$204	45%	75%	0.29	367
Retail	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	992	61.7%	15	$12,275	94%	2%	0.05	6
Retail	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	948	61.7%	15	$12,275	94%	21%	0.05	2
Retail	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	992	8.5%	20	$260	75%	85%	0.42	850
Retail	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	948	8.5%	20	$260	45%	10%	0.40	2
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	2,939	10.4%	15	$775	NA	NA	0.53	2,956
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	2,279	10.4%	15	$620	NA	NA	0.51	193
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	2,939	2.6%	15	$217	NA	NA	0.47	0
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	2,279	2.6%	15	$174	NA	NA	0.46	0
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	2,939	6.7%	15	$429	NA	NA	0.61	0
Small Office	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	2,279	6.7%	15	$343	NA	NA	0.59	0
Small Office	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	2,971	15.0%	15	$842	99%	2%	0.71	8
Small Office	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	2,202	15.0%	15	$674	99%	70%	0.66	7
Small Office	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	2,971	3.0%	15	$5	3%	44%	25.61	25
Small Office	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	2,202	3.0%	15	$4	50%	44%	23.54	8
Small Office	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	2,971	1.0%	10	$998	75%	5%	0.03	21
Small Office	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	2,202	1.0%	10	$998	75%	5%	0.02	0
Small Office	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	2,971	10.0%	15	$375	94%	75%	1.06	3,900
Small Office	Cooling DX	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	New	2,202	10.0%	15	$200	94%	75%	1.47	89

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	2,202	12.5%	3	$1,095	80%	90%	0.06	70
Small Office	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	2,971	12.5%	3	$296	40%	90%	0.31	2,014
Small Office	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	2,971	10.0%	20	$1,020	98%	35%	0.50	1,463
Small Office	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	2,202	10.0%	20	$1,020	98%	35%	0.37	30
Small Office	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	2,971	15.0%	15	$785	20%	10%	0.76	153
Small Office	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	2,971	10.0%	3	$222	95%	95%	0.34	4,440
Small Office	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	2,971	25.0%	15	$3,126	85%	50%	0.32	4,377
Small Office	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	2,202	25.0%	15	$3,126	85%	50%	0.24	95
Small Office	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	2,971	15.0%	5	$469	28%	5%	0.42	26
Small Office	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	2,971	10.0%	5	$263	80%	75%	0.50	1,522
Small Office	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	2,202	10.0%	5	$263	80%	75%	0.37	30
Small Office	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	2,971	15.0%	5	$189	80%	75%	1.04	1,273
Small Office	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	2,202	15.0%	5	$189	80%	75%	0.77	26
Small Office	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	2,971	2.5%	18	$360	45%	45%	0.32	186
Small Office	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	2,202	2.5%	18	$360	45%	45%	0.24	4
Small Office	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	2,971	10.0%	30	$15,195	98%	4%	0.04	120
Small Office	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	2,202	10.0%	30	$15,195	98%	4%	0.03	2
Small Office	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	2,971	5.0%	10	$33	10%	40%	4.06	113
Small Office	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	2,971	2.0%	25	$975	25%	75%	0.12	66
Small Office	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	2,202	2.0%	25	$975	25%	75%	0.09	1

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	2,971	3.0%	25	$1,230	65%	75%	0.15	259
Small Office	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	2,202	3.0%	25	$1,230	65%	75%	0.11	5
Small Office	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	2,971	2.4%	25	$915	4%	75%	0.16	26
Small Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	2,971	3.0%	25	$151	15%	10%	1.19	12
Small Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	2,971	4.4%	25	$242	15%	10%	1.09	17
Small Office	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	2,202	3.3%	25	$68	15%	10%	2.17	0
Small Office	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	2,971	5.0%	25	$511	35%	10%	0.59	75
Small Office	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	2,202	3.0%	25	$821	95%	95%	0.16	22
Small Office	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	2,971	1.0%	25	$405	15%	35%	0.15	19
Small Office	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	2,202	1.0%	25	$405	15%	35%	0.11	0
Small Office	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	2,971	3.0%	25	$780	15%	35%	0.23	56
Small Office	Cooling DX	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	2,202	10.0%	40	$1,500	61%	95%	0.40	55
Small Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	2,971	15.4%	15	$150	50%	0%	4.10	4
Small Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	2,202	5.7%	15	$337	85%	0%	0.50	0
Small Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	2,971	20.3%	15	$570	85%	0%	1.41	9
Small Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	2,971	15.1%	15	$5,112	25%	0%	0.12	2
Small Office	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	2,971	10.5%	15	$94	50%	0%	4.43	3
Small Office	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	2,202	0.4%	30	$532	90%	75%	0.04	2
Small Office	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	2,202	15.0%	20	$628	80%	90%	0.90	124
Small Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	2,971	16.4%	10	$2,099	5%	2%	0.21	3
Small Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	2,971	1.8%	10	$438	25%	2%	0.11	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	2,202	1.8%	10	$350	25%	2%	0.10	0
Small Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	2,971	7.6%	10	$997	50%	2%	0.21	14
Small Office	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	2,202	7.6%	10	$798	50%	2%	0.19	0
Small Office	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	2,971	3.0%	5	$146	20%	20%	0.27	2
Small Office	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	2,202	3.0%	5	$117	20%	20%	0.25	0
Small Office	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	2,971	3.0%	15	$138	67%	95%	0.86	491
Small Office	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	2,202	3.0%	15	$138	67%	95%	0.64	10
Small Office	Cooling DX	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	2,971	30.0%	10	$4,560	70%	15%	0.18	1,154
Small Office	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	2,202	3.1%	30	$2,292	75%	75%	0.07	12
Small Office	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	2,971	5.7%	25	$8,916	98%	15%	0.04	146
Small Office	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	2,202	5.7%	25	$8,916	98%	80%	0.03	15
Small Office	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	2,971	3.6%	40	$2,672	95%	15%	0.11	89
Small Office	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	2,202	3.6%	40	$2,672	95%	80%	0.08	9
Small Office	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	2,592	7.0%	20	$304	75%	85%	0.76	1,993
Small Office	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	482	7.0%	20	$304	75%	85%	0.14	12
Small Office	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	2,592	0.9%	10	$11	81%	85%	1.42	371
Small Office	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	482	0.9%	10	$11	81%	85%	0.26	2
Small Office	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	2,592	5.3%	20	$203	75%	85%	0.86	505
Small Office	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	482	5.3%	20	$203	75%	85%	0.16	3
Small Office	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	Existing	2,592	8.8%	10	$548	77%	50%	0.28	239
Small Office	HVAC Aux	Motor - VAV Box High-Efficiency	ECM Motors	Standard Efficiency - Induction Motors with Silicon Controlled Rectifier (SCR) Speed Control	New	482	8.8%	10	$548	77%	65%	0.05	2

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	2,592	7.0%	5	$300	65%	4%	0.20	56
Small Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	482	7.0%	5	$300	65%	4%	0.04	0
Small Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	2,592	7.0%	5	$300	65%	90%	0.20	1,256
Small Office	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	482	7.0%	5	$300	65%	90%	0.04	8
Small Office	HVAC Aux	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	2,592	12.0%	10	$4,560	70%	15%	0.05	717
Small Office	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	Existing	9,082	2.7%	9	$254	75%	85%	0.55	4,589
Small Office	Lighting	Bi-Level Control, Stairwell Lighting	Occupancy Sensor Control, 50% Lighting Power during unoccupied Time	Continuous Full Power Lighting in Stairways	New	5,188	2.7%	9	$254	75%	85%	0.32	86
Small Office	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	9,082	15.0%	9	$1,500	78%	30%	0.52	1,224
Small Office	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	5,188	15.0%	9	$1,500	78%	30%	0.30	36
Small Office	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	9,082	11.3%	9	$1,125	100%	75%	0.52	3,008
Small Office	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	5,188	11.3%	13	$1,125	99%	75%	0.42	87
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	9,082	15.0%	14	$194	70%	90%	5.45	7,478
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 1.0	New	5,188	15.0%	14	$117	70%	90%	5.17	140
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	9,082	20.0%	14	$482	85%	75%	2.82	9,685
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 1.0	New	5,188	20.0%	14	$378	85%	75%	2.05	181
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	Existing	9,082	25.0%	14	$769	90%	70%	2.11	11,466
Small Office	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 1.0	New	5,188	25.0%	14	$639	90%	70%	1.45	215
Small Office	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 1.0	Existing Lighting Design	Existing	9,082	39.5%	14	$1,161	40%	95%	2.56	37,914
Small Office	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	Existing	9,082	12.5%	20	$281	90%	15%	4.59	4,307

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Lighting	Integrated Lighting, Classrooms And other buildings	Daylighting Controls, Super T8's, Dimming Controls, ~ 0.5 W/sqft	1.2 W/sqft	New	5,188	12.5%	20	$219	90%	15%	3.37	81
Small Office	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	9,082	1.4%	11	$24	65%	95%	3.93	1,129
Small Office	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	9,082	1.8%	11	$24	65%	95%	5.01	1,437
Small Office	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	9,082	7.0%	5	$405	85%	90%	0.47	7,728
Small Office	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	9,082	4.0%	9	$28	87%	90%	7.10	2,289
Small Office	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	5,188	4.0%	10	$28	87%	90%	4.50	85
Small Office	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	9,082	25.3%	13	$2,520	75%	65%	0.74	32,837
Small Office	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	9,082	4.9%	9	$116	88%	85%	2.19	2,433
Small Office	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	3,343	0.1%	7	$1	90%	20%	1.73	15
Small Office	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	3,343	0.1%	7	$1	90%	20%	1.73	1
Small Office	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	3,343	14.8%	4	$2	25%	64%	80.08	1,856
Small Office	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	3,343	14.4%	4	$2	25%	64%	77.73	59
Small Office	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	3,343	34.1%	6	$157	45%	90%	2.74	13,514
Small Office	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	3,343	34.1%	6	$157	45%	90%	2.74	443
Small Office	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	3,343	5.1%	4	$1	45%	90%	39.37	2,022
Small Office	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	3,343	5.1%	4	$1	45%	90%	39.37	66
Small Office	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	3,343	8.8%	4	$225	15%	64%	0.32	663
Small Office	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	3,343	8.8%	4	$225	15%	64%	0.32	22
Small Office	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	3,343	0.1%	5	$15	40%	75%	0.09	37
Small Office	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	3,343	0.1%	5	$15	40%	75%	0.09	1
Small Office	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	3,343	2.2%	4	$1	45%	90%	16.61	853
Small Office	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	3,343	2.2%	4	$1	45%	90%	16.61	28
Small Office	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	3,343	11.0%	10	$1	75%	65%	222.92	5,225

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	3,343	11.0%	10	$1	75%	65%	222.92	171
Small Office	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	3,343	1.8%	5	$76	30%	95%	0.36	98
Small Office	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	3,343	1.8%	5	$76	30%	95%	0.36	3
Small Office	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	3,343	28.7%	7	$550	35%	25%	0.77	2,460
Small Office	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	3,343	52.9%	14	$158	80%	10%	9.85	4,140
Small Office	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	3,343	52.9%	14	$158	80%	10%	9.85	136
Small Office	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	3,343	35.5%	3	$283	25%	10%	0.74	869
Small Office	Space Heat	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 sensors)	Constant Ventilation	Existing	12,375	10.0%	15	$375	94%	50%	2.72	4,366
Small Office	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	12,375	12.5%	3	$296	40%	90%	0.82	3,756
Small Office	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	12,375	15.0%	5	$469	28%	5%	1.08	78
Small Office	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	12,375	10.0%	5	$263	80%	75%	1.28	4,768
Small Office	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	12,375	15.0%	5	$189	80%	75%	2.66	3,938
Small Office	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	18,392	15.0%	5	$189	80%	75%	3.96	185
Small Office	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	12,375	2.5%	18	$360	45%	45%	0.83	403
Small Office	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	12,375	15.0%	10	$2,580	94%	5%	0.40	524
Small Office	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	12,375	10.0%	10	$33	10%	40%	20.77	391
Small Office	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	12,375	2.0%	25	$975	25%	75%	0.32	137
Small Office	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	18,392	2.0%	25	$975	25%	75%	0.48	7

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	12,375	3.0%	25	$1,230	85%	75%	0.38	705
Small Office	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	18,392	3.0%	25	$1,230	85%	75%	0.57	36
Small Office	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	12,375	2.4%	25	$915	4%	75%	0.41	53
Small Office	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	12,375	3.0%	25	$151	15%	10%	3.09	20
Small Office	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	12,375	4.4%	25	$242	15%	10%	2.83	29
Small Office	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	12,375	12.5%	25	$511	35%	10%	3.82	408
Small Office	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	18,392	6.0%	25	$821	95%	95%	1.69	224
Small Office	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	12,375	1.0%	25	$405	15%	35%	0.39	39
Small Office	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	12,375	3.0%	25	$780	15%	35%	0.60	117
Small Office	Space Heat	Natural Ventilation	Natural Ventilation Design Reduction in Cooling	Standard HVAC System	New	18,392	10.0%	40	$1,500	61%	95%	2.12	254
Small Office	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	18,392	0.9%	30	$532	90%	75%	0.45	23
Small Office	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	18,392	5.0%	20	$628	80%	90%	1.54	141
Small Office	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	18,392	5.3%	10	$696	95%	75%	0.78	178
Small Office	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	12,375	3.0%	5	$146	20%	20%	0.69	5
Small Office	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	18,392	3.0%	5	$117	20%	20%	1.28	0
Small Office	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	12,375	25.0%	10	$3,165	98%	25%	0.55	4,857
Small Office	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	12,375	3.0%	15	$138	67%	95%	2.21	169
Small Office	Space Heat	Variable Air-Volume Systems	Install Variable Air-Volume System	Constant Volume System	Existing	12,375	13.0%	10	$4,560	70%	15%	0.20	995
Small Office	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	12,375	5.7%	25	$8,916	98%	15%	0.10	300
Small Office	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	18,392	5.7%	25	$8,916	98%	80%	0.15	165
Small Office	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	12,375	3.6%	40	$2,672	95%	15%	0.29	182

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Small Office	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	427	3.3%	20	$92	NA	NA	0.18	176
Small Office	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	427	3.3%	20	$92	NA	NA	0.18	19
Small Office	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	447	5.0%	15	$417	80%	55%	0.05	81
Small Office	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	447	15.4%	13	$600	25%	8%	0.09	6
Small Office	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	447	7.0%	13	$30	25%	8%	0.83	3
Small Office	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	447	10.0%	25	$35	92%	5%	1.75	17
Small Office	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	447	3.2%	10	$4	25%	95%	2.03	31
Small Office	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	447	4.5%	10	$15	15%	95%	0.86	26
Small Office	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	447	50.0%	15	$1,358	94%	19%	0.15	25
Small Office	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	447	1.0%	15	$26	30%	80%	0.16	9
Small Office	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	447	1.1%	10	$5	75%	15%	0.61	5
Small Office	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	447	2.5%	10	$9	20%	15%	0.76	3
Small Office	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	447	27.9%	20	$2,550	95%	20%	0.06	22
Small Office	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	447	4.0%	10	$65	35%	15%	0.17	8
Small Office	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	447	7.7%	11	$102	40%	75%	0.23	87
Small Office	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	447	61.7%	15	$12,275	94%	2%	0.02	2
Small Office	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	427	61.7%	15	$12,275	94%	21%	0.02	0
Small Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	447	8.5%	20	$130	75%	85%	0.34	224
Small Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	427	8.5%	20	$130	45%	10%	0.32	0
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	Existing	16,153	10.4%	15	$10,920	NA	NA	0.25	417

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	Advanced-Efficiency 12.5 EER Rooftop Unit Tier 3	11.2 EER Rooftop Unit (State Code)	New	10,467	10.4%	15	$8,736	NA	NA	0.20	23
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	Existing	16,153	2.6%	15	$3,055	NA	NA	0.23	0
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	High-Efficiency 11.5 EER Rooftop Unit (CEE Tier 1)	11.2 EER Rooftop Unit (State Code)	New	10,467	2.6%	15	$2,444	NA	NA	0.18	0
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	Existing	16,153	6.7%	15	$6,045	NA	NA	0.29	0
Warehouse	Cooling DX	(DX) Packaged Air Conditioner System	Premium-Efficiency 12.0 EER Rooftop Unit (CEE Tier 2)	11.2 EER Rooftop Unit (State Code)	New	10,467	6.7%	15	$4,836	NA	NA	0.24	0
Warehouse	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	Existing	16,012	15.0%	15	$11,856	99%	2%	0.33	1
Warehouse	Cooling DX	Air Conditioner - Packaged, Ductless Variable Refrigerant Flow	Packaged, Ductless Variable Refrigerant Flow	11.0 EER Rooftop DX Package Unit (State Code)	New	10,117	15.0%	15	$9,485	99%	70%	0.26	1
Warehouse	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	Existing	16,012	3.0%	15	$65	3%	44%	12.10	4
Warehouse	Cooling DX	Air Conditioner, Proper Sizing of Equipment	Correctly Sized Air Conditioner Unit	Oversized Air Conditioner Unit	New	10,117	3.0%	15	$52	50%	44%	9.56	1
Warehouse	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	16,012	1.0%	10	$17,290	75%	1%	0.01	1
Warehouse	Cooling DX	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	10,117	1.0%	10	$17,290	75%	1%	0.01	0
Warehouse	Cooling DX	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	10,117	12.5%	3	$18,980	80%	90%	0.02	9
Warehouse	Cooling DX	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	16,012	12.5%	3	$5,125	40%	90%	0.12	302
Warehouse	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	16,012	10.0%	20	$17,680	98%	95%	0.19	596
Warehouse	Cooling DX	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	10,117	10.0%	20	$17,680	98%	95%	0.12	10
Warehouse	Cooling DX	Cooling DX Package-Air Side Economizer	Air-Side Economizer	No Economizer	Existing	16,012	15.0%	15	$11,058	40%	10%	0.36	46
Warehouse	Cooling DX	DX Tune-Up / Diagnostics	DX Tune-Up / Diagnostics	No DX Tune-Up / Diagnostics	Existing	16,012	10.0%	3	$3,120	95%	95%	0.15	666
Warehouse	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	Existing	16,012	25.0%	15	$54,179	85%	50%	0.12	617
Warehouse	Cooling DX	Direct / Indirect Evaporative Cooling, Pre-Cooling	Direct / Indirect Evaporative Cooling, Pre-Cooling	No modification to DX system	New	10,117	25.0%	15	$54,179	85%	50%	0.08	12

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Cooling DX	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	16,012	15.0%	5	$8,128	93%	5%	0.16	12
Warehouse	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	16,012	10.0%	5	$4,550	98%	75%	0.19	282
Warehouse	Cooling DX	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	10,117	10.0%	5	$4,550	98%	75%	0.12	5
Warehouse	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	16,012	15.0%	5	$3,284	98%	50%	0.39	144
Warehouse	Cooling DX	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	10,117	15.0%	5	$3,284	98%	50%	0.25	3
Warehouse	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	16,012	2.5%	18	$6,240	45%	45%	0.12	26
Warehouse	Cooling DX	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	10,117	2.5%	18	$6,240	45%	45%	0.08	0
Warehouse	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	16,012	10.0%	30	$263,380	98%	4%	0.02	17
Warehouse	Cooling DX	Green Roof	Vegetation on Roof	Standard roofing techniques	New	10,117	10.0%	30	$263,380	98%	4%	0.01	0
Warehouse	Cooling DX	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	16,012	5.0%	10	$125	10%	10%	7.18	4
Warehouse	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	16,012	2.0%	25	$16,900	45%	75%	0.05	17
Warehouse	Cooling DX	Insulation (Ceiling)	R-38	R-20 (Code)	New	10,117	2.0%	25	$16,900	45%	75%	0.03	0
Warehouse	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	16,012	3.0%	25	$21,320	85%	75%	0.06	49
Warehouse	Cooling DX	Insulation (Ceiling)	R-49	R-20 (Code)	New	10,117	3.0%	25	$21,320	85%	75%	0.04	1
Warehouse	Cooling DX	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	16,012	2.4%	25	$15,860	10%	75%	0.06	9
Warehouse	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	16,012	3.0%	25	$2,623	15%	10%	0.45	2
Warehouse	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	16,012	4.4%	25	$4,199	15%	10%	0.41	3
Warehouse	Cooling DX	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	10,117	3.3%	25	$1,173	15%	10%	0.70	0
Warehouse	Cooling DX	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	16,012	5.0%	25	$2,129	35%	10%	0.93	14
Warehouse	Cooling DX	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	10,117	3.0%	25	$3,419	95%	95%	0.22	3
Warehouse	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	16,012	1.0%	25	$7,020	45%	35%	0.06	8

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Cooling DX	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	10,117	1.0%	25	$7,020	45%	35%	0.04	0
Warehouse	Cooling DX	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	16,012	3.0%	25	$13,520	45%	35%	0.09	24
Warehouse	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=10.37	EER=8.77 (IECC Code Replacement)	Existing	16,012	15.4%	15	$2,106	50%	0%	1.92	1
Warehouse	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=10.37 (IECC Code New Construction)	New	10,117	5.7%	15	$4,742	85%	0%	0.20	0
Warehouse	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=11.0	EER=8.77 (IECC Code Replacement)	Existing	16,012	20.3%	15	$8,034	85%	0%	0.66	1
Warehouse	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=8.77 (IECC Code Replacement)	Existing Packaged Terminal Air Conditioner	Existing	16,012	15.1%	15	$71,994	25%	0%	0.05	0
Warehouse	Cooling DX	Packaged Terminal Air Conditioner (10,000 Btu/h)	EER=9.8	EER=8.77 (IECC Code Replacement)	Existing	16,012	10.5%	15	$1,326	50%	0%	2.08	0
Warehouse	Cooling DX	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	10,117	2.1%	30	$9,217	90%	75%	0.06	1
Warehouse	Cooling DX	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	10,117	15.0%	20	$10,886	80%	90%	0.29	15
Warehouse	Cooling DX	Room Air Conditioner (10,000 Btu/h)	EER=11.0 (Federal Code)	Existing Room Air Conditioner	Existing	16,012	16.4%	10	$29,562	5%	2%	0.10	0
Warehouse	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	Existing	16,012	1.8%	10	$6,162	25%	2%	0.05	0
Warehouse	Cooling DX	Room Air Conditioner (10,000 Btu/h)	High-Efficiency EER=11.2	EER=11.0 (Federal Code)	New	10,117	1.8%	10	$4,930	25%	2%	0.04	0
Warehouse	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	Existing	16,012	7.6%	10	$14,040	50%	2%	0.10	2
Warehouse	Cooling DX	Room Air Conditioner (10,000 Btu/h)	Premium-Efficiency EER=11.9	EER=11.0 (Federal Code)	New	10,117	7.6%	10	$11,232	50%	2%	0.08	0
Warehouse	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	16,012	3.0%	5	$2,059	20%	20%	0.12	0
Warehouse	Cooling DX	Scheduled AHU	Reduce AHU runtime	No schedule	New	10,117	3.0%	5	$1,646	20%	20%	0.10	0
Warehouse	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	16,012	3.0%	15	$138	20%	95%	5.71	23
Warehouse	Cooling DX	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	10,117	3.0%	15	$138	20%	95%	3.61	0
Warehouse	Cooling DX	Window RE - Window Overhangs	Overhangs over windows for shading	No window overhangs	New	10,117	4.9%	30	$1,927	75%	75%	0.71	4
Warehouse	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	16,012	1.8%	25	$33,532	98%	15%	0.02	7
Warehouse	Cooling DX	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	10,117	1.8%	25	$33,532	98%	80%	0.01	1
Warehouse	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	16,012	1.1%	40	$10,049	98%	15%	0.06	4

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Cooling DX	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	10,117	1.1%	40	$10,049	98%	80%	0.04	0
Warehouse	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	Existing	50,151	7.0%	20	$5,275	75%	85%	0.84	9,824
Warehouse	HVAC Aux	Motor - Fan System - Variable Speed Control	Fan System Optimization w/ VSD	No Fan System VSD Optimization	New	31,729	7.0%	20	$5,275	75%	85%	0.53	204
Warehouse	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	Existing	50,151	0.9%	10	$192	81%	85%	1.58	1,828
Warehouse	HVAC Aux	Motor - Premium-Efficiency	PE Motors for HVAC Applications	Standard Efficiency Motors	New	31,729	0.9%	10	$192	81%	85%	1.00	38
Warehouse	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	Existing	50,151	5.3%	20	$3,513	75%	85%	0.95	2,490
Warehouse	HVAC Aux	Motor - Pump System - Variable Speed Control	Pump System Optimization w/ VSD	No Pump System VSD Optimization	New	31,729	5.3%	20	$3,513	75%	85%	0.60	52
Warehouse	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	Existing	50,151	7.0%	5	$5,200	65%	4%	0.22	275
Warehouse	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Electric Furnace	Constant Speed Fan	New	31,729	7.0%	5	$5,200	65%	4%	0.14	6
Warehouse	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	Existing	50,151	7.0%	5	$5,200	65%	90%	0.22	6,192
Warehouse	HVAC Aux	VSD Furnace Fan	Variable Speed Fan - Gas Furnace	Constant Speed Fan	New	31,729	7.0%	5	$5,200	65%	90%	0.14	128
Warehouse	Heat Pump	Air-Source Heat Pump - High Efficiency	High-Efficiency EER=11.0, COP=3.5	EER=11, COP=3.3 (IECC 2009)	Existing	129,592	4.3%	15	$12,119	NA	NA	0.44	0
Warehouse	Heat Pump	Air-Source Heat Pump - High Efficiency	High-Efficiency EER=11.0, COP=3.5	EER=11, COP=3.3 (IECC 2009)	New	134,237	4.3%	15	$9,695	NA	NA	0.57	0
Warehouse	Heat Pump	Air-Source Heat Pump - Premium Efficiency	Premium-Efficiency EER=11.8, COP=3.8	EER=11, COP=3.3 (IECC 2009)	Existing	129,592	11.6%	15	$25,945	NA	NA	0.56	10,446
Warehouse	Heat Pump	Air-Source Heat Pump - Premium Efficiency	Premium-Efficiency EER=11.8, COP=3.8	EER=11, COP=3.3 (IECC 2009)	New	134,237	11.6%	15	$20,758	NA	NA	0.72	907
Warehouse	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF	Existing	132,318	7.9%	20	$75,834	99%	2%	0.17	23
Warehouse	Heat Pump	Advanced Cold-Climate Heat Pump	16 SEER, 9.6 HSPF	13 SEER, 7.7 HSPF	New	131,174	7.9%	20	$60,666	99%	2%	0.21	1
Warehouse	Heat Pump	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	Existing	132,318	0.2%	10	$17,290	75%	1%	0.01	6
Warehouse	Heat Pump	Attic Fan - Photovoltaic, Installation	Attic Fan - Photovoltaic, Installation	No attic fan	New	131,174	0.4%	10	$17,290	75%	1%	0.02	0
Warehouse	Heat Pump	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	131,174	12.5%	3	$18,980	80%	90%	0.16	834
Warehouse	Heat Pump	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	132,318	12.5%	3	$5,125	40%	90%	0.59	14,586
Warehouse	Heat Pump	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	Existing	132,318	2.5%	20	$17,680	98%	95%	0.23	6,933

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Heat Pump	Cool Roofs	Install Reflect. Material (Reflectivity=0.55)	Baseline Roof	New	131,174	4.2%	20	$17,680	98%	95%	0.38	335
Warehouse	Heat Pump	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	132,318	15.0%	5	$8,128	93%	5%	0.77	113
Warehouse	Heat Pump	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	132,318	10.0%	5	$4,550	98%	75%	0.92	2,401
Warehouse	Heat Pump	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	New	131,174	10.0%	5	$4,550	98%	75%	0.91	72
Warehouse	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	132,318	15.0%	5	$3,284	98%	50%	1.91	1,206
Warehouse	Heat Pump	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	131,174	15.0%	5	$3,284	98%	50%	1.89	38
Warehouse	Heat Pump	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	132,318	2.5%	18	$6,240	45%	45%	0.60	1,567
Warehouse	Heat Pump	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	131,174	2.5%	18	$6,240	45%	45%	0.59	49
Warehouse	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	132,318	11.3%	10	$23,582	94%	5%	0.42	1,634
Warehouse	Heat Pump	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	131,174	11.3%	10	$23,582	94%	5%	0.41	51
Warehouse	Heat Pump	Green Roof	Vegetation on Roof	Standard roofing techniques	Existing	132,318	7.5%	30	$263,380	98%	4%	0.06	752
Warehouse	Heat Pump	Green Roof	Vegetation on Roof	Standard roofing techniques	New	131,174	7.5%	30	$263,380	98%	4%	0.06	21
Warehouse	Heat Pump	Heat Pump - Ground Water Source (Closed Loop)	GSHP: COP=3.1, EER=13.4	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	Existing	132,318	4.4%	20	$140,543	92%	2%	0.05	12
Warehouse	Heat Pump	Heat Pump - Ground Water Source (Closed Loop)	GSHP: COP=3.1, EER=13.4	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	New	131,174	4.4%	20	$112,434	92%	16%	0.06	3
Warehouse	Heat Pump	Heat Pump - Water Source (Closed Loop)	WSHP: COP=4.2, EER=12.0	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	Existing	132,318	20.0%	20	$28,270	92%	2%	1.15	53
Warehouse	Heat Pump	Heat Pump - Water Source (Closed Loop)	WSHP: COP=4.2, EER=12.0	Stnd. Air Source Heat Pump'EER=11.0, COP=3.3	New	131,174	20.0%	20	$29,871	92%	16%	1.08	15
Warehouse	Heat Pump	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	132,318	8.3%	10	$125	10%	10%	57.45	273
Warehouse	Heat Pump	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	132,318	2.0%	25	$16,900	45%	75%	0.23	992
Warehouse	Heat Pump	Insulation (Ceiling)	R-38	R-20 (Code)	New	131,174	2.0%	25	$16,900	45%	75%	0.23	28
Warehouse	Heat Pump	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	132,318	3.0%	25	$21,320	85%	75%	0.27	2,906

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Heat Pump	Insulation (Ceiling)	R-49	R-20 (Code)	New	131,174	3.0%	25	$21,320	85%	75%	0.27	80
Warehouse	Heat Pump	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	132,318	2.4%	25	$15,860	10%	75%	0.29	549
Warehouse	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	132,318	3.0%	25	$2,623	15%	10%	2.22	74
Warehouse	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	132,318	4.4%	25	$4,199	15%	10%	2.04	108
Warehouse	Heat Pump	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5	New	131,174	3.3%	25	$1,173	15%	10%	5.42	3
Warehouse	Heat Pump	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	132,318	10.0%	25	$2,129	35%	10%	9.13	1,152
Warehouse	Heat Pump	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	131,174	5.0%	25	$3,419	95%	95%	2.79	457
Warehouse	Heat Pump	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	132,318	1.0%	25	$7,020	45%	35%	0.28	479
Warehouse	Heat Pump	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	131,174	1.0%	25	$7,020	45%	35%	0.27	13
Warehouse	Heat Pump	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	132,318	3.0%	25	$13,520	45%	35%	0.43	1,447
Warehouse	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=2.9, EER=10.2	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	132,318	4.0%	15	$858	50%	0%	5.94	14
Warehouse	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=2.9, EER=10.2	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	132,318	4.0%	15	$73,710	50%	0%	0.07	15
Warehouse	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=3.4, EER=11.0	COP=2.6, EER=8.67 (IECC) 10,000 Bth/h	Existing	132,318	15.0%	15	$7,363	85%	0%	2.60	49
Warehouse	Heat Pump	Packaged Terminal Heat Pump (10,000 Btu/h)	COP=3.49, EER=11.95	COP=2.94, EER=10.17 (IECC 2009) 10,000 Bth/h	New	131,174	15.5%	15	$7,020	85%	0%	2.80	5
Warehouse	Heat Pump	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	131,174	0.7%	30	$9,217	90%	75%	0.16	38
Warehouse	Heat Pump	Room Heat Pump - Existing to Code (10,000 Btu/h)	EER=11.0 and COP = 3.2 (State Code)	Existing Room Heat Pump (EER = 9.4, COP = 2.7)	Existing	132,318	8.0%	10	$76,097	5%	1%	0.09	9
Warehouse	Heat Pump	Room Heat Pump - High-Efficiency (10,000 Btu/h)	EER=12 and COP=3.5	EER=11.0 and COP = 3.2 (State Code)	Existing	132,318	4.1%	10	$17,079	25%	1%	0.21	24
Warehouse	Heat Pump	Room Heat Pump - High-Efficiency (10,000 Btu/h)	EER=12 and COP=3.5	EER=11.0 and COP = 3.2 (State Code)	New	131,174	5.0%	10	$13,663	25%	1%	0.32	1
Warehouse	Heat Pump	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	132,318	3.0%	5	$2,059	20%	20%	0.61	19
Warehouse	Heat Pump	Scheduled AHU	Reduce AHU runtime	No schedule	New	131,174	3.0%	5	$1,646	20%	20%	0.75	1
Warehouse	Heat Pump	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	132,318	3.0%	15	$138	20%	95%	27.75	1,727

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Heat Pump	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	131,174	3.0%	15	$138	20%	95%	27.51	54
Warehouse	Heat Pump	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	132,318	1.8%	25	$33,532	98%	15%	0.10	381
Warehouse	Heat Pump	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	131,174	1.8%	25	$33,532	98%	80%	0.10	57
Warehouse	Heat Pump	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	132,318	1.0%	40	$10,049	98%	80%	0.27	1,183
Warehouse	Heat Pump	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	131,174	1.1%	40	$10,049	98%	80%	0.29	36
Warehouse	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	96,051	6.0%	9	$12,899	98%	30%	0.27	3,772
Warehouse	Lighting	Daylighting Controls - Dimming-Continuous, Fluorescent Fixtures	Continuous Dimming, Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	64,403	6.0%	9	$12,899	98%	30%	0.18	105
Warehouse	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	Existing	96,051	2.3%	9	$9,675	100%	75%	0.14	3,598
Warehouse	Lighting	Daylighting Controls - Dimming-Stepped, Fluorescent Fixtures	3-Stepped Dimming of Fluorescent Fixtures (Day-Lighting)	No Dimming Controls	New	64,403	2.3%	13	$9,675	99%	75%	0.13	99
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 0.80	Existing	96,051	15.0%	14	$2,215	70%	90%	5.38	26,556
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 15%	Code Required LPD And Control Strategies: LPD = 0.80	New	64,403	15.0%	14	$1,248	70%	90%	6.40	583
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 0.80	Existing	96,051	20.0%	14	$5,647	85%	75%	2.70	34,396
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 20%	Code Required LPD And Control Strategies: LPD = 0.80	New	64,403	20.0%	14	$4,368	85%	75%	2.34	756
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 0.80	Existing	96,051	25.0%	14	$9,251	90%	70%	1.98	40,720
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 25%	Code Required LPD And Control Strategies: LPD = 0.80	New	64,403	25.0%	14	$7,644	90%	70%	1.60	894
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 0.80	Existing	96,051	35.0%	14	$12,683	95%	65%	1.84	51,020
Warehouse	Lighting	HE Fixtures/Design	Lighting Power Densities Above Code Requirements by 35% - Only High Bay Applications	Code Required LPD And Control Strategies: LPD = 0.80	New	64,403	35.0%	14	$10,764	95%	65%	1.46	1,121

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Lighting	HE Fixtures/Design - Existing to Code	Code Required LPD And Control Strategies: LPD = 0.80	Existing Lighting Design	Existing	96,051	33.0%	14	$14,882	40%	95%	1.87	149,987
Warehouse	Lighting	LED Exit Lighting	5W LED Upgrade from 16W CFL	CFL Exit Sign (16 Watts)	Existing	96,051	1.4%	11	$416	65%	95%	2.55	5,345
Warehouse	Lighting	LED Exit Lighting	5W LED Upgrade from 40W incan	Incandescent Exit Sign (40 Watts)	Existing	96,051	1.8%	11	$416	65%	95%	3.25	6,803
Warehouse	Lighting	Lighting Retrocommissioning	Lighting Retrocommissioning	No Commissioning	Existing	96,051	7.0%	5	$7,020	85%	90%	0.30	46,425
Warehouse	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	Existing	96,051	4.0%	9	$486	83%	90%	4.61	13,133
Warehouse	Lighting	Occupancy Sensor Control, Fluorescent	Occupancy Sensor Control, Fluorescent	No Occupancy Sensor	New	64,403	4.0%	10	$486	83%	90%	3.43	464
Warehouse	Lighting	Task Lighting	Delamp And Install Task Lighting	No Task Lighting	Existing	96,051	1.8%	13	$2,519	100%	65%	0.60	14,951
Warehouse	Lighting	Time Clocks And Timers	Install Time Clock Lighting	No Time Clock	Existing	96,051	4.9%	9	$606	100%	85%	4.69	13,043
Warehouse	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	Existing	12,645	0.1%	7	$3	90%	20%	1.89	26
Warehouse	Plug Load	Energy Star - Battery Charging System	Energy Star Battery Charging System	Non-Energy Star Battery Chargers	New	12,645	0.1%	7	$3	90%	20%	1.89	1
Warehouse	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	Existing	12,645	6.5%	4	$3	25%	64%	76.87	1,383
Warehouse	Plug Load	Energy Star - Computer	Energy Star Features Enabled	Non-Energy Star Features	New	12,645	6.3%	4	$3	25%	64%	74.72	44
Warehouse	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	Existing	12,645	8.8%	6	$156	45%	5%	2.69	328
Warehouse	Plug Load	Energy Star - Copiers	Energy Star or Better Office Equipment: Copiers,	Office Equipment: Copiers, Standard	New	12,645	8.8%	6	$156	45%	5%	2.69	11
Warehouse	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	Existing	12,645	1.3%	4	$1	45%	5%	40.36	49
Warehouse	Plug Load	Energy Star - Fax	Energy Star Features Enabled	Non-Energy Star Features	New	12,645	1.3%	4	$1	45%	5%	40.36	2
Warehouse	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	Existing	12,645	3.9%	4	$390	15%	64%	0.31	502
Warehouse	Plug Load	Energy Star - Monitors	Energy Star Features Enabled	Non-Energy Star Features	New	12,645	3.9%	4	$390	15%	64%	0.31	16
Warehouse	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	Existing	12,645	0.1%	5	$16	40%	75%	0.31	62
Warehouse	Plug Load	Energy Star - Printers	Energy Star Features Enabled	Non-Energy Star Features	New	12,645	0.1%	5	$16	40%	75%	0.31	2
Warehouse	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	Existing	12,645	0.6%	4	$1	45%	5%	17.03	21
Warehouse	Plug Load	Energy Star - Scanners	Energy Star Features Enabled	Non-Energy Star Features	New	12,645	0.6%	4	$1	45%	5%	17.03	1
Warehouse	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	Existing	12,645	2.8%	10	$1	75%	75%	228.53	2,635

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Plug Load	Energy Star - Water Cooler	Energy Star Water Cooler (Hot/Cold Water)	Non-Energy Star Water Cooler	New	12,645	2.8%	10	$1	75%	75%	228.53	86
Warehouse	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	Existing	12,645	1.8%	5	$218	30%	95%	0.12	165
Warehouse	Plug Load	Office Computer Network Energy Management	Office Computer Network Energy Management	No Network Management	New	12,645	1.8%	5	$218	30%	95%	0.12	5
Warehouse	Plug Load	Residential-Size Refrigerator/Freezer - Early Replacement	Energy Star Refrigerator/Freezer	Baseline Refrigerator/Freezer	Existing	12,645	7.4%	7	$551	35%	25%	0.76	1,076
Warehouse	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	Existing	12,645	13.6%	14	$159	80%	10%	9.58	1,810
Warehouse	Plug Load	Vending Machine	Energy Star Vending Machines - High-Efficiency	Vending Machines - Standard	New	12,645	13.6%	14	$159	80%	10%	9.58	59
Warehouse	Plug Load	Vending Miser	Passive Infrared Sensor on Vending Machine Monitoring Vacancy of Area And Cycles Cooling - Controls	No Vending Miser - No controls	Existing	12,645	9.2%	3	$283	25%	10%	0.73	380
Warehouse	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	Existing	12,777	3.2%	16	$3	77%	95%	151.94	3,895
Warehouse	Refrigeration	Special Glass Doors for Refrigerated Reach-in Cases	Do Not Require Anti-Sweat Heating	Standard Glass Doors	New	12,777	3.2%	16	$3	77%	95%	151.94	128
Warehouse	Space Heat	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	189,150	12.5%	3	$5,125	40%	90%	0.72	6,485
Warehouse	Space Heat	Direct Digital Control System-Installation	DDC Retrofit	Pnuematic	Existing	189,150	15.0%	5	$8,128	93%	5%	0.95	455
Warehouse	Space Heat	Direct Digital Control System-Optimization	DDC System (Optimized)	DDC System (Basic)	Existing	189,150	10.0%	5	$4,550	98%	75%	1.13	10,241
Warehouse	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	189,150	15.0%	5	$3,284	98%	50%	2.34	5,299
Warehouse	Space Heat	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	New	186,050	15.0%	5	$3,284	98%	50%	2.30	156
Warehouse	Space Heat	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	189,150	2.5%	18	$6,240	45%	45%	0.73	692
Warehouse	Space Heat	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	189,150	15.0%	10	$23,582	94%	5%	0.67	970
Warehouse	Space Heat	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	189,150	10.0%	10	$125	10%	10%	84.87	161

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	189,150	2.0%	25	$16,900	45%	75%	0.28	422
Warehouse	Space Heat	Insulation (Ceiling)	R-38	R-20 (Code)	New	186,050	2.0%	25	$16,900	45%	75%	0.28	15
Warehouse	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	189,150	3.0%	25	$21,320	98%	75%	0.33	1,396
Warehouse	Space Heat	Insulation (Ceiling)	R-49	R-20 (Code)	New	186,050	3.0%	25	$21,320	98%	75%	0.33	49
Warehouse	Space Heat	Insulation (Ceiling) - Existing to Code	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	189,150	2.4%	25	$15,860	10%	75%	0.36	229
Warehouse	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-5	R-0	Existing	189,150	3.0%	25	$2,623	15%	10%	2.72	35
Warehouse	Space Heat	Insulation (Duct) (Unconditioned Spaces)	R-8	R-0	Existing	189,150	4.4%	25	$4,199	15%	10%	2.49	51
Warehouse	Space Heat	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	189,150	12.5%	25	$2,129	35%	10%	13.97	704
Warehouse	Space Heat	Insulation (Wall)	R-25 (2x6 Framing) - Advanced	R-13 + R-7.5 (Code)	New	186,050	6.0%	25	$3,419	95%	95%	4.11	271
Warehouse	Space Heat	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	189,150	1.0%	25	$7,020	45%	35%	0.34	200
Warehouse	Space Heat	Insulation - Floor (Non-Slab) - Existing to Code	R-10 (Code)	R-0	Existing	189,150	3.0%	25	$13,520	45%	35%	0.53	603
Warehouse	Space Heat	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	186,050	0.0%	30	$9,217	90%	75%	0.00	0
Warehouse	Space Heat	Radiant Barrier (Ceiling)	Install Radiant Barrier- Improves R-Value insulation	No Radiant Barrier R-19	New	186,050	5.0%	20	$10,886	80%	90%	0.90	165
Warehouse	Space Heat	Radiant Heating	Install Electric Radiant Heating	Baseline Electric Furnace System	New	186,050	5.3%	10	$12,064	95%	75%	0.45	195
Warehouse	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	189,150	3.0%	5	$2,059	20%	20%	0.75	8
Warehouse	Space Heat	Scheduled AHU	Reduce AHU runtime	No schedule	New	186,050	3.0%	5	$1,646	20%	20%	0.92	0
Warehouse	Space Heat	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 50% sensible and latent recovery effectiveness	No Heat Recovery	Existing	189,150	25.0%	10	$54,860	98%	25%	0.48	8,328
Warehouse	Space Heat	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	189,150	3.0%	15	$138	20%	95%	33.80	93
Warehouse	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	189,150	1.8%	25	$33,532	98%	15%	0.13	163
Warehouse	Space Heat	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	186,050	1.8%	25	$33,532	98%	80%	0.12	61
Warehouse	Space Heat	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	189,150	1.1%	40	$10,049	98%	15%	0.36	102

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (MWh)
Warehouse	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	Existing	1,096	3.3%	20	$91	NA	NA	0.47	202
Warehouse	Water Heat	Water_Heater (40 Gallon Electric) - Residential Sized	EF = 0.95	EF = 0.92	New	1,097	3.3%	20	$91	NA	NA	0.47	22
Warehouse	Water Heat	Demand controlled Circulating Systems	Install demand-based control system (VFD Control by Demand)	No demand control systems in place	Existing	1,147	5.0%	15	$7,223	94%	55%	0.01	109
Warehouse	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,147	5.8%	13	$601	25%	3%	0.09	1
Warehouse	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,147	2.7%	13	$31	25%	3%	0.79	0
Warehouse	Water Heat	Drainwater Heat Recovery Water Heater	Install (Power-Pipe or GFX) - Heat Recovery Water Heater	No Heat Recovery System	Existing	1,147	10.0%	25	$94	92%	5%	1.71	20
Warehouse	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	1,147	3.2%	10	$5	25%	95%	4.40	36
Warehouse	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	1,147	4.5%	10	$16	15%	95%	2.07	30
Warehouse	Water Heat	Heat Pump Water Heater	EF = 2.5	EF=0.92 Baseline Electric Water Heater	Existing	1,147	50.0%	15	$1,357	94%	19%	0.39	29
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	1,147	1.0%	15	$26	90%	80%	0.40	30
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	1,147	1.1%	10	$5	75%	15%	1.55	6
Warehouse	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	1,147	2.5%	10	$10	20%	15%	1.73	4
Warehouse	Water Heat	RE - Solar Water Heater	Passive solar water heating	Non-solar hot water heater	Existing	1,147	16.4%	20	$2,551	95%	20%	0.09	15
Warehouse	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No tank Insulation	Existing	1,147	4.0%	10	$65	35%	15%	0.44	9
Warehouse	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	1,147	7.7%	11	$101	45%	75%	0.60	113
Warehouse	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	Existing	1,147	61.7%	15	$12,275	94%	2%	0.05	2
Warehouse	Water Heat	Water Heater, Ground-Source Heat Pump	EF = 2.4	EF=0.93 Baseline Electric Water Heater	New	1,096	61.7%	15	$12,275	94%	21%	0.05	0
Warehouse	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	1,147	8.5%	20	$130	75%	85%	0.88	257
Warehouse	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	New	1,096	8.5%	20	$130	45%	10%	0.84	1

Table D.4. Commercial Gas Measure Details

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	Existing	2,354	4.3%	10	$200	75%	67%	3.39	2,683
Education	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	New	2,348	4.3%	10	$200	75%	67%	3.38	158
Education	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	Existing	2,354	3.7%	8	$1,058	65%	39%	0.45	1,198
Education	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	New	2,348	3.7%	8	$1,058	65%	39%	0.45	70
Education	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	Existing	2,354	0.6%	12	$1,166	75%	65%	0.10	371
Education	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	New	2,348	0.6%	12	$1,166	75%	65%	0.10	22
Education	Cooking	Oven - Convection	Convection Oven	Standard Oven	Existing	2,354	1.8%	12	$400	40%	50%	0.87	276
Education	Cooking	Oven - Convection	Convection Oven	Standard Oven	New	2,348	1.8%	12	$400	40%	50%	0.87	16
Education	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	Existing	2,354	10.4%	10	$3,370	85%	4%	0.49	39
Education	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	New	2,348	10.4%	10	$2,697	85%	4%	0.61	2
Education	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	Existing	2,354	4.6%	10	$2,075	75%	18%	0.35	764
Education	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	New	2,348	4.6%	10	$2,075	75%	18%	0.35	45
Education	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	10,290	5.9%	20	$3,905	NA	NA	2.00	0
Education	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	9,834	5.9%	20	$3,146	NA	NA	2.37	0
Education	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	10,290	11.1%	20	$7,966	NA	NA	1.85	281,476
Education	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	9,834	11.1%	20	$6,415	NA	NA	2.20	39,737

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	10,441	10.0%	15	$20,020	94%	25%	0.53	413,476
Education	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	9,376	10.0%	15	$20,020	94%	25%	0.47	20,554
Education	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	10,441	5.5%	20	$15,792	65%	40%	0.47	230,643
Education	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	9,376	5.5%	20	$12,720	65%	40%	0.52	12,213
Education	Space Heat Boiler	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	9,376	12.5%	3	$16,060	40%	90%	0.15	31,066
Education	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	10,441	12.5%	3	$4,336	40%	90%	0.62	853,125
Education	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	10,441	5.0%	15	$6,112	34%	5%	0.86	6,988
Education	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	10,441	10.0%	5	$11,849	80%	75%	0.31	858,506
Education	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	9,376	10.0%	5	$11,849	80%	75%	0.27	39,891
Education	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	10,441	15.0%	5	$1,116,625	80%	50%	0.00	392,781
Education	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	10,441	2.5%	18	$8,800	45%	45%	0.35	75,602
Education	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	9,376	2.5%	18	$8,800	45%	45%	0.31	3,513
Education	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	10,441	15.0%	10	$36,280	94%	5%	0.30	106,030

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	9,376	15.0%	10	$36,280	94%	5%	0.27	4,927
Education	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	10,441	4.5%	10	$5,449	85%	73%	0.60	503,478
Education	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	9,376	4.5%	10	$5,449	85%	73%	0.54	25,962
Education	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	9,376	3.0%	30	$125,708	98%	75%	0.04	14,469
Education	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	10,441	15.0%	25	$13,420	15%	75%	1.81	110,775
Education	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	10,441	15.0%	25	$11,440	45%	75%	2.12	341,163
Education	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	9,376	15.0%	25	$11,440	45%	75%	1.90	25,453
Education	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	10,441	15.0%	25	$15,180	85%	75%	1.60	624,193
Education	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	9,376	15.0%	25	$15,180	85%	75%	1.44	46,862
Education	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	10,441	4.4%	25	$2,460	15%	10%	2.89	6,675
Education	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	10,441	3.0%	25	$1,778	15%	10%	2.73	4,550
Education	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	9,376	3.3%	25	$992	15%	10%	4.83	263
Education	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	10,441	10.0%	25	$2,002	35%	10%	8.08	71,209

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	9,376	6.0%	25	$4,343	95%	95%	2.01	57,569
Education	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	10,441	15.0%	25	$11,440	35%	35%	2.12	182,610
Education	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	10,441	15.0%	25	$1,980	35%	35%	12.26	189,226
Education	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	9,376	15.0%	25	$1,980	35%	35%	11.01	19,951
Education	Space Heat Boiler	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	9,376	0.6%	30	$12,800	90%	90%	0.08	3,081
Education	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	9,376	5.0%	20	$9,211	80%	90%	0.66	32,662
Education	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	10,441	3.0%	5	$5,630	20%	20%	0.19	891
Education	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	9,376	3.0%	5	$4,503	20%	20%	0.22	41
Education	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	10,441	25.0%	10	$46,420	98%	25%	0.39	1,052,352
Education	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	9,376	25.0%	10	$46,420	98%	50%	0.35	103,127
Education	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	10,441	12.1%	20	$2,149	25%	10%	7.54	61,480
Education	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	10,441	3.0%	15	$609	79%	95%	5.18	45,849
Education	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	9,376	3.0%	15	$609	79%	95%	4.65	2,410

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Boiler	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	10,441	16.0%	10	$66,880	70%	15%	0.17	249,602
Education	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	10,441	0.5%	25	$44,031	98%	85%	0.02	32,953
Education	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	9,376	0.5%	25	$44,031	98%	95%	0.02	1,618
Education	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	10,441	0.5%	25	$24,559	96%	85%	0.03	27,223
Education	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	9,376	0.5%	25	$24,559	96%	95%	0.03	1,337
Education	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	11,289	11.1%	18	$4,501	NA	NA	3.28	0
Education	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	8,268	11.1%	18	$4,501	NA	NA	2.40	0
Education	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	11,289	14.9%	18	$9,227	NA	NA	2.15	537,090
Education	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	8,268	14.9%	18	$9,227	NA	NA	1.57	69,791
Education	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	11,359	10.0%	15	$20,020	94%	25%	0.57	242,897
Education	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	7,731	10.0%	15	$20,020	94%	25%	0.39	8,918
Education	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	7,731	12.5%	3	$16,060	80%	90%	0.12	29,817
Education	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	11,359	12.5%	3	$4,336	80%	90%	0.67	1,051,496

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	11,359	2.5%	18	$8,800	45%	45%	0.38	45,916
Education	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	7,731	2.5%	18	$8,800	45%	45%	0.26	1,686
Education	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	11,359	15.0%	10	$36,280	94%	5%	0.33	64,397
Education	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	7,731	15.0%	10	$36,280	94%	5%	0.22	2,364
Education	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	11,359	4.5%	10	$5,449	85%	73%	0.65	295,768
Education	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	7,731	4.5%	10	$5,449	85%	73%	0.44	11,265
Education	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	7,731	3.0%	30	$116,329	98%	75%	0.04	6,617
Education	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	11,359	13.0%	13	$6,930	65%	5%	1.90	54,994
Education	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	7,731	13.0%	13	$6,930	65%	5%	1.29	2,047
Education	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	11,359	15.0%	25	$13,420	15%	75%	1.97	68,266
Education	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	11,359	15.0%	25	$11,440	45%	75%	2.31	208,361
Education	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	7,731	15.0%	25	$11,440	45%	75%	1.57	11,044
Education	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	11,359	15.0%	25	$15,180	85%	75%	1.74	384,666

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	7,731	15.0%	25	$15,180	85%	75%	1.18	20,333
Education	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	11,359	4.4%	25	$2,460	15%	10%	3.15	4,114
Education	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	11,359	3.0%	25	$2,563	15%	10%	2.06	2,731
Education	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	7,731	3.3%	25	$992	15%	10%	3.98	114
Education	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	11,359	10.0%	25	$2,002	35%	10%	8.79	44,797
Education	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	7,731	6.0%	25	$4,343	95%	95%	1.65	24,978
Education	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	11,359	15.0%	25	$11,440	35%	35%	2.31	114,493
Education	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	11,359	15.0%	25	$1,980	35%	35%	13.33	118,683
Education	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	7,731	15.0%	25	$1,980	35%	35%	9.07	8,837
Education	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	7,731	0.6%	30	$12,800	90%	90%	0.06	1,409
Education	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	7,731	5.0%	20	$9,211	80%	90%	0.54	14,172
Education	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	11,359	3.0%	5	$5,630	20%	20%	0.21	541
Education	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	7,731	3.0%	5	$4,503	20%	20%	0.18	20

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	11,359	25.0%	10	$46,420	95%	40%	0.42	958,847
Education	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	7,731	25.0%	10	$46,420	95%	40%	0.29	35,204
Education	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	11,359	3.0%	15	$609	79%	95%	5.64	288,437
Education	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	7,731	3.0%	15	$609	79%	95%	3.84	10,676
Education	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	11,359	16.0%	10	$66,880	70%	15%	0.19	151,594
Education	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	11,359	0.5%	25	$44,031	98%	85%	0.02	20,014
Education	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	7,731	0.5%	25	$44,031	98%	95%	0.01	740
Education	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	11,359	0.5%	25	$24,559	96%	85%	0.03	16,533
Education	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	7,731	0.5%	25	$24,559	96%	95%	0.02	611
Education	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	1,113	4.8%	13	$427	NA	NA	1.09	0
Education	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	1,110	4.8%	13	$427	NA	NA	1.09	0
Education	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	1,113	11.9%	13	$3,318	NA	NA	0.35	998,229
Education	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	1,110	11.9%	13	$3,318	NA	NA	0.35	135,058
Education	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	1,017	2.0%	10	$290	75%	25%	0.48	5,214

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Education	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	1,017	5.0%	15	$6,112	94%	55%	0.08	35,090
Education	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	1,017	3.0%	13	$2,570	80%	46%	0.10	7,642
Education	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,017	0.5%	13	$601	55%	35%	0.07	738
Education	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,017	0.1%	13	$31	25%	35%	0.40	95
Education	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	1,017	20.0%	25	$3,868	92%	5%	0.79	12,698
Education	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	1,017	3.2%	10	$13	25%	95%	16.56	11,683
Education	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	1,017	4.5%	10	$18	15%	95%	17.56	9,914
Education	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	1,017	1.0%	15	$233	70%	75%	0.43	7,164
Education	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	1,017	0.5%	5	$11	25%	90%	0.77	1,623
Education	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	1,017	3.4%	10	$46	75%	45%	0.69	17,611
Education	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	1,017	7.5%	10	$84	20%	45%	0.85	10,436
Education	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	1,017	3.6%	20	$24,651	95%	20%	0.02	1,062
Education	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	1,017	30.0%	14	$6,255	90%	5%	0.45	2,087
Education	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	1,017	28.0%	20	$1,923	90%	5%	1.86	1,951
Education	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	1,017	4.0%	10	$519	35%	15%	0.53	2,872
Education	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	1,017	7.7%	11	$741	15%	75%	0.78	12,048
Education	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	1,017	8.5%	20	$1,041	75%	85%	1.04	83,778

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	Existing	744	4.3%	10	$200	75%	67%	1.07	26,675
Grocery	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	New	741	4.3%	10	$200	75%	67%	1.07	1,568
Grocery	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	Existing	744	3.7%	8	$1,058	65%	39%	0.14	11,911
Grocery	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	New	741	3.7%	8	$1,058	65%	39%	0.14	700
Grocery	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	Existing	744	0.6%	12	$1,165	75%	45%	0.03	2,552
Grocery	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	New	741	0.6%	12	$1,165	75%	45%	0.03	150
Grocery	Cooking	Oven - Convection	Convection Oven	Standard Oven	Existing	744	1.8%	12	$400	85%	50%	0.27	5,828
Grocery	Cooking	Oven - Convection	Convection Oven	Standard Oven	New	741	1.8%	12	$400	85%	50%	0.27	343
Grocery	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	Existing	744	10.4%	10	$3,370	85%	4%	0.16	389
Grocery	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	New	741	10.4%	10	$2,696	85%	4%	0.19	23
Grocery	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	Existing	744	4.6%	10	$2,075	75%	18%	0.11	7,596
Grocery	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	New	741	4.6%	10	$2,075	75%	18%	0.11	446
Grocery	Space Heat	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	1,465	11.1%	18	$1,688	NA	NA	1.14	0
Grocery	Space Heat	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	816	11.1%	18	$1,688	NA	NA	0.63	0
Grocery	Space Heat	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	1,465	14.9%	18	$3,460	NA	NA	0.74	96,634
Grocery	Space Heat	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	816	14.9%	18	$3,460	NA	NA	0.41	9,547

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	763	12.5%	3	$2,190	80%	90%	0.09	4,349
Grocery	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	1,439	12.5%	3	$591	80%	90%	0.63	186,202
Grocery	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	1,439	2.5%	18	$1,200	45%	45%	0.35	8,625
Grocery	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	763	2.5%	18	$1,200	45%	45%	0.19	246
Grocery	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	1,439	15.0%	10	$8,600	94%	5%	0.17	11,951
Grocery	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	763	15.0%	10	$8,600	94%	5%	0.09	310
Grocery	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	1,439	4.5%	10	$5,450	85%	64%	0.08	41,204
Grocery	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	763	4.5%	10	$5,450	85%	64%	0.04	1,069
Grocery	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	763	3.0%	30	$15,863	98%	75%	0.03	930
Grocery	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	1,439	10.0%	10	$702	10%	40%	1.42	8,617
Grocery	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	1,439	13.0%	13	$945	65%	5%	1.77	9,717
Grocery	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	763	13.0%	13	$945	65%	5%	0.94	280
Grocery	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	1,439	15.0%	25	$1,830	10%	75%	1.83	8,044

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	1,439	15.0%	25	$1,560	45%	75%	2.15	36,976
Grocery	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	763	15.0%	25	$1,560	45%	75%	1.14	1,605
Grocery	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	1,439	15.0%	25	$2,070	85%	75%	1.62	68,118
Grocery	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	763	15.0%	25	$2,070	85%	75%	0.86	2,955
Grocery	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	1,439	4.4%	25	$335	15%	10%	2.93	732
Grocery	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	1,439	3.0%	25	$350	15%	10%	1.92	483
Grocery	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	763	3.3%	25	$135	15%	10%	2.89	16
Grocery	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	1,439	10.0%	25	$739	35%	10%	3.02	7,791
Grocery	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	763	6.0%	25	$1,603	95%	95%	0.44	3,187
Grocery	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	1,439	15.0%	25	$1,560	45%	35%	2.15	26,192
Grocery	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	1,439	15.0%	25	$270	45%	35%	12.40	26,962
Grocery	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	763	15.0%	25	$270	45%	35%	6.57	1,555
Grocery	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	763	1.2%	30	$6,064	90%	90%	0.03	397

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	763	5.0%	20	$1,256	80%	90%	0.39	2,004
Grocery	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	1,439	3.0%	5	$528	20%	20%	0.28	102
Grocery	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	763	3.0%	5	$422	20%	20%	0.19	3
Grocery	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	1,439	25.0%	10	$6,330	95%	40%	0.39	178,858
Grocery	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	763	25.0%	10	$6,330	95%	40%	0.21	5,098
Grocery	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	1,439	3.0%	15	$83	46%	95%	5.24	29,686
Grocery	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	763	3.0%	15	$83	46%	95%	2.78	846
Grocery	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,439	0.3%	25	$4,151	98%	85%	0.02	2,117
Grocery	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	763	0.3%	25	$4,151	98%	95%	0.01	59
Grocery	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,439	0.3%	25	$2,315	96%	85%	0.03	2,010
Grocery	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	763	0.3%	25	$2,315	96%	95%	0.02	56
Grocery	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	91	4.8%	13	$89	NA	NA	0.43	0
Grocery	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	90	4.8%	13	$89	NA	NA	0.43	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	91	11.9%	13	$686	NA	NA	0.14	26,006
Grocery	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	90	11.9%	13	$686	NA	NA	0.14	3,519
Grocery	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	83	5.0%	15	$833	94%	75%	0.05	1,231
Grocery	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	83	3.0%	13	$2,570	80%	40%	0.01	176
Grocery	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	83	5.9%	13	$600	55%	24%	0.07	159
Grocery	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	83	1.7%	13	$30	25%	24%	0.40	20
Grocery	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	83	20.0%	25	$800	92%	5%	0.31	325
Grocery	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	83	3.2%	10	$2	25%	95%	9.87	304
Grocery	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	83	4.5%	10	$2	15%	95%	10.47	258
Grocery	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	83	1.0%	15	$32	90%	75%	0.26	240
Grocery	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	83	1.2%	5	$5	40%	75%	0.69	141
Grocery	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	83	1.1%	10	$5	75%	15%	1.58	51
Grocery	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	83	2.5%	10	$9	20%	15%	1.93	30
Grocery	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	83	19.3%	20	$5,100	95%	20%	0.04	148
Grocery	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	83	30.0%	14	$1,294	90%	5%	0.18	54
Grocery	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	83	28.0%	20	$398	90%	13%	0.73	127
Grocery	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	83	4.0%	10	$132	35%	15%	0.17	74

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Grocery	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	83	7.7%	11	$154	50%	75%	0.31	1,057
Grocery	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	83	8.5%	20	$260	75%	85%	0.34	2,183
Health	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	Existing	7,126	5.9%	20	$3,552	NA	NA	1.51	0
Health	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	New	5,986	5.9%	20	$3,552	NA	NA	1.27	0
Health	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	Existing	7,126	11.1%	20	$7,104	NA	NA	1.42	98,157
Health	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	New	5,986	11.1%	20	$7,104	NA	NA	1.19	15,975
Health	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	7,230	10.0%	15	$14,560	94%	5%	0.50	27,676
Health	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	5,647	10.0%	15	$14,560	94%	5%	0.39	1,231
Health	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	7,230	5.5%	20	$3,466	90%	40%	1.46	135,318
Health	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	5,647	5.5%	20	$2,968	90%	40%	1.34	6,139
Health	Space Heat Boiler	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	5,647	12.5%	3	$11,680	40%	90%	0.12	9,463
Health	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	7,230	12.5%	3	$3,154	40%	90%	0.58	289,767
Health	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	7,230	5.0%	15	$4,445	26%	35%	0.81	12,494

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	7,230	10.0%	5	$8,618	80%	75%	0.29	290,104
Health	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	5,647	10.0%	5	$8,618	80%	75%	0.22	12,065
Health	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	7,230	15.0%	5	$6,218	80%	75%	0.60	248,549
Health	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	7,230	2.5%	18	$6,400	45%	45%	0.33	25,729
Health	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	5,647	2.5%	18	$6,400	45%	45%	0.26	1,070
Health	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	7,230	15.0%	10	$7,256	94%	5%	1.03	45,719
Health	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	5,647	15.0%	10	$7,256	94%	5%	0.80	1,930
Health	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	7,230	4.5%	10	$5,450	85%	62%	0.41	137,957
Health	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	5,647	4.5%	10	$5,450	85%	62%	0.32	6,138
Health	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	5,647	3.0%	30	$91,424	98%	75%	0.03	4,365
Health	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	7,230	15.0%	25	$9,760	13%	75%	1.71	33,480
Health	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	7,230	15.0%	25	$8,320	45%	75%	2.00	117,882
Health	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	5,647	15.0%	25	$8,320	45%	75%	1.56	8,052

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	7,230	15.0%	25	$11,040	85%	75%	1.51	213,528
Health	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	5,647	15.0%	25	$11,040	85%	75%	1.18	13,743
Health	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	7,230	4.4%	25	$1,789	15%	10%	2.73	2,328
Health	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	7,230	3.0%	25	$1,293	15%	10%	2.57	1,587
Health	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	5,647	3.3%	25	$722	15%	10%	3.96	79
Health	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	7,230	10.0%	25	$1,707	35%	10%	6.50	24,827
Health	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	5,647	6.0%	25	$3,702	95%	95%	1.40	16,456
Health	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	7,230	15.0%	25	$8,320	35%	35%	2.00	64,775
Health	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	7,230	15.0%	25	$1,440	35%	35%	11.56	65,973
Health	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	5,647	15.0%	25	$1,440	35%	35%	9.03	5,968
Health	Space Heat Boiler	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	5,647	0.7%	30	$10,672	90%	90%	0.07	1,206
Health	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	5,647	5.0%	20	$6,699	80%	90%	0.54	9,784
Health	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	7,230	3.0%	5	$845	20%	20%	0.88	389

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	5,647	3.0%	5	$675	20%	20%	0.86	18
Health	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	7,230	25.0%	10	$33,760	98%	25%	0.37	350,523
Health	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	5,647	25.0%	10	$33,760	98%	50%	0.29	31,191
Health	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	7,230	12.1%	20	$1,832	25%	10%	6.07	21,435
Health	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	7,230	3.0%	15	$443	71%	95%	4.89	14,245
Health	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	5,647	3.0%	15	$443	71%	95%	3.82	643
Health	Space Heat Boiler	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	7,230	16.0%	10	$48,640	70%	15%	0.16	84,949
Health	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	7,230	1.4%	25	$8,658	98%	85%	0.18	28,301
Health	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	5,647	1.4%	25	$8,658	98%	95%	0.14	1,278
Health	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	7,230	0.4%	25	$4,829	96%	85%	0.09	8,105
Health	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	5,647	0.4%	25	$4,829	96%	95%	0.07	366
Health	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	3,581	11.1%	18	$2,701	NA	NA	1.73	0
Health	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	3,064	11.1%	18	$2,701	NA	NA	1.48	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	3,581	14.9%	18	$5,536	NA	NA	1.13	503,865
Health	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	3,064	14.9%	18	$5,536	NA	NA	0.97	76,396
Health	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	3,517	10.0%	15	$14,560	94%	5%	0.24	45,843
Health	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	2,865	10.0%	15	$14,560	94%	5%	0.20	1,998
Health	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	2,865	12.5%	3	$11,680	80%	90%	0.06	33,484
Health	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	3,517	12.5%	3	$3,154	80%	90%	0.29	964,671
Health	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	3,517	2.5%	18	$6,400	45%	45%	0.16	43,431
Health	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	2,865	2.5%	18	$6,400	45%	45%	0.13	1,893
Health	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	3,517	15.0%	10	$7,256	94%	5%	0.50	76,102
Health	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	2,865	15.0%	10	$7,256	94%	5%	0.41	3,131
Health	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	3,517	4.5%	10	$5,450	85%	62%	0.20	228,518
Health	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	2,865	4.5%	10	$5,450	85%	62%	0.16	9,961
Health	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	2,865	3.0%	30	$84,603	98%	75%	0.02	7,359

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	3,517	13.0%	13	$5,040	65%	5%	0.81	50,648
Health	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	2,865	13.0%	13	$5,040	65%	5%	0.66	2,240
Health	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	3,517	15.0%	25	$9,760	13%	75%	0.84	54,626
Health	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	3,517	15.0%	25	$8,320	45%	75%	0.98	194,163
Health	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	2,865	15.0%	25	$8,320	45%	75%	0.80	12,808
Health	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	3,517	15.0%	25	$11,040	85%	75%	0.74	355,430
Health	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	2,865	15.0%	25	$11,040	85%	75%	0.60	22,303
Health	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	3,517	4.4%	25	$1,789	15%	10%	1.34	3,798
Health	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	3,517	3.0%	25	$1,864	15%	10%	0.88	2,522
Health	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	2,865	3.3%	25	$722	15%	10%	2.03	125
Health	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	3,517	10.0%	25	$1,707	35%	10%	3.19	41,257
Health	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	2,865	6.0%	25	$3,702	95%	95%	0.72	26,705
Health	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	3,517	15.0%	25	$8,320	35%	35%	0.98	103,927

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	3,517	15.0%	25	$1,440	35%	35%	5.68	109,304
Health	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	2,865	15.0%	25	$1,440	35%	35%	4.62	9,669
Health	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	2,865	0.7%	30	$10,672	90%	90%	0.04	2,033
Health	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	2,865	5.0%	20	$6,699	80%	90%	0.28	15,877
Health	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	3,517	3.0%	5	$845	20%	20%	0.43	648
Health	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	2,865	3.0%	5	$675	20%	20%	0.44	30
Health	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	3,517	25.0%	10	$33,760	95%	40%	0.18	900,556
Health	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	2,865	25.0%	10	$33,760	95%	40%	0.15	39,253
Health	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	3,517	3.0%	15	$443	71%	95%	2.40	236,720
Health	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	2,865	3.0%	15	$443	71%	95%	1.95	10,410
Health	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	3,517	16.0%	10	$48,640	70%	15%	0.08	143,397
Health	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	3,517	1.4%	25	$8,658	98%	85%	0.09	47,774
Health	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	2,865	1.4%	25	$8,658	98%	95%	0.07	2,154

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	3,517	0.4%	25	$4,829	96%	85%	0.05	13,682
Health	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	2,865	0.4%	25	$4,829	96%	95%	0.04	617
Health	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	4,544	4.8%	13	$398	NA	NA	4.76	0
Health	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	4,539	4.8%	13	$398	NA	NA	4.76	0
Health	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	4,544	11.9%	13	$3,090	NA	NA	1.51	4,534,976
Health	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	4,539	11.9%	13	$3,090	NA	NA	1.51	613,573
Health	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	4,151	0.1%	10	$30	75%	11%	0.49	264
Health	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	4,151	5.0%	15	$4,445	94%	55%	0.46	155,018
Health	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	4,151	3.0%	13	$2,570	80%	13%	0.42	10,212
Health	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	4,151	0.1%	13	$600	55%	11%	0.07	255
Health	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	4,151	0.0%	13	$30	25%	11%	0.41	33
Health	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	4,151	20.0%	25	$3,600	92%	5%	3.47	56,095
Health	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	4,151	3.2%	10	$8	25%	95%	111.21	53,078
Health	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	4,151	4.5%	10	$13	15%	95%	98.30	45,040
Health	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	4,151	1.0%	15	$170	70%	75%	2.40	31,650
Health	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	4,151	0.5%	5	$10	45%	15%	3.53	2,213

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Health	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	4,151	2.6%	10	$27	75%	35%	6.12	48,399
Health	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	4,151	5.8%	10	$50	20%	35%	7.45	28,681
Health	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	4,151	33.3%	20	$22,950	95%	20%	0.75	44,423
Health	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	4,151	30.0%	14	$5,824	90%	5%	1.97	9,482
Health	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	4,151	28.0%	20	$1,790	90%	5%	8.14	8,865
Health	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	4,151	4.0%	10	$469	35%	15%	2.39	12,686
Health	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	4,151	7.7%	11	$691	80%	75%	3.41	295,029
Health	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	4,151	8.5%	20	$910	75%	85%	4.85	380,605
Large Office	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	55,783	5.9%	20	$10,710	NA	NA	3.90	0
Large Office	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	26,258	5.9%	20	$8,570	NA	NA	2.30	0
Large Office	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	55,783	11.1%	20	$21,850	NA	NA	3.61	143,222
Large Office	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	26,258	11.1%	20	$17,480	NA	NA	2.13	13,040
Large Office	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	56,599	10.0%	15	$91,000	94%	75%	0.62	649,892
Large Office	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	24,770	10.0%	15	$91,000	94%	75%	0.27	16,934
Large Office	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	56,599	5.5%	20	$38,830	45%	40%	1.02	92,834

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	24,770	5.5%	20	$31,060	45%	40%	0.56	2,419
Large Office	Space Heat Boiler	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	24,770	12.5%	3	$73,000	40%	90%	0.09	8,298
Large Office	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	56,599	12.5%	3	$19,710	40%	90%	0.73	460,651
Large Office	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	56,599	5.0%	15	$27,780	28%	5%	1.02	3,059
Large Office	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	56,599	10.0%	5	$53,860	80%	75%	0.36	434,355
Large Office	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	24,770	10.0%	5	$53,860	80%	75%	0.16	10,579
Large Office	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	56,599	15.0%	5	$38,860	80%	75%	0.75	395,805
Large Office	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	56,599	2.5%	18	$40,000	45%	45%	0.41	38,522
Large Office	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	24,770	2.5%	18	$40,000	45%	45%	0.18	938
Large Office	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	56,599	15.0%	10	$90,700	94%	5%	0.64	65,451
Large Office	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	24,770	15.0%	10	$90,700	94%	5%	0.28	1,705
Large Office	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	24,770	3.0%	30	$144,020	98%	75%	0.09	3,855
Large Office	Space Heat Boiler	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	56,599	10.0%	10	$23,410	10%	40%	1.66	41,379

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	56,599	3.8%	25	$15,250	4%	75%	2.13	3,864
Large Office	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	56,599	3.8%	25	$13,000	25%	75%	2.50	24,302
Large Office	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	24,770	3.8%	25	$13,000	25%	75%	1.09	878
Large Office	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	56,599	3.8%	25	$17,250	65%	75%	1.88	62,762
Large Office	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	24,770	3.8%	25	$17,250	65%	75%	0.82	2,274
Large Office	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	56,599	4.4%	25	$11,180	15%	10%	3.41	3,427
Large Office	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	56,599	3.0%	25	$8,080	15%	10%	3.22	2,336
Large Office	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	24,770	3.3%	25	$4,510	15%	10%	2.78	65
Large Office	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	56,599	10.0%	25	$8,530	35%	10%	10.16	36,545
Large Office	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	24,770	6.0%	25	$18,510	95%	95%	1.23	14,296
Large Office	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	56,599	3.8%	25	$13,000	15%	35%	2.50	10,217
Large Office	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	56,599	3.8%	25	$2,250	15%	35%	14.45	10,288
Large Office	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	24,770	3.8%	25	$2,250	15%	35%	6.32	522

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Boiler	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	24,770	0.9%	30	$40,450	90%	90%	0.10	1,286
Large Office	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	24,770	1.3%	20	$5,430	80%	90%	0.73	2,219
Large Office	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	56,599	3.0%	5	$10,560	20%	20%	0.55	557
Large Office	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	24,770	3.0%	5	$8,440	20%	20%	0.30	15
Large Office	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	56,599	25.0%	10	$211,000	98%	25%	0.46	524,816
Large Office	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	24,770	25.0%	10	$211,000	98%	50%	0.20	27,349
Large Office	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	56,599	12.1%	20	$4,580	25%	10%	18.97	31,583
Large Office	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	56,599	3.0%	15	$2,770	67%	95%	6.11	19,883
Large Office	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	24,770	3.0%	15	$2,770	67%	95%	2.67	506
Large Office	Space Heat Boiler	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	56,599	16.0%	10	$304,000	70%	15%	0.20	127,188
Large Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	34,443	11.1%	18	$11,250	NA	NA	3.93	0
Large Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	9,729	11.1%	18	$11,250	NA	NA	1.11	0
Large Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	34,443	14.9%	18	$23,070	NA	NA	2.57	86,008

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	9,729	14.9%	18	$23,070	NA	NA	0.73	4,297
Large Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	34,371	10.0%	15	$91,000	94%	75%	0.37	126,122
Large Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	9,097	10.0%	15	$91,000	94%	75%	0.10	1,877
Large Office	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	9,097	12.5%	3	$73,000	80%	90%	0.03	2,006
Large Office	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	34,371	12.5%	3	$19,710	80%	90%	0.44	178,197
Large Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	34,371	2.5%	18	$40,000	45%	45%	0.25	7,618
Large Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	9,097	2.5%	18	$40,000	45%	45%	0.07	113
Large Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	34,371	15.0%	10	$90,700	94%	5%	0.39	12,702
Large Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	9,097	15.0%	10	$90,700	94%	5%	0.10	189
Large Office	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	9,097	3.0%	30	$144,020	98%	75%	0.03	444
Large Office	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	34,371	10.0%	10	$23,410	10%	40%	1.00	8,005
Large Office	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	34,371	13.0%	13	$31,500	65%	5%	1.24	8,757
Large Office	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	9,097	13.0%	13	$31,500	65%	5%	0.33	126

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	34,371	3.8%	25	$15,250	4%	75%	1.28	747
Large Office	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	34,371	3.8%	25	$13,000	25%	75%	1.51	4,702
Large Office	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	9,097	3.8%	25	$13,000	25%	75%	0.40	96
Large Office	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	34,371	3.8%	25	$17,250	65%	75%	1.14	12,139
Large Office	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	9,097	3.8%	25	$17,250	65%	75%	0.30	250
Large Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	34,371	4.4%	25	$11,180	15%	10%	2.06	663
Large Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	34,371	3.0%	25	$11,650	15%	10%	1.34	448
Large Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	9,097	3.3%	25	$4,510	15%	10%	1.01	7
Large Office	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	34,371	10.0%	25	$8,530	35%	10%	6.12	7,192
Large Office	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	9,097	6.0%	25	$18,510	95%	95%	0.45	1,569
Large Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	34,371	3.8%	25	$13,000	15%	35%	1.51	1,977
Large Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	34,371	3.8%	25	$2,250	15%	35%	8.70	2,025
Large Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	9,097	3.8%	25	$2,250	15%	35%	2.30	58

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	9,097	0.9%	30	$40,450	90%	90%	0.04	148
Large Office	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	9,097	1.3%	20	$5,430	80%	90%	0.26	244
Large Office	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	34,371	3.0%	5	$10,560	20%	20%	0.33	108
Large Office	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	9,097	3.0%	5	$8,440	20%	20%	0.11	2
Large Office	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	34,371	25.0%	10	$211,000	95%	40%	0.28	157,970
Large Office	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	9,097	25.0%	10	$211,000	95%	40%	0.07	2,351
Large Office	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	34,371	3.0%	15	$2,770	67%	95%	3.68	39,132
Large Office	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	9,097	3.0%	15	$2,770	67%	95%	0.97	565
Large Office	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	34,371	16.0%	10	$304,000	70%	15%	0.12	25,154
Large Office	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	1,619	4.8%	13	$930	NA	NA	0.73	0
Large Office	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	1,621	4.8%	13	$930	NA	NA	0.73	0
Large Office	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	1,619	11.9%	13	$7,210	NA	NA	0.23	35,161
Large Office	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	1,621	11.9%	13	$7,210	NA	NA	0.23	4,757
Large Office	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	1,479	5.0%	15	$27,780	80%	55%	0.03	1,060

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Large Office	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,479	1.4%	13	$2,400	55%	8%	0.08	17
Large Office	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	1,479	0.4%	13	$120	25%	8%	0.43	2
Large Office	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	1,479	20.0%	25	$8,400	92%	5%	0.53	449
Large Office	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	1,479	3.2%	10	$50	25%	95%	6.34	412
Large Office	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	1,479	4.5%	10	$80	15%	95%	5.61	349
Large Office	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	1,479	1.0%	15	$1,060	30%	75%	0.14	109
Large Office	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	1,479	1.1%	10	$10	75%	15%	13.43	69
Large Office	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	1,479	2.5%	10	$10	20%	15%	29.84	41
Large Office	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	1,479	27.9%	20	$53,550	95%	20%	0.10	289
Large Office	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	1,479	30.0%	14	$13,590	90%	13%	0.30	184
Large Office	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	1,479	28.0%	20	$4,180	90%	13%	1.24	172
Large Office	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	1,479	4.0%	10	$1,140	35%	15%	0.35	102
Large Office	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	1,479	7.7%	11	$1,610	40%	75%	0.52	1,153
Large Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	1,479	8.5%	20	$2,080	75%	85%	0.76	2,951
Lodging	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	Existing	1,119	4.3%	10	$200	75%	67%	1.61	19,457
Lodging	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	New	1,116	4.3%	10	$200	75%	67%	1.60	1,144
Lodging	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	Existing	1,119	3.7%	8	$1,058	65%	31%	0.21	6,757

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	New	1,116	3.7%	8	$1,058	65%	31%	0.21	397
Lodging	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	Existing	1,119	0.6%	12	$1,165	75%	45%	0.05	1,862
Lodging	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	New	1,116	0.6%	12	$1,165	75%	45%	0.05	109
Lodging	Cooking	Oven - Convection	Convection Oven	Standard Oven	Existing	1,119	1.8%	12	$400	55%	50%	0.41	2,751
Lodging	Cooking	Oven - Convection	Convection Oven	Standard Oven	New	1,116	1.8%	12	$400	55%	50%	0.41	162
Lodging	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	Existing	1,119	10.4%	10	$3,370	85%	4%	0.23	284
Lodging	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	New	1,116	10.4%	10	$2,696	85%	4%	0.29	17
Lodging	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	Existing	1,119	4.6%	10	$2,075	75%	18%	0.17	5,540
Lodging	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	New	1,116	4.6%	10	$2,075	75%	18%	0.17	326
Lodging	Pool Heat	Solar RE - Installation of Solar Pool/Spa Heating Systems	Solar Pool/Spa Heating Systems	No Solar Pool Heating System	Existing	2,507	10.1%	12	$9,120	90%	30%	0.22	24,508
Lodging	Pool Heat	Solar RE - Installation of Solar Pool/Spa Heating Systems	Solar Pool/Spa Heating Systems	No Solar Pool Heating System	New	2,499	10.1%	12	$9,120	90%	30%	0.22	1,441
Lodging	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	Existing	2,507	50.0%	10	$2,130	35%	95%	3.97	149,726
Lodging	Pool Heat	Swimming Pool/Spa Covers	Plastic Or Foam Pool Covers (50-65% Energy Savings)	No Pool Covers	New	2,499	50.0%	10	$2,130	35%	95%	3.95	8,801
Lodging	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	1,834	11.1%	18	$1,182	NA	NA	2.03	0
Lodging	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	1,566	11.1%	18	$1,182	NA	NA	1.73	0
Lodging	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	1,834	14.9%	18	$2,422	NA	NA	1.33	56,734
Lodging	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	1,566	14.9%	18	$2,422	NA	NA	1.13	8,602

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	1,801	2.0%	15	$1,560	94%	50%	0.23	9,220
Lodging	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	1,465	2.0%	15	$1,560	94%	50%	0.19	404
Lodging	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	1,465	12.5%	3	$5,840	80%	90%	0.06	3,347
Lodging	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	1,801	12.5%	3	$1,577	80%	90%	0.29	97,004
Lodging	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	1,801	2.5%	18	$3,200	45%	45%	0.17	4,451
Lodging	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	1,465	2.5%	18	$3,200	45%	45%	0.13	195
Lodging	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	1,801	15.0%	10	$18,060	94%	5%	0.10	6,167
Lodging	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	1,465	15.0%	10	$18,060	94%	5%	0.08	270
Lodging	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	1,801	4.5%	10	$5,450	85%	58%	0.10	19,167
Lodging	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	1,465	4.5%	10	$5,450	85%	58%	0.08	839
Lodging	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	1,465	3.0%	30	$42,302	98%	75%	0.02	746
Lodging	Space Heat Furnace	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods		New	1,465	18.0%	15	$3,102	95%	60%	0.86	5,802
Lodging	Space Heat Furnace	Hotel Key Card Room Energy Control System	Key card system to control room HVAC and lighting during non-occupied periods	325 sqft room, $100/room	Existing	1,801	18.0%	15	$3,102	95%	60%	1.05	132,287

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	1,801	13.0%	13	$2,520	65%	5%	0.83	5,703
Lodging	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	1,465	13.0%	13	$2,520	65%	5%	0.67	252
Lodging	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	1,801	15.0%	25	$4,880	25%	75%	0.86	10,536
Lodging	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	1,801	15.0%	25	$4,160	45%	75%	1.00	19,295
Lodging	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	1,465	15.0%	25	$4,160	45%	75%	0.82	1,285
Lodging	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	1,801	15.0%	25	$5,520	85%	75%	0.76	35,487
Lodging	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	1,465	15.0%	25	$5,520	85%	75%	0.62	2,365
Lodging	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	1,801	4.4%	25	$894	15%	10%	1.37	426
Lodging	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	1,801	3.0%	25	$932	15%	10%	0.90	253
Lodging	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	1,465	3.3%	25	$361	15%	10%	2.07	14
Lodging	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	1,801	10.0%	25	$1,206	35%	10%	2.31	4,530
Lodging	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	1,465	6.0%	25	$2,618	95%	95%	0.52	2,550
Lodging	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	1,801	15.0%	25	$4,160	45%	35%	1.00	13,668

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	1,801	15.0%	25	$720	45%	35%	5.81	15,824
Lodging	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	1,465	15.0%	25	$720	45%	35%	4.72	1,400
Lodging	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	1,465	0.0%	30	$7,836	90%	90%	0.00	7
Lodging	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	1,465	5.0%	20	$3,350	80%	90%	0.28	1,604
Lodging	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	1,801	3.0%	5	$1,108	20%	20%	0.17	58
Lodging	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	1,465	3.0%	5	$886	20%	20%	0.17	3
Lodging	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	1,801	25.0%	10	$16,880	95%	40%	0.18	92,296
Lodging	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	1,465	25.0%	10	$16,880	95%	40%	0.15	4,041
Lodging	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	1,801	3.0%	15	$222	78%	95%	2.45	29,442
Lodging	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	1,465	3.0%	15	$222	78%	95%	2.00	1,287
Lodging	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,801	1.3%	25	$23,395	98%	85%	0.02	4,550
Lodging	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	1,465	1.3%	25	$23,395	98%	95%	0.01	198
Lodging	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,801	0.6%	25	$13,048	96%	85%	0.01	2,096

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	1,465	0.6%	25	$13,048	96%	95%	0.01	91
Lodging	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	2,421	4.8%	13	$486	NA	NA	2.08	0
Lodging	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	2,414	4.8%	13	$486	NA	NA	2.07	0
Lodging	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	2,421	11.9%	13	$3,775	NA	NA	0.66	673,150
Lodging	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	2,414	11.9%	13	$3,775	NA	NA	0.66	91,076
Lodging	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	2,212	4.0%	10	$1,160	75%	25%	0.51	6,888
Lodging	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	2,212	5.0%	15	$2,222	80%	55%	0.49	18,488
Lodging	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	2,212	3.0%	13	$2,570	80%	24%	0.22	2,728
Lodging	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,212	0.2%	13	$600	55%	24%	0.08	169
Lodging	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	2,212	0.1%	13	$30	25%	24%	0.43	22
Lodging	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	2,212	20.0%	25	$4,400	92%	5%	1.51	7,820
Lodging	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	2,212	3.2%	10	$4	25%	95%	118.56	7,879
Lodging	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	2,212	4.5%	10	$6	15%	95%	104.80	6,686
Lodging	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	2,212	1.0%	15	$85	90%	75%	2.55	5,793
Lodging	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	2,212	0.5%	5	$10	50%	75%	1.79	1,825
Lodging	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	2,212	7.5%	10	$224	75%	100%	0.13	58,646

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Lodging	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	2,212	16.7%	10	$409	20%	100%	0.16	34,753
Lodging	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	2,212	28.1%	20	$28,050	95%	20%	0.28	5,558
Lodging	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	2,212	30.0%	14	$7,118	90%	5%	0.86	1,407
Lodging	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	2,212	28.0%	20	$2,188	90%	5%	3.55	1,316
Lodging	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	2,212	4.0%	10	$612	35%	15%	0.97	1,769
Lodging	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	2,212	7.7%	11	$844	5%	75%	1.49	2,459
Lodging	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	2,212	8.5%	20	$1,170	75%	85%	2.01	56,495
Miscellaneous	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	Existing	988	3.7%	8	$1,058	65%	18%	0.19	1,460
Miscellaneous	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	New	986	3.7%	8	$1,058	65%	18%	0.19	86
Miscellaneous	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	Existing	4,411	5.9%	20	$1,017	NA	NA	3.27	0
Miscellaneous	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	New	4,015	5.9%	20	$1,017	NA	NA	2.98	0
Miscellaneous	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	Existing	4,411	11.1%	20	$2,035	NA	NA	3.09	345,020
Miscellaneous	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	New	4,015	11.1%	20	$2,035	NA	NA	2.81	52,685
Miscellaneous	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	4,475	10.0%	15	$8,190	94%	50%	0.55	964,436
Miscellaneous	Space Heat Boiler	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	3,810	10.0%	15	$8,190	94%	50%	0.47	47,210

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	4,475	5.5%	20	$993	90%	40%	3.18	489,207
Miscellaneous	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	3,810	5.5%	20	$761	90%	40%	3.53	24,149
Miscellaneous	Space Heat Boiler	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	3,810	12.5%	3	$6,570	40%	90%	0.15	35,509
Miscellaneous	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	4,475	12.5%	3	$1,774	40%	90%	0.65	1,000,375
Miscellaneous	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	4,475	5.0%	15	$2,500	66%	45%	0.90	140,839
Miscellaneous	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	4,475	10.0%	5	$4,847	80%	75%	0.32	991,316
Miscellaneous	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	3,810	10.0%	5	$4,847	80%	75%	0.27	45,359
Miscellaneous	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	4,475	15.0%	5	$3,497	80%	50%	0.66	569,412
Miscellaneous	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	4,475	2.5%	18	$3,600	45%	45%	0.36	87,917
Miscellaneous	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	3,810	2.5%	18	$3,600	45%	45%	0.31	4,023
Miscellaneous	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	4,475	15.0%	10	$3,956	94%	5%	1.17	157,838
Miscellaneous	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	3,810	15.0%	10	$3,956	94%	5%	1.00	7,822
Miscellaneous	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	4,475	4.5%	10	$5,450	85%	5%	0.26	33,045

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Boiler	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	3,810	4.5%	10	$5,450	85%	5%	0.22	1,512
Miscellaneous	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	3,810	3.0%	30	$51,426	98%	75%	0.04	16,570
Miscellaneous	Space Heat Boiler	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	4,475	10.0%	10	$2,107	10%	40%	1.47	93,930
Miscellaneous	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	4,475	15.0%	25	$5,490	30%	75%	1.89	263,122
Miscellaneous	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	4,475	15.0%	25	$4,680	45%	75%	2.21	403,070
Miscellaneous	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	3,810	15.0%	25	$4,680	45%	75%	1.88	30,259
Miscellaneous	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	4,475	15.0%	25	$6,210	85%	75%	1.67	737,126
Miscellaneous	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	3,810	15.0%	25	$6,210	85%	75%	1.42	55,709
Miscellaneous	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	4,475	4.4%	25	$1,006	15%	10%	3.02	7,992
Miscellaneous	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	4,475	3.0%	25	$727	15%	10%	2.85	5,447
Miscellaneous	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	3,810	3.3%	25	$406	15%	10%	4.78	302
Miscellaneous	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	4,475	10.0%	25	$1,280	35%	10%	5.39	86,780
Miscellaneous	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	3,810	6.0%	25	$2,777	95%	95%	1.27	59,653

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	4,475	15.0%	25	$4,680	50%	35%	2.21	317,668
Miscellaneous	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	4,475	15.0%	25	$810	50%	35%	12.78	331,339
Miscellaneous	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	3,810	15.0%	25	$810	50%	35%	10.88	32,945
Miscellaneous	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	3,810	5.0%	20	$3,768	80%	90%	0.65	37,511
Miscellaneous	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	4,475	3.0%	5	$262	20%	20%	1.77	1,453
Miscellaneous	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	3,810	3.0%	5	$210	20%	20%	1.88	72
Miscellaneous	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	4,475	25.0%	10	$18,990	98%	25%	0.41	1,197,774
Miscellaneous	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	3,810	25.0%	10	$18,990	98%	50%	0.35	117,263
Miscellaneous	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	4,475	12.1%	20	$1,374	25%	10%	5.03	74,924
Miscellaneous	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	4,475	3.0%	15	$249	63%	95%	5.40	44,448
Miscellaneous	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	3,810	3.0%	15	$249	63%	95%	4.60	2,180
Miscellaneous	Space Heat Boiler	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	4,475	16.0%	10	$27,360	70%	15%	0.18	289,369
Miscellaneous	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	4,475	0.3%	25	$1,259	98%	85%	0.17	21,866

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	3,810	0.3%	25	$1,259	98%	95%	0.14	1,086
Miscellaneous	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	4,475	0.3%	25	$702	96%	85%	0.30	21,108
Miscellaneous	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	3,810	0.3%	25	$702	96%	95%	0.25	1,031
Miscellaneous	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	4,428	11.1%	18	$777	NA	NA	7.45	0
Miscellaneous	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	3,378	11.1%	18	$777	NA	NA	5.68	0
Miscellaneous	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	4,428	14.9%	18	$1,591	NA	NA	4.87	2,475,856
Miscellaneous	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	3,378	14.9%	18	$1,591	NA	NA	3.72	334,872
Miscellaneous	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	4,400	10.0%	15	$8,190	94%	50%	0.54	2,237,401
Miscellaneous	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	3,145	10.0%	15	$8,190	94%	50%	0.39	86,795
Miscellaneous	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	3,145	12.5%	3	$6,570	80%	90%	0.12	142,346
Miscellaneous	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	4,400	12.5%	3	$1,774	80%	90%	0.64	4,708,115
Miscellaneous	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	4,400	2.5%	18	$3,600	45%	45%	0.36	207,851
Miscellaneous	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	3,145	2.5%	18	$3,600	45%	45%	0.26	8,063

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	4,400	15.0%	10	$3,956	94%	5%	1.16	371,421
Miscellaneous	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	3,145	15.0%	10	$3,956	94%	5%	0.83	14,380
Miscellaneous	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	4,400	4.5%	10	$5,450	85%	5%	0.25	78,124
Miscellaneous	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	3,145	4.5%	10	$5,450	85%	5%	0.18	3,031
Miscellaneous	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	3,145	3.0%	30	$47,589	98%	75%	0.04	31,647
Miscellaneous	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	4,400	10.0%	10	$2,107	10%	40%	1.45	221,084
Miscellaneous	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	4,400	13.0%	13	$2,835	65%	5%	1.80	251,187
Miscellaneous	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	3,145	13.0%	13	$2,835	65%	5%	1.28	9,786
Miscellaneous	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	4,400	15.0%	25	$5,490	30%	75%	1.86	619,173
Miscellaneous	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	4,400	15.0%	25	$4,680	45%	75%	2.18	948,708
Miscellaneous	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	3,145	15.0%	25	$4,680	45%	75%	1.56	55,631
Miscellaneous	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	4,400	15.0%	25	$6,210	85%	75%	1.64	1,734,586
Miscellaneous	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	3,145	15.0%	25	$6,210	85%	75%	1.18	102,421

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	4,400	4.4%	25	$1,006	15%	10%	2.98	18,807
Miscellaneous	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	4,400	3.0%	25	$1,049	15%	10%	1.95	12,386
Miscellaneous	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	3,145	3.3%	25	$406	15%	10%	3.96	544
Miscellaneous	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	4,400	10.0%	25	$1,280	35%	10%	5.32	200,164
Miscellaneous	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	3,145	6.0%	25	$2,777	95%	95%	1.05	109,672
Miscellaneous	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	4,400	15.0%	25	$4,680	50%	35%	2.18	747,698
Miscellaneous	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	4,400	15.0%	25	$810	50%	35%	12.60	774,416
Miscellaneous	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	3,145	15.0%	25	$810	50%	35%	9.01	60,341
Miscellaneous	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	3,145	5.0%	20	$3,768	80%	90%	0.54	68,964
Miscellaneous	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	4,400	3.0%	5	$262	20%	20%	1.74	3,418
Miscellaneous	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	3,145	3.0%	5	$210	20%	20%	1.56	132
Miscellaneous	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	4,400	25.0%	10	$18,990	95%	40%	0.40	4,309,853
Miscellaneous	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	3,145	25.0%	10	$18,990	95%	40%	0.29	167,191

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	4,400	3.0%	15	$249	63%	95%	5.33	1,038,858
Miscellaneous	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	3,145	3.0%	15	$249	63%	95%	3.81	39,935
Miscellaneous	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	4,400	16.0%	10	$27,360	70%	15%	0.18	684,115
Miscellaneous	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	4,400	0.3%	25	$1,259	98%	85%	0.17	51,694
Miscellaneous	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	3,145	0.3%	25	$1,259	98%	95%	0.12	2,074
Miscellaneous	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	4,400	0.3%	25	$702	96%	85%	0.29	49,904
Miscellaneous	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	3,145	0.3%	25	$702	96%	95%	0.21	1,969
Miscellaneous	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	161	4.8%	13	$44	NA	NA	1.52	0
Miscellaneous	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	160	4.8%	13	$44	NA	NA	1.52	0
Miscellaneous	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	161	11.9%	13	$343	NA	NA	0.48	1,020,854
Miscellaneous	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	160	11.9%	13	$343	NA	NA	0.48	138,119
Miscellaneous	Water Heat	Clothes Washer Commercial	Energy Star Commercial Clothes Washer MEF=1.8, WF=7.5	Standard Commercial Clothes Washer MEF=1.26 (Federal Code)	Existing	147	15.2%	10	$290	75%	25%	0.52	39,871
Miscellaneous	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	147	5.0%	15	$2,500	94%	75%	0.03	47,187
Miscellaneous	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	147	3.7%	13	$600	55%	5%	0.08	868

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	147	1.0%	13	$30	25%	5%	0.45	112
Miscellaneous	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	147	20.0%	25	$400	92%	5%	1.11	12,541
Miscellaneous	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	147	3.2%	10	$5	25%	95%	7.00	11,948
Miscellaneous	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	147	4.5%	10	$7	15%	95%	6.19	10,139
Miscellaneous	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	147	1.0%	15	$95	90%	75%	0.15	9,097
Miscellaneous	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	147	0.5%	5	$5	50%	50%	0.42	1,845
Miscellaneous	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	147	1.1%	10	$5	75%	15%	2.38	2,001
Miscellaneous	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	147	2.5%	10	$9	20%	15%	3.17	1,186
Miscellaneous	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	147	31.2%	20	$2,550	95%	20%	0.22	9,360
Miscellaneous	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	147	30.0%	14	$647	90%	13%	0.63	5,336
Miscellaneous	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	147	28.0%	20	$199	90%	13%	2.59	4,989
Miscellaneous	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	147	4.0%	10	$69	35%	15%	0.57	2,836
Miscellaneous	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	147	7.7%	11	$77	55%	75%	1.09	44,670
Miscellaneous	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	147	8.5%	20	$130	75%	85%	1.21	85,677
Restaurant	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	Existing	2,497	4.3%	10	$200	75%	67%	3.59	281,618
Restaurant	Cooking	Broiler	High-Efficiency Broiler (34% Efficient)	Standard Broiler (15% Efficient)	New	2,483	4.3%	10	$200	75%	67%	3.57	16,554
Restaurant	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	Existing	2,497	3.7%	8	$1,058	65%	57%	0.47	181,637

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Restaurant	Cooking	Cooking Fryers - Commercial	Energy Star Commercial Fryer (50% efficient)	Non-Energy Star Fryer (35% efficient)	New	2,483	3.7%	8	$1,058	65%	57%	0.47	10,677
Restaurant	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	Existing	2,497	0.6%	12	$1,165	75%	75%	0.10	44,908
Restaurant	Cooking	Griddle	High-Efficiency Griddle (40% Efficient)	Standard Griddle (32% Efficient)	New	2,483	0.6%	12	$1,165	75%	75%	0.10	2,640
Restaurant	Cooking	Oven - Convection	Convection Oven	Standard Oven	Existing	2,497	1.8%	12	$400	85%	50%	0.92	61,530
Restaurant	Cooking	Oven - Convection	Convection Oven	Standard Oven	New	2,483	1.8%	12	$400	85%	50%	0.92	3,617
Restaurant	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	Existing	2,497	10.4%	10	$3,370	85%	4%	0.52	4,105
Restaurant	Cooking	Oven - Conveyor	High-Efficiency Model (23% Efficient)	Standard Model (15% Efficient)	New	2,483	10.4%	10	$2,696	85%	25%	0.65	1,689
Restaurant	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	Existing	2,497	4.6%	10	$2,075	75%	46%	0.37	208,496
Restaurant	Cooking	Steam Cooker	Energy Star Steam Cooker (38% Efficient)	Standard Cooker (30% Efficient)	New	2,483	4.6%	10	$2,075	75%	46%	0.37	12,256
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	673	11.1%	18	$844	NA	NA	1.04	0
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	445	11.1%	18	$844	NA	NA	0.69	0
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	673	14.9%	18	$1,730	NA	NA	0.68	148,645
Restaurant	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	445	14.9%	18	$1,730	NA	NA	0.45	17,508
Restaurant	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	416	12.5%	3	$1,095	80%	90%	0.10	7,506
Restaurant	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	667	12.5%	3	$296	80%	90%	0.58	267,592
Restaurant	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	667	2.5%	18	$600	45%	45%	0.33	12,396

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Restaurant	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	416	2.5%	18	$600	45%	45%	0.20	424
Restaurant	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	667	15.0%	10	$4,300	94%	5%	0.16	17,175
Restaurant	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	416	15.0%	10	$4,300	94%	5%	0.10	535
Restaurant	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	Existing	667	4.5%	10	$5,450	85%	100%	0.04	92,523
Restaurant	Space Heat Furnace	Exhaust Hood Makeup Air	Provide Makeup Air Directly at Exhaust Hood Instead of Pulling Conditioned Air	Hood Pulls Conditioned Air (No Make-up Air)	New	416	4.5%	10	$5,450	85%	100%	0.02	2,882
Restaurant	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	416	3.0%	30	$7,932	98%	75%	0.03	1,598
Restaurant	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	667	10.0%	10	$351	10%	40%	1.32	12,807
Restaurant	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	667	13.0%	13	$473	65%	5%	1.64	15,064
Restaurant	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	416	13.0%	13	$473	65%	5%	1.02	514
Restaurant	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	667	15.0%	25	$915	85%	75%	1.69	101,627
Restaurant	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	667	15.0%	25	$780	95%	75%	1.99	118,694
Restaurant	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	416	15.0%	25	$780	95%	75%	1.24	6,070
Restaurant	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	667	15.0%	25	$1,035	98%	75%	1.50	113,435

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Restaurant	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	416	15.0%	25	$1,035	98%	75%	0.93	5,927
Restaurant	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	667	4.4%	25	$168	15%	10%	2.71	1,126
Restaurant	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	667	3.0%	25	$175	15%	10%	1.77	718
Restaurant	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	416	3.3%	25	$68	15%	10%	3.15	28
Restaurant	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	667	10.0%	25	$522	35%	10%	1.98	11,246
Restaurant	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	416	6.0%	25	$1,134	95%	95%	0.34	5,303
Restaurant	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	667	15.0%	25	$780	90%	35%	1.99	80,618
Restaurant	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	667	15.0%	25	$135	90%	35%	11.48	83,599
Restaurant	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	416	15.0%	25	$135	90%	35%	7.16	5,703
Restaurant	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	416	0.2%	30	$5,532	90%	90%	0.00	140
Restaurant	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	416	5.0%	20	$628	80%	90%	0.43	3,657
Restaurant	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	667	3.0%	5	$528	20%	20%	0.13	145
Restaurant	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	416	3.0%	5	$422	20%	20%	0.10	5

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Restaurant	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	667	25.0%	10	$3,165	95%	40%	0.37	257,037
Restaurant	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	416	25.0%	10	$3,165	95%	40%	0.23	8,800
Restaurant	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	667	3.0%	15	$42	42%	95%	4.85	41,474
Restaurant	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	416	3.0%	15	$42	42%	95%	3.03	1,380
Restaurant	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	667	0.1%	25	$4,260	98%	85%	0.00	579
Restaurant	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	416	0.1%	25	$4,260	98%	95%	0.00	20
Restaurant	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	667	0.4%	25	$2,376	96%	85%	0.02	3,500
Restaurant	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	416	0.4%	25	$2,376	96%	95%	0.01	119
Restaurant	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	575	4.8%	13	$103	NA	NA	2.33	0
Restaurant	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	571	4.8%	13	$103	NA	NA	2.31	0
Restaurant	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	575	11.9%	13	$801	NA	NA	0.74	817,845
Restaurant	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	571	11.9%	13	$801	NA	NA	0.73	110,653
Restaurant	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	525	5.0%	15	$417	94%	75%	0.62	38,044
Restaurant	Water Heat	Dishwashing - Commercial - High Efficeincy	High Efficiency Dishwasher	Standard Dishwasher	Existing	525	3.0%	13	$2,570	80%	54%	0.05	7,366

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Restaurant	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	525	0.9%	13	$600	55%	46%	0.07	1,507
Restaurant	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	525	0.3%	13	$30	25%	46%	0.40	194
Restaurant	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	525	20.0%	25	$933	92%	5%	1.69	10,042
Restaurant	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	525	3.2%	10	$1	25%	95%	125.02	9,572
Restaurant	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	525	4.5%	10	$1	15%	95%	132.61	8,123
Restaurant	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	525	1.0%	15	$16	90%	75%	3.23	7,754
Restaurant	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	525	2.3%	5	$5	25%	95%	8.89	7,020
Restaurant	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	525	1.1%	10	$5	75%	15%	9.88	1,603
Restaurant	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	525	2.5%	10	$9	20%	15%	12.23	950
Restaurant	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	525	19.7%	20	$5,950	95%	20%	0.22	4,749
Restaurant	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	525	30.0%	14	$1,510	90%	13%	0.96	4,275
Restaurant	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	525	28.0%	20	$464	90%	13%	3.97	3,997
Restaurant	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	525	4.0%	10	$144	35%	15%	0.98	2,271
Restaurant	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	525	7.7%	11	$179	75%	75%	1.67	49,368
Restaurant	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	525	8.5%	20	$260	75%	85%	2.15	68,639
Retail	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	Existing	1,610	5.9%	20	$3,531	NA	NA	0.35	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=85%	AFUE=80%	New	1,192	5.9%	20	$3,531	NA	NA	0.26	0
Retail	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	Existing	1,610	11.1%	20	$7,061	NA	NA	0.33	37,383
Retail	Space Heat Boiler	Gas Boiler - Less than 300 kBTUH	AFUE=90%	AFUE=80%	New	1,192	11.1%	20	$7,061	NA	NA	0.24	5,382
Retail	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	1,633	5.5%	20	$3,444	90%	40%	0.34	39,596
Retail	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	1,125	5.5%	20	$2,561	90%	40%	0.31	1,680
Retail	Space Heat Boiler	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	1,125	12.5%	3	$3,468	40%	90%	0.08	3,091
Retail	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	1,633	12.5%	3	$936	40%	90%	0.45	104,207
Retail	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	1,633	5.0%	15	$1,320	59%	75%	0.62	22,097
Retail	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	1,633	10.0%	5	$2,558	80%	75%	0.22	105,852
Retail	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	1,125	10.0%	5	$2,558	80%	75%	0.15	3,941
Retail	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	1,633	15.0%	5	$1,846	80%	50%	0.46	59,114
Retail	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	1,633	2.5%	18	$1,900	45%	45%	0.25	9,388
Retail	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	1,125	2.5%	18	$1,900	45%	45%	0.17	350

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	1,633	15.0%	10	$15,480	94%	5%	0.11	12,788
Retail	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	1,125	15.0%	10	$15,480	94%	5%	0.08	462
Retail	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	1,125	3.0%	30	$25,117	98%	75%	0.02	1,421
Retail	Space Heat Boiler	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	1,633	10.0%	10	$1,112	10%	40%	1.02	9,973
Retail	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	1,633	15.0%	25	$2,898	85%	75%	1.31	79,153
Retail	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	1,633	15.0%	25	$2,470	95%	75%	1.54	92,101
Retail	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	1,125	15.0%	25	$2,470	95%	75%	1.06	5,560
Retail	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	1,633	15.0%	25	$3,278	98%	75%	1.16	88,349
Retail	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	1,125	15.0%	25	$3,278	98%	75%	0.80	5,429
Retail	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	1,633	4.4%	25	$531	15%	10%	2.10	874
Retail	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	1,633	3.0%	25	$384	15%	10%	1.98	596
Retail	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	1,125	3.3%	25	$214	15%	10%	2.69	26
Retail	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	1,633	10.0%	25	$930	35%	10%	2.72	9,305

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	1,125	6.0%	25	$2,017	95%	95%	0.52	5,039
Retail	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	1,633	15.0%	25	$2,470	90%	35%	1.54	62,555
Retail	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	1,633	15.0%	25	$428	90%	35%	8.88	64,625
Retail	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	1,125	15.0%	25	$428	90%	35%	6.12	5,170
Retail	Space Heat Boiler	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	1,125	1.3%	30	$6,684	90%	90%	0.04	687
Retail	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	1,125	5.0%	20	$1,989	80%	90%	0.36	3,169
Retail	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	1,633	3.0%	5	$1,425	20%	20%	0.12	111
Retail	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	1,125	3.0%	5	$1,140	20%	20%	0.10	4
Retail	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	1,633	25.0%	10	$10,023	98%	25%	0.28	130,481
Retail	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	1,125	25.0%	10	$10,023	98%	50%	0.19	10,189
Retail	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	1,633	12.1%	20	$998	25%	10%	2.54	8,034
Retail	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	1,633	3.0%	15	$132	54%	95%	3.75	4,146
Retail	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	1,125	3.0%	15	$132	54%	95%	2.59	162

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Boiler	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	1,633	16.0%	10	$14,440	70%	15%	0.13	30,994
Retail	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,633	0.8%	25	$10,521	98%	85%	0.02	6,283
Retail	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	1,125	0.8%	25	$10,521	98%	95%	0.01	246
Retail	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	1,633	0.6%	25	$5,868	96%	85%	0.03	4,279
Retail	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	1,125	0.6%	25	$5,868	96%	95%	0.02	167
Retail	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	3,288	11.1%	18	$3,038	NA	NA	1.42	0
Retail	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	2,970	11.1%	18	$3,038	NA	NA	1.28	0
Retail	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	3,288	14.9%	18	$6,228	NA	NA	0.93	925,984
Retail	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	2,970	14.9%	18	$6,228	NA	NA	0.84	148,172
Retail	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	2,730	12.5%	3	$3,468	80%	90%	0.20	62,254
Retail	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	3,243	12.5%	3	$936	80%	90%	0.89	1,653,702
Retail	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	3,243	2.5%	18	$1,900	45%	45%	0.50	76,607
Retail	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	2,730	2.5%	18	$1,900	45%	45%	0.42	3,520

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	3,243	15.0%	10	$15,480	94%	5%	0.22	104,353
Retail	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	2,730	15.0%	10	$15,480	94%	5%	0.18	4,438
Retail	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	2,730	3.0%	30	$25,117	98%	75%	0.06	13,636
Retail	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	3,243	10.0%	10	$1,112	10%	40%	2.02	79,148
Retail	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	3,243	13.0%	13	$1,496	65%	5%	2.51	93,430
Retail	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	2,730	13.0%	13	$1,496	65%	5%	2.11	4,277
Retail	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	3,243	15.0%	25	$2,898	85%	75%	2.60	628,050
Retail	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	3,243	15.0%	25	$2,470	95%	75%	3.05	730,957
Retail	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	2,730	15.0%	25	$2,470	95%	75%	2.57	50,342
Retail	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	3,243	15.0%	25	$3,278	98%	75%	2.30	701,024
Retail	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	2,730	15.0%	25	$3,278	98%	75%	1.94	49,157
Retail	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	3,243	4.4%	25	$531	15%	10%	4.16	6,937
Retail	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	3,243	3.0%	25	$553	15%	10%	2.72	4,434

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	2,730	3.3%	25	$214	15%	10%	6.51	233
Retail	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	3,243	10.0%	25	$930	35%	10%	5.40	73,834
Retail	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	2,730	6.0%	25	$2,017	95%	95%	1.26	45,626
Retail	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	3,243	15.0%	25	$2,470	90%	35%	3.05	496,469
Retail	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	3,243	15.0%	25	$428	90%	35%	17.62	518,485
Retail	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	2,730	15.0%	25	$428	90%	35%	14.84	47,469
Retail	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	2,730	1.3%	30	$6,684	90%	90%	0.09	6,594
Retail	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	2,730	5.0%	20	$1,989	80%	90%	0.88	28,690
Retail	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	3,243	3.0%	5	$1,425	20%	20%	0.24	903
Retail	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	2,730	3.0%	5	$1,140	20%	20%	0.25	42
Retail	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	3,243	25.0%	10	$10,023	95%	40%	0.56	1,588,473
Retail	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	2,730	25.0%	10	$10,023	95%	40%	0.47	72,985
Retail	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	3,243	3.0%	15	$132	54%	95%	7.45	332,647

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	2,730	3.0%	15	$132	54%	95%	6.27	14,859
Retail	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	3,243	16.0%	10	$14,440	70%	15%	0.25	252,920
Retail	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	3,243	0.8%	25	$10,521	98%	85%	0.04	51,269
Retail	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	2,730	0.8%	25	$10,521	98%	95%	0.03	2,357
Retail	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	3,243	0.6%	25	$5,868	96%	85%	0.05	34,915
Retail	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	2,730	0.6%	25	$5,868	96%	95%	0.04	1,606
Retail	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	112	4.8%	13	$74	NA	NA	0.63	0
Retail	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	111	4.8%	13	$74	NA	NA	0.63	0
Retail	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	112	11.9%	13	$572	NA	NA	0.20	131,792
Retail	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	111	11.9%	13	$572	NA	NA	0.20	17,831
Retail	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	102	5.0%	15	$1,320	94%	75%	0.04	6,291
Retail	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	102	5.0%	13	$600	55%	24%	0.07	677
Retail	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	102	1.4%	13	$30	25%	24%	0.41	87
Retail	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	102	20.0%	25	$667	92%	5%	0.46	1,672
Retail	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	102	3.2%	10	$2	25%	95%	9.22	1,543

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Retail	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	102	4.5%	10	$4	15%	95%	8.15	1,309
Retail	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	102	1.0%	15	$50	90%	75%	0.20	1,213
Retail	Water Heat	Low Flow Spray Heads	1.6 GPM	3.0 GPM	Existing	102	2.3%	5	$5	45%	2%	1.60	43
Retail	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	102	1.1%	10	$5	75%	15%	1.83	258
Retail	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	102	2.5%	10	$9	20%	15%	2.36	153
Retail	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	102	27.8%	20	$4,250	95%	20%	0.08	1,079
Retail	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	102	30.0%	14	$1,079	90%	13%	0.26	689
Retail	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	102	28.0%	20	$332	90%	13%	1.08	644
Retail	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	102	4.0%	10	$146	35%	15%	0.19	378
Retail	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	102	7.7%	11	$128	45%	75%	0.45	4,844
Retail	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	102	8.5%	20	$260	75%	85%	0.42	11,061
Small Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	651	11.1%	18	$506	NA	NA	1.68	0
Small Office	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	657	11.1%	18	$506	NA	NA	1.70	0
Small Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	651	14.9%	18	$1,038	NA	NA	1.10	210,055
Small Office	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	657	14.9%	18	$1,038	NA	NA	1.11	37,661
Small Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	Existing	639	10.0%	15	$1,365	94%	75%	0.47	296,082

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Small Office	Space Heat Furnace	Automated Ventilation VFD Control (Occupancy Sensors / CO2 Sensors)	Demand Controlled Ventilation (CO2 Sensors)	Constant Ventilation	New	614	10.0%	15	$1,365	94%	75%	0.45	16,300
Small Office	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	614	12.5%	3	$1,095	80%	90%	0.14	16,356
Small Office	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	639	12.5%	3	$296	80%	90%	0.56	415,384
Small Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	639	2.5%	18	$600	45%	45%	0.31	17,885
Small Office	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	614	2.5%	18	$600	45%	45%	0.30	931
Small Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	639	15.0%	10	$2,580	94%	5%	0.26	24,780
Small Office	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	614	15.0%	10	$2,580	94%	5%	0.25	1,290
Small Office	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	614	3.0%	30	$7,932	98%	75%	0.04	3,559
Small Office	Space Heat Furnace	Infiltration Control (Caulking, Weather Stripping, etc.)	Install Caulking And Weatherstripping (ACH 0.65)	Infiltration Conditions (ACH 1.0)	Existing	639	10.0%	10	$351	10%	40%	1.26	19,032
Small Office	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	639	13.0%	13	$473	65%	5%	1.57	21,091
Small Office	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	614	13.0%	13	$473	65%	5%	1.51	1,105
Small Office	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	639	15.0%	25	$915	4%	75%	1.62	7,107
Small Office	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	639	15.0%	25	$780	25%	75%	1.90	45,186

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Small Office	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	614	15.0%	25	$780	25%	75%	1.83	3,551
Small Office	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	639	15.0%	25	$1,035	65%	75%	1.43	115,311
Small Office	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	614	15.0%	25	$1,035	65%	75%	1.38	9,103
Small Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	639	4.4%	25	$168	15%	10%	2.60	1,597
Small Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	639	3.0%	25	$175	15%	10%	1.70	1,066
Small Office	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	614	3.3%	25	$68	15%	10%	4.64	63
Small Office	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	639	10.0%	25	$522	35%	10%	1.89	16,711
Small Office	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	614	6.0%	25	$1,134	95%	95%	0.50	11,637
Small Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	639	15.0%	25	$780	15%	35%	1.90	19,053
Small Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	639	15.0%	25	$135	15%	35%	11.00	19,507
Small Office	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	614	15.0%	25	$135	15%	35%	10.57	2,044
Small Office	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	614	0.9%	30	$5,532	90%	90%	0.02	1,153
Small Office	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	614	5.0%	20	$628	80%	90%	0.63	8,634

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Small Office	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	639	3.0%	5	$146	20%	20%	0.45	252
Small Office	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	614	3.0%	5	$117	20%	20%	0.55	14
Small Office	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	639	25.0%	10	$3,165	95%	40%	0.35	370,848
Small Office	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	614	25.0%	10	$3,165	95%	40%	0.34	19,311
Small Office	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	639	3.0%	15	$42	67%	95%	4.65	94,299
Small Office	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	614	3.0%	15	$42	67%	95%	4.47	4,920
Small Office	Space Heat Furnace	Variable Air-Volume Systems	Variable Air-Volume Systems	Constant Volume	Existing	639	16.0%	10	$4,560	70%	15%	0.16	58,634
Small Office	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	639	3.0%	25	$2,034	98%	85%	0.15	43,124
Small Office	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	614	3.0%	25	$2,034	98%	95%	0.14	2,320
Small Office	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	639	2.2%	25	$1,135	96%	85%	0.19	30,436
Small Office	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	614	2.2%	25	$1,135	96%	95%	0.18	1,639
Small Office	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	25	4.8%	13	$44	NA	NA	0.24	0
Small Office	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	25	4.8%	13	$44	NA	NA	0.24	0

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Small Office	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	25	11.9%	13	$343	NA	NA	0.08	88,360
Small Office	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	25	11.9%	13	$343	NA	NA	0.08	11,955
Small Office	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	23	5.0%	15	$417	80%	55%	0.03	2,646
Small Office	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	23	23.6%	13	$600	55%	8%	0.08	718
Small Office	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	23	6.7%	13	$30	25%	8%	0.45	92
Small Office	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	23	20.0%	25	$400	92%	5%	0.18	1,119
Small Office	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	23	3.2%	10	$1	25%	95%	5.55	1,034
Small Office	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	23	4.5%	10	$1	15%	95%	5.88	878
Small Office	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	23	1.0%	15	$16	30%	75%	0.14	274
Small Office	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	23	1.1%	10	$5	75%	15%	0.40	173
Small Office	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	23	2.5%	10	$9	20%	15%	0.49	103
Small Office	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	23	27.9%	20	$2,550	95%	20%	0.03	726
Small Office	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	23	30.0%	14	$647	90%	13%	0.10	462
Small Office	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	23	28.0%	20	$199	90%	13%	0.41	432
Small Office	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	23	4.0%	10	$70	35%	15%	0.09	253
Small Office	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	23	7.7%	11	$77	40%	75%	0.17	2,880
Small Office	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	23	8.5%	20	$130	75%	85%	0.19	7,416

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	14,444	5.9%	20	$2,155	NA	NA	5.08	0
Warehouse	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	85% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	16,804	5.9%	20	$2,520	NA	NA	5.05	0
Warehouse	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	Existing	14,444	11.1%	20	$4,400	NA	NA	4.70	67,138
Warehouse	Space Heat Boiler	Gas Boiler - Greater than 300 kBTUH	90% Thermal Efficiency	80% Thermal Efficiency (State Code)	New	16,804	11.1%	20	$5,145	NA	NA	4.67	15,190
Warehouse	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	Existing	14,656	5.5%	20	$8,725	90%	40%	1.19	95,327
Warehouse	Space Heat Boiler	Boiler Economizer	Economizer	No Economizer	New	15,852	5.5%	20	$10,200	90%	40%	1.10	5,496
Warehouse	Space Heat Boiler	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	14,656	12.5%	3	$9,855	40%	90%	0.38	197,572
Warehouse	Space Heat Boiler	Direct Digital Control System-Installation	DDC Retrofit (Morning Warm-Up Control Logic Included in This Measure)	Pneumatic	Existing	14,656	5.0%	15	$13,890	93%	5%	0.53	4,397
Warehouse	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	Existing	14,656	10.0%	5	$26,930	98%	75%	0.19	244,136
Warehouse	Space Heat Boiler	Direct Digital Control System-Optimization	Premium-Efficiency EMS System	High-Efficiency EMS System	New	15,852	10.0%	5	$26,930	98%	75%	0.20	14,196
Warehouse	Space Heat Boiler	Direct Digital Control System-Wireless Performance Monitoring	DDC Retrofit - Wireless Performance Monitoring, Diagnostics And Control	Pnuematic	Existing	14,656	15.0%	5	$19,430	98%	75%	0.39	207,803
Warehouse	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	14,656	2.5%	18	$20,000	45%	45%	0.22	17,448
Warehouse	Space Heat Boiler	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	15,852	2.5%	18	$20,000	45%	45%	0.23	1,015

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	14,656	15.0%	10	$23,580	94%	5%	0.65	31,173
Warehouse	Space Heat Boiler	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	15,852	15.0%	10	$23,580	94%	5%	0.70	1,827
Warehouse	Space Heat Boiler	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	15,852	3.0%	30	$264,385	98%	75%	0.03	4,397
Warehouse	Space Heat Boiler	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	14,656	15.0%	25	$30,500	10%	75%	1.12	17,192
Warehouse	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	14,656	15.0%	25	$26,000	45%	75%	1.31	78,695
Warehouse	Space Heat Boiler	Insulation (Ceiling)	R-38	R-20 (Code)	New	15,852	15.0%	25	$26,000	45%	75%	1.42	7,209
Warehouse	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	14,656	15.0%	25	$34,500	85%	75%	0.99	145,581
Warehouse	Space Heat Boiler	Insulation (Ceiling)	R-49	R-20 (Code)	New	15,852	15.0%	25	$34,500	85%	75%	1.07	13,010
Warehouse	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	14,656	4.4%	25	$5,590	15%	10%	1.79	1,590
Warehouse	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	14,656	3.0%	25	$4,040	15%	10%	1.68	1,083
Warehouse	Space Heat Boiler	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	15,852	3.3%	25	$2,255	15%	10%	3.59	75
Warehouse	Space Heat Boiler	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	14,656	10.0%	25	$3,015	35%	10%	7.52	16,929
Warehouse	Space Heat Boiler	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	15,852	6.0%	25	$6,545	95%	95%	2.25	16,306

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	14,656	15.0%	25	$26,000	45%	35%	1.31	55,745
Warehouse	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	14,656	15.0%	25	$4,500	45%	35%	7.56	57,818
Warehouse	Space Heat Boiler	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	15,852	15.0%	25	$4,500	45%	35%	8.18	7,292
Warehouse	Space Heat Boiler	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	15,852	0.0%	30	$22,725	90%	90%	0.00	16
Warehouse	Space Heat Boiler	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	15,852	5.0%	20	$20,935	80%	90%	0.49	9,133
Warehouse	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	14,656	3.0%	5	$2,060	20%	20%	0.74	275
Warehouse	Space Heat Boiler	Scheduled AHU	Reduce AHU runtime	No schedule	New	15,852	3.0%	5	$1,645	20%	20%	1.00	17
Warehouse	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	14,656	25.0%	10	$105,500	98%	25%	0.24	240,801
Warehouse	Space Heat Boiler	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	15,852	25.0%	10	$105,500	98%	50%	0.26	29,960
Warehouse	Space Heat Boiler	Steam Pipe Insulation	R-4	R-0	Existing	14,656	12.1%	20	$3,240	25%	10%	7.02	14,791
Warehouse	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	14,656	3.0%	15	$1,385	20%	95%	3.20	2,795
Warehouse	Space Heat Boiler	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	15,852	3.0%	15	$1,385	20%	95%	3.46	175
Warehouse	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	14,656	2.0%	25	$7,650	98%	85%	0.59	33,159

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Boiler	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	15,852	2.0%	25	$7,650	98%	95%	0.64	2,395
Warehouse	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	14,656	1.0%	25	$4,265	96%	85%	0.53	16,106
Warehouse	Space Heat Boiler	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	15,852	1.0%	25	$4,265	96%	95%	0.58	1,162
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	Existing	18,645	11.1%	18	$2,925	NA	NA	8.32	0
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 90% (Condensing Furnace)	AFUE=80%	New	17,919	11.1%	18	$2,925	NA	NA	8.00	0
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	Existing	18,645	14.9%	18	$5,995	NA	NA	5.44	842,716
Warehouse	Space Heat Furnace	Gas Furnace	AFUE = 94% (Condensing Furnace)	AFUE=80%	New	17,919	14.9%	18	$5,995	NA	NA	5.23	143,928
Warehouse	Space Heat Furnace	Commissioning - New Building Commissioning	Commissioning - New Building Commissioning	No Commisioning	New	16,754	12.5%	3	$36,500	80%	90%	0.12	64,657
Warehouse	Space Heat Furnace	Commissioning - Retro Building Commissioning	Commissioning - Retro Building Commissioning	No Commisioning	Existing	18,310	12.5%	3	$9,855	80%	90%	0.48	1,630,188
Warehouse	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	Existing	18,310	2.5%	18	$20,000	45%	45%	0.27	74,583
Warehouse	Space Heat Furnace	Duct Repair And Sealing	Reduction In Duct Losses to 5%	No Repair or Sealing, 15% duct losses	New	16,754	2.5%	18	$20,000	45%	45%	0.25	3,655
Warehouse	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	Existing	18,310	15.0%	10	$23,580	94%	5%	0.81	128,605
Warehouse	Space Heat Furnace	Exhaust Air to Ventilation Air Heat Recovery	Exhaust Air Heat Recovery	No Heat Recovery	New	16,754	15.0%	10	$23,580	94%	5%	0.74	5,959

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Furnace	Green Roof	Vegetation on Roof	Standard Built Up Roof	New	16,754	3.0%	30	$264,385	98%	75%	0.03	14,415
Warehouse	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	Existing	18,310	13.0%	13	$15,750	65%	5%	1.34	84,707
Warehouse	Space Heat Furnace	Infrared Heater (Warm Air Unit heaters) - Gas Radiant Heating	92% Combustion Efficiency	80% Combustion Efficiency	New	16,754	13.0%	13	$15,750	65%	5%	1.23	4,224
Warehouse	Space Heat Furnace	Insulation (Ceiling)	R-20 (Code)	Existing Ceiling Insulation (Average R-9)	Existing	18,310	15.0%	25	$30,500	10%	75%	1.39	70,925
Warehouse	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	Existing	18,310	15.0%	25	$26,000	45%	75%	1.63	324,733
Warehouse	Space Heat Furnace	Insulation (Ceiling)	R-38	R-20 (Code)	New	16,754	15.0%	25	$26,000	45%	75%	1.49	23,052
Warehouse	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	Existing	18,310	15.0%	25	$34,500	85%	75%	1.23	600,602
Warehouse	Space Heat Furnace	Insulation (Ceiling)	R-49	R-20 (Code)	New	16,754	15.0%	25	$34,500	85%	75%	1.13	42,441
Warehouse	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	Install New Duct Insulation (R-8)	R-0	Existing	18,310	4.4%	25	$5,590	15%	10%	2.23	6,428
Warehouse	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-5 (code)	R-0	Existing	18,310	3.0%	25	$5,825	15%	10%	1.46	4,256
Warehouse	Space Heat Furnace	Insulation (Duct) (Unconditioned Spaces)	R-8	R-5 (code)	New	16,754	3.3%	25	$2,255	15%	10%	3.79	238
Warehouse	Space Heat Furnace	Insulation (Wall)	R-13 + R-7.5 (Code)	R-11	Existing	18,310	10.0%	25	$3,015	35%	10%	9.39	68,818
Warehouse	Space Heat Furnace	Insulation (Wall)	R-25 (2x6 Framing) - Advanced Spray	R-13 + R-7.5 (Code)	New	16,754	6.0%	25	$6,545	95%	95%	2.37	52,142

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-10 (Code)	R-0	Existing	18,310	15.0%	25	$26,000	45%	35%	1.63	230,031
Warehouse	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	Existing	18,310	15.0%	25	$4,500	45%	35%	9.44	235,038
Warehouse	Space Heat Furnace	Insulation - Floor (Non-Slab)	R-19	R-10 (Code)	New	16,754	15.0%	25	$4,500	45%	35%	8.63	23,441
Warehouse	Space Heat Furnace	Passive Solar Design	Design to minimize heating/cooling costs	No Passive Solar Design	New	16,754	0.0%	30	$22,725	90%	90%	0.00	52
Warehouse	Space Heat Furnace	Radiant Barrier (Ceiling)	Install Radiant Barrier- improves R-Value insulation	No Radiant Barrier R-19	New	16,754	5.0%	20	$20,935	80%	90%	0.51	29,796
Warehouse	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	Existing	18,310	3.0%	5	$2,060	20%	20%	0.92	1,135
Warehouse	Space Heat Furnace	Scheduled AHU	Reduce AHU runtime	No schedule	New	16,754	3.0%	5	$1,645	20%	20%	1.06	55
Warehouse	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	Existing	18,310	25.0%	10	$105,500	95%	40%	0.30	1,546,506
Warehouse	Space Heat Furnace	Sensible And Total Heat Recovery Devices	Install Heat Recovery Devices - rotary air-to-air enthalpy heat recovery- 70% sensible and latent recovery effectiveness	No Heat Recovery	New	16,754	25.0%	10	$105,500	95%	40%	0.27	75,797
Warehouse	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	Existing	18,310	3.0%	15	$1,385	20%	95%	3.99	113,638
Warehouse	Space Heat Furnace	Thermostat - Programmable	Energy Star Programmable Thermostat	Manual Thermostat	New	16,754	3.0%	15	$1,385	20%	95%	3.65	5,619
Warehouse	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	Existing	18,310	2.0%	25	$7,650	98%	85%	0.74	137,303
Warehouse	Space Heat Furnace	Windows	U-Value=0.29; SHGC=0.22	U-Value = 0.45, SHGC 0.47 (Code)	New	16,754	2.0%	25	$7,650	98%	95%	0.68	7,814

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	Existing	18,310	1.0%	25	$4,265	96%	85%	0.66	66,690
Warehouse	Space Heat Furnace	Windows	U-Value=0.35; SHGC=0.32	U-Value = 0.45, SHGC 0.47 (Code)	New	16,754	1.0%	25	$4,265	96%	95%	0.61	3,791
Warehouse	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	Existing	337	4.8%	13	$45	NA	NA	3.13	0
Warehouse	Water Heat	Water Heater - High-Efficiency Storage	EF=0.62	EF = 0.59	New	336	4.8%	13	$45	NA	NA	3.11	0
Warehouse	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	Existing	337	11.9%	13	$345	NA	NA	1.01	529,938
Warehouse	Water Heat	Water Heater - Premium Efficency Storage	EF = 0.67	EF = 0.59	New	336	11.9%	13	$345	NA	NA	1.00	71,699
Warehouse	Water Heat	Demand controlled Circulating Systems	Demand Controlled Circulating Systems (VFD Control by Demand)	Constant Circulation	Existing	308	5.0%	15	$13,890	94%	55%	0.01	18,673
Warehouse	Water Heat	Dishwashing - Residential Sized System	287 kWh/yr & 4 gal/cycle	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	308	1.6%	13	$600	55%	3%	0.07	98
Warehouse	Water Heat	Dishwashing - Residential Sized System	Energy Star Dishwasher (<324 kWh/yr & < 5.8 gal/cycle)	Existing Dishwasher (FED Std. <355 kWh/yr & <6.5 gal/cycle)	Existing	308	0.5%	13	$30	25%	3%	0.41	13
Warehouse	Water Heat	Drainwater Heat Recovery (Power-Pipe or GFX)	Install Power-Pipe or GFX System	No GFX or Power-Pipe System	Existing	308	20.0%	25	$400	92%	5%	2.32	6,767
Warehouse	Water Heat	Faucet Aerators	1.5 GPM Aerator	2.2 GPM Aerator (Federal Code)	Existing	308	3.2%	10	$25	25%	95%	2.64	6,202
Warehouse	Water Heat	Faucet Aerators - Existing to Code	2.2 GPM Aerator (Federal Code)	4.0 GPM Aerator	Existing	308	4.5%	10	$40	15%	95%	2.34	5,263
Warehouse	Water Heat	Hot Water (SHW) Pipe Insulation	Install Insulation (R-4)	No Pipe Insulation	Existing	308	1.0%	15	$530	90%	75%	0.06	4,909
Warehouse	Water Heat	Low-Flow Showerheads	2.0 GPM Showerhead	2.5 GPM Showerhead (Federal Code)	Existing	308	1.1%	10	$5	75%	15%	5.88	1,039
Warehouse	Water Heat	Low-Flow Showerheads - Existing to Code	2.5 GPM Showerhead (Federal Code)	4.5 GPM Showerhead	Existing	308	2.5%	10	$10	20%	15%	6.53	616
Warehouse	Water Heat	Solar RE - Solar Water Heater	Passive solar water heating	Standard Water Heater EF = 0.93	Existing	308	16.4%	20	$2,550	95%	20%	0.25	2,551

Building Type	End Use	Measure Name	Measure Description	Baseline	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost	Percent of Installations Incomplete	Percent of Installations Technically Feasible	TRC Benefit-Cost Ratio	2016 Technical Potential (therms)
Warehouse	Water Heat	Tankless Water Heater - Commercial	EF = 0.82	Thermal Efficiency = 80%	Existing	308	30.0%	14	$645	90%	13%	1.32	2,770
Warehouse	Water Heat	Tankless Water Heater - Residential	EF = 0.82	EF = 0.59 (40 Gal)	Existing	308	28.0%	20	$200	90%	13%	5.41	2,590
Warehouse	Water Heat	Water Heater Tank Blanket/Insulation	R-6.9	No Tank Insulation	Existing	308	4.0%	10	$75	35%	15%	1.11	1,530
Warehouse	Water Heat	Water Heater Thermostat Setback	Thermostat Setback and Replecement (120 Degrees)	No Thermostat Setback (130 Degrees)	Existing	308	7.7%	11	$75	45%	75%	2.33	19,605
Warehouse	Water Heat	Water Heater, Install Timer	Water heater timer	No timer	Existing	308	8.5%	20	$130	75%	85%	2.52	44,476

Table D.5. Industrial Electric Measure Details

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Fabricated Metal Products	Fans	Motor Improvements	Existing	18,072,455	4.2%	15	$0.12	100%	7.83	792
Fabricated Metal Products	Fans	Motor O&M	Existing	18,072,455	7.3%	2	$0.02	100%	9.57	1,472
Fabricated Metal Products	HVAC	HVAC Improvements	Existing	30,296,859	10.0%	15	$0.13	100%	7.17	3,386
Fabricated Metal Products	HVAC	HVAC O&M	Existing	30,296,859	11.2%	2	$0.06	100%	2.67	3,409
Fabricated Metal Products	Lighting	Lighting Improvements	Existing	28,244,654	8.9%	10	$0.11	100%	6.45	2,801
Fabricated Metal Products	Motors Other	Motor Improvements	Existing	51,447,135	4.2%	15	$0.12	100%	7.83	2,253
Fabricated Metal Products	Motors Other	Motor O&M	Existing	51,447,135	7.3%	2	$0.02	100%	9.57	4,191
Fabricated Metal Products	Other	Bldg Improvements	Existing	27,076,476	5.5%	15	$0.28	100%	3.40	1,679
Fabricated Metal Products	Process AirComp	Air Comp Improvements	Existing	20,842,686	10.9%	15	$0.03	100%	28.16	2,533
Fabricated Metal Products	Process AirComp	Air Comp O&M	Existing	20,842,686	14.2%	2	$0.02	100%	10.53	2,963
Fabricated Metal Products	Process AirComp	Motor Improvements	Existing	20,842,686	4.2%	15	$0.12	100%	7.83	698
Fabricated Metal Products	Process AirComp	Motor O&M	Existing	20,842,686	7.3%	2	$0.02	100%	9.57	1,298
Fabricated Metal Products	Process Cool	Cool Improvements	Existing	10,368,371	12.1%	15	$0.11	100%	8.62	1,405
Fabricated Metal Products	Process Heat	Heat Improvements	Existing	68,613,103	6.2%	15	$0.03	100%	33.34	3,170
Fabricated Metal Products	Process Heat	Heat O&M	Existing	68,613,103	4.7%	2	$0.02	100%	9.46	2,259
Fabricated Metal Products	Process Heat	Steam Distribution	Existing	68,613,103	33.3%	15	$0.01	100%	117.37	25,619
Fabricated Metal Products	Process Other	Other Improvements	Existing	555,674	13.1%	15	$0.11	100%	8.43	82
Fabricated Metal Products	Process Other	Other O&M	Existing	555,674	8.3%	2	$0.02	100%	7.28	45
Fabricated Metal Products	Process Refrig	Motor Improvements	Existing	8,838,354	4.2%	15	$0.12	100%	7.83	343
Fabricated Metal Products	Process Refrig	Motor O&M	Existing	8,838,354	7.3%	2	$0.02	100%	9.57	637
Fabricated Metal Products	Process Refrig	Refrig Improvements	Existing	8,838,354	11.5%	15	$0.01	100%	93.08	1,140
Fabricated Metal Products	Pumps	Motor Improvements	Existing	32,715,101	4.2%	15	$0.12	100%	7.83	1,433
Fabricated Metal Products	Pumps	Motor O&M	Existing	32,715,101	7.3%	2	$0.02	100%	9.57	2,665
Food Mfg	Fans	Motor Improvements	Existing	183,567,128	3.3%	15	$0.09	100%	10.63	6,638
Food Mfg	Fans	Motor O&M	Existing	183,567,128	1.6%	2	$0.01	100%	12.00	3,277
Food Mfg	HVAC	HVAC Improvements	Existing	337,957,957	9.2%	15	$0.11	100%	8.87	31,072
Food Mfg	HVAC	HVAC O&M	Existing	337,957,957	10.9%	2	$0.02	100%	10.03	41,255

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Food Mfg	Lighting	Lighting Improvements	Existing	323,800,894	7.8%	10	$0.09	100%	7.28	28,234
Food Mfg	Motors Other	Motor Improvements	Existing	954,549,067	3.3%	15	$0.09	100%	10.63	34,515
Food Mfg	Motors Other	Motor O&M	Existing	954,549,067	1.6%	2	$0.01	100%	12.00	17,040
Food Mfg	Other	Bldg Improvements	Existing	364,460,517	0.6%	15	$0.12	100%	8.22	2,448
Food Mfg	Process AirComp	Air Comp Improvements	Existing	188,462,252	10.2%	15	$0.04	100%	24.63	21,570
Food Mfg	Process AirComp	Air Comp O&M	Existing	188,462,252	13.0%	2	$0.02	100%	8.05	23,446
Food Mfg	Process AirComp	Motor Improvements	Existing	188,462,252	3.3%	15	$0.09	100%	10.63	6,118
Food Mfg	Process AirComp	Motor O&M	Existing	188,462,252	1.6%	2	$0.01	100%	12.00	3,020
Food Mfg	Process Cool	Cool Improvements	Existing	1220728028	11.9%	15	$0.15	100%	6.34	162,686
Food Mfg	Process Heat	Heat Improvements	Existing	149,554,951	11.1%	15	$0.16	100%	5.82	18,608
Food Mfg	Process Heat	Heat O&M	Existing	149,554,951	8.9%	2	$0.04	100%	3.79	10,288
Food Mfg	Process Heat	Steam Distribution	Existing	149,554,951	22.6%	15	$0.21	100%	4.50	33,632
Food Mfg	Process Other	Other Improvements	Existing	12,546,781	13.1%	15	$0.10	100%	9.25	1,747
Food Mfg	Process Other	Other O&M	Existing	12,546,781	5.1%	2	$0.02	100%	8.83	717
Food Mfg	Process Refrig	Motor Improvements	Existing	719,583,142	3.3%	15	$0.09	100%	10.63	21,968
Food Mfg	Process Refrig	Motor O&M	Existing	719,583,142	1.6%	2	$0.01	100%	12.00	10,846
Food Mfg	Process Refrig	Refrig Improvements	Existing	719,583,142	15.6%	15	$0.07	100%	14.02	125,474
Food Mfg	Pumps	Motor Improvements	Existing	401,400,120	3.3%	15	$0.09	100%	10.63	14,514
Food Mfg	Pumps	Motor O&M	Existing	401,400,120	1.6%	2	$0.01	100%	12.00	7,166
Industrial Machinery	Fans	Motor Improvements	Existing	94,153,366	3.1%	15	$0.08	100%	11.39	3,219
Industrial Machinery	Fans	Motor O&M	Existing	94,153,366	1.0%	2	$0.05	100%	3.70	1,033
Industrial Machinery	HVAC	HVAC Improvements	Existing	261,170,245	12.8%	15	$0.13	100%	7.46	37,292
Industrial Machinery	HVAC	HVAC O&M	Existing	261,170,245	7.5%	2	$0.04	100%	4.46	19,101
Industrial Machinery	Lighting	Lighting Improvements	Existing	194,299,182	6.9%	10	$0.10	100%	6.72	15,064
Industrial Machinery	Motors Other	Motor Improvements	Existing	268,027,830	3.1%	15	$0.08	100%	11.39	9,164
Industrial Machinery	Motors Other	Motor O&M	Existing	268,027,830	1.0%	2	$0.05	100%	3.70	2,942
Industrial Machinery	Other	Bldg Improvements	Existing	99,876,094	9.3%	15	$0.20	100%	4.84	10,451
Industrial Machinery	Process AirComp	Air Comp Improvements	Existing	108,585,634	11.9%	15	$0.08	100%	11.64	14,435
Industrial Machinery	Process AirComp	Air Comp O&M	Existing	108,585,634	15.5%	2	$0.02	100%	7.25	16,104

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Industrial Machinery	Process AirComp	Motor Improvements	Existing	108,585,634	3.1%	15	$0.08	100%	11.39	3,272
Industrial Machinery	Process AirComp	Motor O&M	Existing	108,585,634	1.0%	2	$0.05	100%	3.70	888
Industrial Machinery	Process Cool	Cool Improvements	Existing	46,264,443	31.5%	15	$0.11	100%	8.95	16,326
Industrial Machinery	Process Heat	Heat Improvements	Existing	105,271,699	6.4%	15	$0.11	100%	8.56	7,063
Industrial Machinery	Process Heat	Heat O&M	Existing	105,271,699	8.5%	2	$0.05	100%	3.26	8,754
Industrial Machinery	Process Heat	Steam Distribution	Existing	105,271,699	6.7%	15	$0.01	100%	75.03	7,941
Industrial Machinery	Process Other	Other Improvements	Existing	7,691,607	13.1%	15	$0.10	100%	9.89	1,128
Industrial Machinery	Process Other	Other O&M	Existing	7,691,607	4.6%	2	$0.04	100%	3.96	342
Industrial Machinery	Process Refrig	Motor Improvements	Existing	46,045,807	3.1%	15	$0.08	100%	11.39	1,574
Industrial Machinery	Process Refrig	Motor O&M	Existing	46,045,807	1.0%	2	$0.05	100%	3.70	457
Industrial Machinery	Process Refrig	Refrig Improvements	Existing	46,045,807	9.5%	15	$0.10	100%	9.82	4,752
Industrial Machinery	Pumps	Motor Improvements	Existing	170,438,210	3.1%	15	$0.08	100%	11.39	5,827
Industrial Machinery	Pumps	Motor O&M	Existing	170,438,210	1.0%	2	$0.05	100%	3.70	1,871
Mining	Motors Other	Motor Improvements	Existing	357,145,896	2.7%	15	$0.13	25%	7.58	2,742
Mining	Pumps	Motor Improvements	Existing	3,057,310	2.7%	15	$0.13	100%	7.58	94
Miscellaneous Mfg	Fans	Motor Improvements	Existing	59,907,521	4.4%	15	$0.17	50%	5.76	1,463
Miscellaneous Mfg	Fans	Motor O&M	Existing	59,907,521	2.4%	2	$0.01	50%	19.85	801
Miscellaneous Mfg	HVAC	HVAC Improvements	Existing	218,956,115	8.7%	15	$0.28	50%	3.46	10,114
Miscellaneous Mfg	HVAC	HVAC O&M	Existing	218,956,115	9.5%	2	$0.01	50%	31.41	11,622
Miscellaneous Mfg	Lighting	Lighting Improvements	Existing	156,934,211	6.3%	10	$0.09	50%	7.51	5,575
Miscellaneous Mfg	Motors Other	Motor Improvements	Existing	241,196,293	4.4%	15	$0.17	50%	5.76	5,890
Miscellaneous Mfg	Motors Other	Motor O&M	Existing	241,196,293	2.4%	2	$0.01	50%	19.85	3,224
Miscellaneous Mfg	Other	Bldg Improvements	Existing	45,733,323	6.8%	15	$0.07	50%	13.10	1,740
Miscellaneous Mfg	Process AirComp	Air Comp Improvements	Existing	55,991,996	11.8%	15	$0.10	50%	10.01	3,659
Miscellaneous Mfg	Process AirComp	Air Comp O&M	Existing	55,991,996	13.3%	2	$0.02	50%	7.63	3,883
Miscellaneous Mfg	Process AirComp	Motor Improvements	Existing	55,991,996	4.4%	15	$0.17	50%	5.76	1,201
Miscellaneous Mfg	Process AirComp	Motor O&M	Existing	55,991,996	2.4%	2	$0.01	50%	19.85	748
Miscellaneous Mfg	Process Cool	Cool Improvements	Existing	64,319,011	23.2%	15	$0.08	50%	12.25	8,366
Miscellaneous Mfg	Process Heat	Heat O&M	Existing	99,506,522	4.9%	2	$0.05	50%	3.45	2,504

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Miscellaneous Mfg	Process Heat	Steam Distribution	Existing	99,506,522	15.3%	15	$0.02	50%	56.93	8,508
Miscellaneous Mfg	Process Other	Other Improvements	Existing	4,698,629	13.1%	15	$0.15	50%	6.63	336
Miscellaneous Mfg	Process Other	Other O&M	Existing	4,698,629	5.0%	2	$0.02	50%	11.32	130
Miscellaneous Mfg	Process Refrig	Motor Improvements	Existing	391,552	4.4%	15	$0.17	50%	5.76	10
Miscellaneous Mfg	Process Refrig	Motor O&M	Existing	391,552	2.4%	2	$0.01	50%	19.85	5
Miscellaneous Mfg	Pumps	Motor Improvements	Existing	34,065,061	4.4%	15	$0.17	50%	5.76	832
Miscellaneous Mfg	Pumps	Motor O&M	Existing	34,065,061	2.4%	2	$0.01	50%	19.85	455
Nonmetallic Mineral Products	Fans	Motor Improvements	Existing	23,356,532	3.0%	15	$0.10	100%	9.74	777
Nonmetallic Mineral Products	Fans	Motor O&M	Existing	23,356,532	1.2%	2	$0.05	100%	3.53	300
Nonmetallic Mineral Products	HVAC	HVAC Improvements	Existing	17,815,694	10.0%	15	$0.04	100%	27.05	1,986
Nonmetallic Mineral Products	HVAC	HVAC O&M	Existing	17,815,694	8.5%	2	$0.06	100%	2.74	1,520
Nonmetallic Mineral Products	Lighting	Lighting Improvements	Existing	13,836,969	8.0%	10	$0.09	100%	7.32	1,242
Nonmetallic Mineral Products	Motors Other	Motor Improvements	Existing	66,489,397	3.0%	15	$0.10	100%	9.74	2,213
Nonmetallic Mineral Products	Motors Other	Motor O&M	Existing	66,489,397	1.2%	2	$0.05	100%	3.53	854
Nonmetallic Mineral Products	Other	Bldg Improvements	Existing	12,998,984	17.9%	15	$0.13	100%	7.71	2,601
Nonmetallic Mineral Products	Process AirComp	Air Comp Improvements	Existing	26,936,730	10.0%	15	$0.06	100%	16.31	3,010
Nonmetallic Mineral Products	Process AirComp	Air Comp O&M	Existing	26,936,730	5.7%	2	$0.02	100%	9.77	1,545
Nonmetallic Mineral Products	Process AirComp	Motor Improvements	Existing	26,936,730	3.0%	15	$0.10	100%	9.74	761
Nonmetallic Mineral Products	Process AirComp	Motor O&M	Existing	26,936,730	1.2%	2	$0.05	100%	3.53	294
Nonmetallic Mineral Products	Process Cool	Cool Improvements	Existing	9,926,373	9.2%	15	$0.07	100%	12.99	1,020
Nonmetallic Mineral Products	Process Heat	Heat Improvements	Existing	58,052,592	8.7%	15	$0.06	100%	16.83	5,649
Nonmetallic Mineral Products	Process Heat	Heat O&M	Existing	58,052,592	4.8%	2	$0.03	100%	5.36	2,857
Nonmetallic Mineral Products	Process Other	Other Improvements	Existing	1,737,286	13.1%	15	$0.09	100%	11.29	255
Nonmetallic Mineral Products	Process Other	Other O&M	Existing	1,737,286	3.1%	2	$0.04	100%	3.87	53
Nonmetallic Mineral Products	Process Refrig	Motor Improvements	Existing	11,422,537	3.0%	15	$0.10	100%	9.74	380
Nonmetallic Mineral Products	Process Refrig	Motor O&M	Existing	11,422,537	1.2%	2	$0.05	100%	3.53	147
Nonmetallic Mineral Products	Pumps	Motor Improvements	Existing	42,280,437	3.0%	15	$0.10	100%	9.74	1,407
Nonmetallic Mineral Products	Pumps	Motor O&M	Existing	42,280,437	1.2%	2	$0.05	100%	3.53	543
Paper Mfg	Fans	Motor Improvements	Existing	51,152,009	1.4%	15	$0.07	100%	14.47	810

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Paper Mfg	Fans	Motor O&M	Existing	51,152,009	1.2%	2	$0.03	100%	5.27	686
Paper Mfg	HVAC	HVAC Improvements	Existing	12,998,414	6.0%	15	$0.10	100%	9.69	866
Paper Mfg	HVAC	HVAC O&M	Existing	12,998,414	9.6%	2	$0.06	100%	3.03	1,308
Paper Mfg	Indirect Boiler	Boiler Improvements	Existing	1,994,834	11.8%	15	$0.05	100%	18.02	264
Paper Mfg	Lighting	Lighting Improvements	Existing	12,592,214	12.7%	10	$0.10	100%	7.06	1,790
Paper Mfg	Motors Other	Motor Improvements	Existing	101,270,644	1.4%	15	$0.07	100%	14.47	1,604
Paper Mfg	Motors Other	Motor O&M	Existing	101,270,644	1.2%	2	$0.03	100%	5.27	1,358
Paper Mfg	Other	Bldg Improvements	Existing	14,033,391	1.2%	15	$0.16	100%	6.03	193
Paper Mfg	Process AirComp	Air Comp Improvements	Existing	11,883,800	14.1%	15	$0.04	100%	26.47	1,878
Paper Mfg	Process AirComp	Air Comp O&M	Existing	11,883,800	11.6%	2	$0.02	100%	7.85	1,309
Paper Mfg	Process AirComp	Motor Improvements	Existing	11,883,800	1.4%	15	$0.07	100%	14.47	162
Paper Mfg	Process AirComp	Motor O&M	Existing	11,883,800	1.2%	2	$0.03	100%	5.27	121
Paper Mfg	Process Cool	Cool Improvements	Existing	4,785,375	17.6%	15	$0.03	100%	29.77	945
Paper Mfg	Process Heat	Heat Improvements	Existing	7,945,948	23.8%	15	$0.29	100%	3.40	1,822
Paper Mfg	Process Heat	Heat O&M	Existing	7,945,948	14.0%	2	$0.03	100%	5.75	1,245
Paper Mfg	Process Other	Other Improvements	Existing	1,544,118	13.1%	15	$0.10	100%	10.02	227
Paper Mfg	Process Other	Other O&M	Existing	1,544,118	5.2%	2	$0.03	100%	5.59	77
Paper Mfg	Process Refrig	Motor Improvements	Existing	12,917,174	1.4%	15	$0.07	100%	14.47	166
Paper Mfg	Process Refrig	Motor O&M	Existing	12,917,174	1.2%	2	$0.03	100%	5.27	141
Paper Mfg	Process Refrig	Refrig Improvements	Existing	12,917,174	18.8%	15	$0.02	100%	57.37	2,721
Paper Mfg	Pumps	Motor Improvements	Existing	81,119,853	1.4%	15	$0.07	100%	14.47	1,285
Paper Mfg	Pumps	Motor O&M	Existing	81,119,853	1.2%	2	$0.03	100%	5.27	1,088
Petroleum Coal Products	Fans	Motor Improvements	Existing	174,050,125	1.5%	15	$0.11	100%	8.84	2,668
Petroleum Coal Products	Fans	Motor O&M	Existing	174,050,125	10.8%	2	$0.01	100%	15.92	21,129
Petroleum Coal Products	HVAC	HVAC Improvements	Existing	50,573,605	32.9%	15	$0.14	100%	6.90	18,634
Petroleum Coal Products	HVAC	HVAC O&M	Existing	50,573,605	11.7%	2	$0.04	100%	4.48	4,458
Petroleum Coal Products	Lighting	Lighting Improvements	Existing	38,807,618	6.4%	10	$0.08	100%	8.31	2,770
Petroleum Coal Products	Motors Other	Motor Improvements	Existing	495,471,158	1.5%	15	$0.11	100%	8.84	7,594
Petroleum Coal Products	Motors Other	Motor O&M	Existing	495,471,158	10.8%	2	$0.01	100%	15.92	60,149

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Petroleum Coal Products	Process AirComp	Air Comp Improvements	Existing	200,729,341	23.2%	15	$0.04	100%	21.98	52,131
Petroleum Coal Products	Process AirComp	Air Comp O&M	Existing	200,729,341	13.7%	2	$0.02	100%	10.11	21,091
Petroleum Coal Products	Process AirComp	Motor Improvements	Existing	200,729,341	1.5%	15	$0.11	100%	8.84	2,039
Petroleum Coal Products	Process AirComp	Motor O&M	Existing	200,729,341	10.8%	2	$0.01	100%	15.92	18,717
Petroleum Coal Products	Process Cool	Cool Improvements	Existing	87,885,303	3.8%	15	$0.07	100%	14.20	3,782
Petroleum Coal Products	Process Refrig	Motor Improvements	Existing	85,119,404	1.5%	15	$0.11	100%	8.84	1,305
Petroleum Coal Products	Process Refrig	Motor O&M	Existing	85,119,404	10.8%	2	$0.01	100%	15.92	10,333
Petroleum Coal Products	Pumps	Motor Improvements	Existing	315,068,839	1.5%	15	$0.11	100%	8.84	4,829
Petroleum Coal Products	Pumps	Motor O&M	Existing	315,068,839	10.8%	2	$0.01	100%	15.92	38,249
Plastics Rubber Products	Fans	Motor Improvements	Existing	35,014,958	4.4%	15	$0.12	100%	8.22	1,723
Plastics Rubber Products	Fans	Motor O&M	Existing	35,014,958	1.6%	2	$0.10	100%	1.74	595
Plastics Rubber Products	HVAC	HVAC Improvements	Existing	47,143,728	10.6%	15	$0.08	100%	12.16	5,586
Plastics Rubber Products	HVAC	HVAC O&M	Existing	47,143,728	7.0%	2	$0.05	100%	3.67	3,293
Plastics Rubber Products	Lighting	Lighting Improvements	Existing	38,570,413	6.4%	10	$0.09	100%	7.31	2,766
Plastics Rubber Products	Motors Other	Motor Improvements	Existing	99,677,618	4.4%	15	$0.12	100%	8.22	4,906
Plastics Rubber Products	Motors Other	Motor O&M	Existing	99,677,618	1.6%	2	$0.10	100%	1.74	1,695
Plastics Rubber Products	Other	Bldg Improvements	Existing	13,639,365	26.6%	15	$0.26	100%	3.80	4,062
Plastics Rubber Products	Process AirComp	Air Comp Improvements	Existing	40,382,215	8.5%	15	$0.03	100%	33.55	3,840
Plastics Rubber Products	Process AirComp	Air Comp O&M	Existing	40,382,215	10.6%	2	$0.02	100%	9.22	4,366
Plastics Rubber Products	Process AirComp	Motor Improvements	Existing	40,382,215	4.4%	15	$0.12	100%	8.22	1,627
Plastics Rubber Products	Process AirComp	Motor O&M	Existing	40,382,215	1.6%	2	$0.10	100%	1.74	562
Plastics Rubber Products	Process Cool	Cool Improvements	Existing	39,235,747	15.5%	15	$0.06	100%	15.76	6,789
Plastics Rubber Products	Process Heat	Heat Improvements	Existing	73,395,940	12.6%	15	$0.05	100%	19.27	10,203
Plastics Rubber Products	Process Heat	Heat O&M	Existing	73,395,940	8.7%	2	$0.02	100%	7.96	6,162
Plastics Rubber Products	Process Heat	Steam Distribution	Existing	73,395,940	1.4%	15	$0.02	100%	51.65	1,155
Plastics Rubber Products	Process Other	Other Improvements	Existing	4,201,114	13.1%	15	$0.10	100%	9.87	616
Plastics Rubber Products	Process Other	Other O&M	Existing	4,201,114	4.3%	2	$0.07	100%	2.37	175
Plastics Rubber Products	Process Refrig	Motor Improvements	Existing	17,124,104	4.4%	15	$0.12	100%	8.22	843
Plastics Rubber Products	Process Refrig	Motor O&M	Existing	17,124,104	1.6%	2	$0.10	100%	1.74	291

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Plastics Rubber Products	Pumps	Motor Improvements	Existing	63,384,742	4.4%	15	$0.12	100%	8.22	3,120
Plastics Rubber Products	Pumps	Motor O&M	Existing	63,384,742	1.6%	2	$0.10	100%	1.74	1,078
Primary Metal Mfg	Fans	Motor Improvements	Existing	66,538,557	3.5%	15	$0.18	100%	5.40	2,610
Primary Metal Mfg	Fans	Motor O&M	Existing	66,538,557	3.0%	2	$0.06	100%	2.74	2,172
Primary Metal Mfg	HVAC	HVAC Improvements	Existing	49,671,950	7.6%	15	$0.06	100%	16.58	4,240
Primary Metal Mfg	HVAC	HVAC O&M	Existing	49,671,950	9.6%	2	$0.03	100%	5.39	4,940
Primary Metal Mfg	Indirect Boiler	Boiler Improvements	Existing	1,968,897	25.0%	15	$0.01	100%	151.49	551
Primary Metal Mfg	Lighting	Lighting Improvements	Existing	39,791,502	11.2%	10	$0.13	100%	5.24	4,973
Primary Metal Mfg	Motors Other	Motor Improvements	Existing	267,893,797	3.5%	15	$0.18	100%	5.40	10,507
Primary Metal Mfg	Motors Other	Motor O&M	Existing	267,893,797	3.0%	2	$0.06	100%	2.74	8,743
Primary Metal Mfg	Other	Bldg Improvements	Existing	18,277,479	2.9%	15	$0.16	100%	5.96	590
Primary Metal Mfg	Process AirComp	Air Comp Improvements	Existing	62,189,632	11.3%	15	$0.02	100%	58.69	7,835
Primary Metal Mfg	Process AirComp	Air Comp O&M	Existing	62,189,632	11.6%	2	$0.02	100%	11.29	7,158
Primary Metal Mfg	Process AirComp	Motor Improvements	Existing	62,189,632	3.5%	15	$0.18	100%	5.40	1,914
Primary Metal Mfg	Process AirComp	Motor O&M	Existing	62,189,632	3.0%	2	$0.06	100%	2.74	1,593
Primary Metal Mfg	Process Cool	Cool Improvements	Existing	11,076,170	40.9%	15	$0.02	100%	48.87	5,071
Primary Metal Mfg	Process Heat	Heat Improvements	Existing	379,988,167	12.7%	15	$0.04	100%	23.79	54,215
Primary Metal Mfg	Process Heat	Heat O&M	Existing	379,988,167	6.0%	2	$0.05	100%	3.48	20,775
Primary Metal Mfg	Process Heat	Steam Distribution	Existing	379,988,167	7.2%	15	$0.04	100%	23.48	26,747
Primary Metal Mfg	Process Other	Other Improvements	Existing	1,825,051	13.1%	15	$0.11	100%	8.85	268
Primary Metal Mfg	Process Other	Other O&M	Existing	1,825,051	5.4%	2	$0.05	100%	3.36	97
Primary Metal Mfg	Process Refrig	Motor Improvements	Existing	434,893	3.5%	15	$0.18	100%	5.40	17
Primary Metal Mfg	Process Refrig	Motor O&M	Existing	434,893	3.0%	2	$0.06	100%	2.74	14
Primary Metal Mfg	Pumps	Motor Improvements	Existing	37,835,650	3.5%	15	$0.18	100%	5.40	1,484
Primary Metal Mfg	Pumps	Motor O&M	Existing	37,835,650	3.0%	2	$0.06	100%	2.74	1,235
Transportation Equipment Mfg	Fans	Motor Improvements	Existing	26,539,082	2.4%	15	$0.10	100%	9.28	715
Transportation Equipment Mfg	Fans	Motor O&M	Existing	26,539,082	2.4%	2	$0.06	100%	3.04	689
Transportation Equipment Mfg	HVAC	HVAC Improvements	Existing	97,990,690	13.2%	15	$0.07	100%	14.26	14,486
Transportation Equipment Mfg	HVAC	HVAC O&M	Existing	97,990,690	2.1%	2	$0.05	100%	3.49	1,993

Building Type	End Use	Measure Name	Construction Vintage	Baseline kWh	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year kWh)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (MWh)
Transportation Equipment Mfg	Indirect Boiler	Boiler Improvements	Existing	1,006,232	33.4%	15	$0.05	100%	18.02	376
Transportation Equipment Mfg	Lighting	Lighting Improvements	Existing	76,717,532	8.2%	10	$0.08	100%	8.16	7,039
Transportation Equipment Mfg	Motors Other	Motor Improvements	Existing	59,545,672	2.4%	15	$0.10	100%	9.28	1,604
Transportation Equipment Mfg	Motors Other	Motor O&M	Existing	59,545,672	2.4%	2	$0.06	100%	3.04	1,546
Transportation Equipment Mfg	Other	Bldg Improvements	Existing	21,283,322	38.8%	15	$0.01	100%	109.18	9,241
Transportation Equipment Mfg	Process AirComp	Air Comp Improvements	Existing	61,775,847	8.2%	15	$0.03	100%	32.73	5,680
Transportation Equipment Mfg	Process AirComp	Air Comp O&M	Existing	61,775,847	9.6%	2	$0.03	100%	6.52	5,963
Transportation Equipment Mfg	Process AirComp	Motor Improvements	Existing	61,775,847	2.4%	15	$0.10	100%	9.28	1,527
Transportation Equipment Mfg	Process AirComp	Motor O&M	Existing	61,775,847	2.4%	2	$0.06	100%	3.04	1,330
Transportation Equipment Mfg	Process Cool	Cool Improvements	Existing	23,163,653	15.2%	15	$0.11	100%	8.46	3,951
Transportation Equipment Mfg	Process Heat	Heat Improvements	Existing	49,234,198	7.1%	15	$0.04	100%	25.80	3,554
Transportation Equipment Mfg	Process Heat	Heat O&M	Existing	49,234,198	9.5%	2	$0.01	100%	12.57	4,433
Transportation Equipment Mfg	Process Heat	Steam Distribution	Existing	49,234,198	8.6%	15	$0.03	100%	33.82	4,747
Transportation Equipment Mfg	Process Other	Other Improvements	Existing	6,698,046	13.1%	15	$0.07	100%	13.30	983
Transportation Equipment Mfg	Process Other	Other O&M	Existing	6,698,046	4.4%	2	$0.05	100%	3.73	288
Transportation Equipment Mfg	Process Refrig	Motor Improvements	Existing	17,172,347	2.4%	15	$0.10	100%	9.28	463
Transportation Equipment Mfg	Process Refrig	Motor O&M	Existing	17,172,347	2.4%	2	$0.06	100%	3.04	277
Transportation Equipment Mfg	Process Refrig	Refrig Improvements	Existing	17,172,347	37.9%	15	$0.15	100%	6.28	7,117
Transportation Equipment Mfg	Pumps	Motor Improvements	Existing	57,984,550	2.4%	15	$0.10	100%	9.28	1,562
Transportation Equipment Mfg	Pumps	Motor O&M	Existing	57,984,550	2.4%	2	$0.06	100%	3.04	1,505

Table D.6. Industrial Gas Measure Details

Building Type	End Use	Measure Name	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year therm)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (therms)
Fabricated Metal Products	HVAC	HVAC Improvements	Existing	5,739,605	14.5%	15	$1.22	100%	7.95	881,487
Fabricated Metal Products	HVAC	HVAC O&M	Existing	5,739,605	13.1%	2	$0.69	100%	1.90	679,949
Fabricated Metal Products	Process Heat	Boiler Improvements	Existing	17,218,814	6.0%	15	$0.47	100%	20.55	1,094,518
Fabricated Metal Products	Process Heat	Heat Improvements	Existing	17,218,814	6.9%	15	$0.91	100%	10.70	1,117,175
Fabricated Metal Products	Process Heat	Heat O&M	Existing	17,218,814	3.5%	2	$0.48	100%	2.75	536,127
Fabricated Metal Products	Process Heat	Steam Distribution	Existing	17,218,814	5.2%	15	$0.65	100%	14.98	893,238
Food Mfg	HVAC	HVAC Improvements	Existing	13,376,218	20.4%	15	$0.58	100%	16.65	2,901,881
Food Mfg	HVAC	HVAC O&M	Existing	13,376,218	5.6%	2	$0.21	100%	6.28	635,241
Food Mfg	Indirect Boiler	Boiler Improvements	Existing	99,578,513	6.0%	15	$0.82	100%	11.91	6,305,424
Food Mfg	Indirect Boiler	Boiler O&M	Existing	99,578,513	4.1%	2	$0.36	100%	3.66	4,102,567
Food Mfg	Process Heat	Boiler Improvements	Existing	73,940,761	7.1%	15	$0.32	100%	30.67	5,572,741
Food Mfg	Process Heat	Heat Improvements	Existing	73,940,761	12.9%	15	$0.50	100%	19.29	8,928,548
Food Mfg	Process Heat	Heat O&M	Existing	73,940,761	3.5%	2	$0.35	100%	3.77	2,128,491
Food Mfg	Process Heat	Steam Distribution	Existing	73,940,761	5.2%	15	$0.46	100%	21.16	3,799,106
Food Mfg	Process Other	Other O&M	Existing	1,486,246	4.4%	2	$0.31	100%	4.30	69,881
Industrial Machinery	HVAC	HVAC Improvements	Existing	20,144,045	14.5%	15	$0.82	100%	11.86	3,108,684
Industrial Machinery	HVAC	HVAC O&M	Existing	20,144,045	14.7%	2	$0.34	100%	3.81	2,693,224
Industrial Machinery	Indirect Boiler	Boiler Improvements	Existing	9,724,711	19.1%	15	$1.03	100%	9.44	1,667,747
Industrial Machinery	Indirect Boiler	Boiler O&M	Existing	9,724,711	15.3%	2	$0.17	100%	7.61	1,576,091
Industrial Machinery	Process Heat	Boiler Improvements	Existing	20,144,045	2.1%	15	$1.09	100%	8.91	365,756
Industrial Machinery	Process Heat	Heat Improvements	Existing	20,144,045	13.4%	15	$0.51	100%	19.18	2,684,772
Industrial Machinery	Process Heat	Heat O&M	Existing	20,144,045	9.8%	2	$0.57	100%	2.30	1,668,955
Industrial Machinery	Process Heat	Steam Distribution	Existing	20,144,045	6.3%	15	$0.36	100%	26.76	1,344,602
Miscellaneous Mfg	HVAC	HVAC Improvements	Existing	21,912,932	16.6%	15	$0.70	50%	13.92	1,740,082
Miscellaneous Mfg	HVAC	HVAC O&M	Existing	21,912,932	20.2%	2	$0.05	50%	28.10	2,343,209
Miscellaneous Mfg	Indirect Boiler	Boiler Improvements	Existing	19,721,639	14.3%	15	$0.59	50%	16.48	1,495,583
Miscellaneous Mfg	Indirect Boiler	Boiler O&M	Existing	19,721,639	5.5%	2	$0.21	50%	6.24	530,222

Building Type	End Use	Measure Name	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year therm)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (therms)
Miscellaneous Mfg	Process Heat	Boiler Improvements	Existing	17,530,346	4.4%	15	$1.05	50%	9.30	366,977
Miscellaneous Mfg	Process Heat	Heat Improvements	Existing	17,530,346	8.1%	15	$0.46	50%	21.16	710,979
Miscellaneous Mfg	Process Heat	Heat O&M	Existing	17,530,346	3.5%	2	$0.33	50%	3.95	291,492
Miscellaneous Mfg	Process Heat	Steam Distribution	Existing	17,530,346	11.7%	15	$0.21	50%	45.63	1,092,179
Nonmetallic Mineral Products	HVAC	HVAC Improvements	Existing	1,201,774	10.8%	15	$1.16	100%	8.40	137,629
Nonmetallic Mineral Products	HVAC	HVAC O&M	Existing	1,201,774	1.9%	2	$0.46	100%	2.84	21,927
Nonmetallic Mineral Products	Indirect Boiler	Boiler O&M	Existing	721,064	19.7%	2	$0.07	100%	19.59	150,384
Nonmetallic Mineral Products	Process Heat	Boiler Improvements	Existing	20,910,870	21.8%	15	$0.20	100%	48.64	4,844,972
Nonmetallic Mineral Products	Process Heat	Heat Improvements	Existing	20,910,870	12.9%	15	$0.90	100%	10.79	2,135,780
Nonmetallic Mineral Products	Process Heat	Heat O&M	Existing	20,910,870	3.0%	2	$0.30	100%	4.35	438,286
Nonmetallic Mineral Products	Process Heat	Steam Distribution	Existing	20,910,870	4.6%	15	$0.41	100%	23.77	805,520
Paper Mfg	HVAC	HVAC Improvements	Existing	963,541	18.3%	15	$0.66	100%	14.70	187,455
Paper Mfg	HVAC	HVAC O&M	Existing	963,541	22.0%	2	$0.14	100%	9.57	184,081
Paper Mfg	Indirect Boiler	Boiler Improvements	Existing	15,112,382	7.8%	15	$0.48	100%	20.49	1,246,772
Paper Mfg	Indirect Boiler	Boiler O&M	Existing	15,112,382	4.1%	2	$0.12	100%	10.78	609,620
Paper Mfg	Process Heat	Boiler Improvements	Existing	6,389,799	6.2%	15	$0.48	100%	20.08	407,454
Paper Mfg	Process Heat	Heat Improvements	Existing	6,389,799	10.4%	15	$0.68	100%	14.35	635,777
Paper Mfg	Process Heat	Heat O&M	Existing	6,389,799	3.1%	2	$0.24	100%	5.43	169,819
Paper Mfg	Process Heat	Steam Distribution	Existing	6,389,799	3.8%	15	$0.18	100%	54.76	255,339
Paper Mfg	Process Other	Other O&M	Existing	101,425	9.8%	2	$0.17	100%	7.86	10,496
Petroleum Coal Products	Indirect Boiler	Boiler Improvements	Existing	85,774,130	8.8%	15	$0.92	100%	10.61	7,535,818
Petroleum Coal Products	Indirect Boiler	Boiler O&M	Existing	85,774,130	5.8%	2	$0.17	100%	7.67	5,286,565
Petroleum Coal Products	Process Heat	Boiler Improvements	Existing	156,285,958	1.9%	15	$0.77	100%	12.69	2,931,882
Petroleum Coal Products	Process Heat	Heat Improvements	Existing	156,285,958	4.8%	15	$0.75	100%	13.02	7,748,095
Petroleum Coal Products	Process Heat	Heat O&M	Existing	156,285,958	2.3%	2	$0.19	100%	6.85	3,434,365
Petroleum Coal Products	Process Heat	Steam Distribution	Existing	156,285,958	3.0%	15	$0.05	100%	196.31	5,027,723
Primary Metal Mfg	HVAC	HVAC Improvements	Existing	2,884,520	11.3%	15	$0.59	100%	16.45	345,647
Primary Metal Mfg	Indirect Boiler	Boiler Improvements	Existing	4,628,649	17.8%	15	$0.98	100%	9.90	756,456
Primary Metal Mfg	Indirect Boiler	Boiler O&M	Existing	4,628,649	13.6%	2	$0.15	100%	9.01	670,091

Building Type	End Use	Measure Name	Construction Vintage	Baseline therms	Savings as Percent of End Use	Measure Life	Measure Cost ($/first year therm)	Measure Applicability	TRC Beneift-Cost Ratio	2016 Technical Potential (therms)
Primary Metal Mfg	Process Heat	Boiler Improvements	Existing	34,614,243	7.8%	15	$0.43	100%	22.45	2,754,405
Primary Metal Mfg	Process Heat	Heat Improvements	Existing	34,614,243	8.4%	15	$0.74	100%	13.10	2,727,545
Primary Metal Mfg	Process Heat	Heat O&M	Existing	34,614,243	1.7%	2	$0.49	100%	2.69	491,909
Primary Metal Mfg	Process Heat	Steam Distribution	Existing	34,614,243	4.2%	15	$0.39	100%	25.11	1,551,830

Appendix E: Energy-Efficiency Inputs and Detailed Results

Appendix E.1 1

End Use Saturations, Fuel Shares, and UECs for Residential Electric Sector 1
End Use Saturations, Fuel Shares, and UECs for Residential Gas Sector 4
End Use Saturations, Fuel Shares, and EUIs for Commercial Electric Sector 6
End Use Saturations, Fuel Shares, and EUIs for Commercial Gas Sector 12
End Use Percents for Industrial Electric Sector 15
End Use Percents for Industrial Gas Sector 19

Appendix E.2: Detailed Technical and Economic Potential 21

Residential Sector Electric Technical Potential 21
Residential Sector Electric Economic Potential 24
Residential Sector Gas Technical Potential 27
Residential Sector Gas Economic Potential 30
Commercial Sector Electric Technical Potential 33
Commercial Sector Electric Economic Potential 39
Commercial Sector Gas Technical Potential 45
Commercial Sector Gas Economic Potential 51
Industrial Sector Electric Technical Potential 57
Industrial Sector Electric Economic Potential 63
Industrial Sector Gas Technical Potential 69
Industrial Sector Gas Economic Potential 74

Appendix E.1

Table E.1. End Use Saturations, Fuel Shares, and UECs for Residential Electric Sector

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Unit Energy Consumption (kWh)
Residential	Manufactured	Central AC	Existing	71%	100%	1,879
Residential	Manufactured	Central AC	New	81%	100%	857
Residential	Manufactured	Central Heat	Existing	93%	8%	12,306
Residential	Manufactured	Central Heat	New	93%	8%	8,629
Residential	Manufactured	Cooking Oven	Existing	100%	25%	433
Residential	Manufactured	Cooking Oven	New	100%	25%	433
Residential	Manufactured	Cooking Range	Existing	93%	31%	527
Residential	Manufactured	Cooking Range	New	93%	31%	527
Residential	Manufactured	Dryer	Existing	86%	75%	683
Residential	Manufactured	Dryer	New	86%	75%	663
Residential	Manufactured	Freezer	Existing	36%	100%	678
Residential	Manufactured	Freezer	New	36%	100%	540
Residential	Manufactured	HVAC Aux	Existing	86%	100%	604
Residential	Manufactured	HVAC Aux	New	86%	100%	450
Residential	Manufactured	Heat Pump	Existing	0%	100%	9,393
Residential	Manufactured	Heat Pump	New	19%	100%	8,742
Residential	Manufactured	Lighting	Existing	100%	100%	813
Residential	Manufactured	Lighting	New	100%	100%	774
Residential	Manufactured	Other	Existing	100%	100%	0
Residential	Manufactured	Other	New	100%	100%	0
Residential	Manufactured	Plug Load	Existing	100%	100%	1,465
Residential	Manufactured	Plug Load	New	100%	100%	1,465
Residential	Manufactured	Refrigerator	Existing	100%	100%	586
Residential	Manufactured	Refrigerator	New	100%	100%	479
Residential	Manufactured	Room AC	Existing	29%	100%	903
Residential	Manufactured	Room AC	New	29%	100%	492
Residential	Manufactured	Room Heat	Existing	7%	100%	9,475
Residential	Manufactured	Room Heat	New	7%	100%	6,645
Residential	Manufactured	Water Heat	Existing	100%	50%	2,662
Residential	Manufactured	Water Heat	New	100%	27%	2,586
Residential	Multi Family	Central AC	Existing	67%	100%	1,278
Residential	Multi Family	Central AC	New	81%	100%	679
Residential	Multi Family	Central Heat	Existing	46%	54%	8,279
Residential	Multi Family	Central Heat	New	46%	54%	5,710
Residential	Multi Family	Cooking Oven	Existing	100%	81%	433

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Unit Energy Consumption (kWh)
Residential	Multi Family	Cooking Oven	New	100%	81%	433
Residential	Multi Family	Cooking Range	Existing	97%	71%	527
Residential	Multi Family	Cooking Range	New	97%	71%	527
Residential	Multi Family	Dryer	Existing	27%	88%	621
Residential	Multi Family	Dryer	New	27%	88%	595
Residential	Multi Family	Freezer	Existing	7%	100%	678
Residential	Multi Family	Freezer	New	7%	100%	540
Residential	Multi Family	HVAC Aux	Existing	61%	100%	429
Residential	Multi Family	HVAC Aux	New	61%	100%	296
Residential	Multi Family	Heat Pump	Existing	0%	100%	5,874
Residential	Multi Family	Heat Pump	New	19%	100%	5,583
Residential	Multi Family	Lighting	Existing	100%	100%	716
Residential	Multi Family	Lighting	New	100%	100%	577
Residential	Multi Family	Other	Existing	100%	100%	0
Residential	Multi Family	Other	New	100%	100%	0
Residential	Multi Family	Plug Load	Existing	100%	100%	1,195
Residential	Multi Family	Plug Load	New	100%	100%	1,195
Residential	Multi Family	Refrigerator	Existing	103%	100%	586
Residential	Multi Family	Refrigerator	New	103%	100%	479
Residential	Multi Family	Room AC	Existing	27%	100%	614
Residential	Multi Family	Room AC	New	27%	100%	390
Residential	Multi Family	Room Heat	Existing	25%	100%	6,375
Residential	Multi Family	Room Heat	New	25%	100%	4,397
Residential	Multi Family	Water Heat	Existing	75%	71%	1,852
Residential	Multi Family	Water Heat	New	75%	27%	1,799
Residential	Single Family	Central AC	Existing	77%	100%	2,392
Residential	Single Family	Central AC	New	81%	100%	1,110
Residential	Single Family	Central Heat	Existing	88%	9%	13,533
Residential	Single Family	Central Heat	New	88%	9%	11,587
Residential	Single Family	Cooking Oven	Existing	106%	55%	433
Residential	Single Family	Cooking Oven	New	106%	55%	433
Residential	Single Family	Cooking Range	Existing	102%	51%	527
Residential	Single Family	Cooking Range	New	102%	51%	527
Residential	Single Family	Dryer	Existing	94%	71%	825
Residential	Single Family	Dryer	New	94%	71%	790
Residential	Single Family	Freezer	Existing	62%	100%	678
Residential	Single Family	Freezer	New	62%	100%	540
Residential	Single Family	HVAC Aux	Existing	89%	100%	718
Residential	Single Family	HVAC Aux	New	89%	100%	602
Residential	Single Family	Heat Pump	Existing	2%	100%	12,852
Residential	Single Family	Heat Pump	New	19%	100%	11,234

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Unit Energy Consumption (kWh)
Residential	Single Family	Lighting	Existing	100%	100%	1,670
Residential	Single Family	Lighting	New	100%	100%	1,875
Residential	Single Family	Other	Existing	100%	100%	0
Residential	Single Family	Other	New	100%	100%	0
Residential	Single Family	Plug Load	Existing	100%	100%	2,247
Residential	Single Family	Plug Load	New	100%	100%	2,247
Residential	Single Family	Pool Pump	Existing	9%	36%	1,475
Residential	Single Family	Pool Pump	New	9%	36%	1,475
Residential	Single Family	Refrigerator	Existing	129%	100%	586
Residential	Single Family	Refrigerator	New	129%	100%	479
Residential	Single Family	Room AC	Existing	13%	100%	1,150
Residential	Single Family	Room AC	New	13%	100%	637
Residential	Single Family	Room Heat	Existing	4%	92%	10,420
Residential	Single Family	Room Heat	New	4%	92%	8,922
Residential	Single Family	Water Heat	Existing	100%	30%	3,009
Residential	Single Family	Water Heat	New	100%	27%	2,923

Table E.2. End Use Saturations, Fuel Shares, and UECs for Residential Gas Sector

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Natural Gas for End Use	End Use Unit Energy Consumption (therms)
Residential	Manufactured	Central Heat Boiler	Existing	0%	0%	715
Residential	Manufactured	Central Heat Boiler	New	0%	0%	448
Residential	Manufactured	Central Heat Furnace	Existing	85%	100%	594
Residential	Manufactured	Central Heat Furnace	New	85%	100%	399
Residential	Manufactured	Cooking Oven	Existing	100%	82%	19
Residential	Manufactured	Cooking Oven	New	100%	82%	19
Residential	Manufactured	Cooking Range	Existing	92%	75%	23
Residential	Manufactured	Cooking Range	New	92%	75%	23
Residential	Manufactured	Dryer	Existing	92%	25%	35
Residential	Manufactured	Dryer	New	92%	25%	34
Residential	Manufactured	Other	Existing	100%	100%	24
Residential	Manufactured	Other	New	100%	100%	24
Residential	Manufactured	Water Heat	Existing	100%	45%	121
Residential	Manufactured	Water Heat	New	100%	45%	118
Residential	Multi Family	Central Heat Boiler	Existing	0%	0%	591
Residential	Multi Family	Central Heat Boiler	New	0%	0%	467
Residential	Multi Family	Central Heat Furnace	Existing	92%	45%	393
Residential	Multi Family	Central Heat Furnace	New	92%	45%	261
Residential	Multi Family	Cooking Oven	Existing	100%	24%	19
Residential	Multi Family	Cooking Oven	New	100%	24%	19
Residential	Multi Family	Cooking Range	Existing	100%	33%	23
Residential	Multi Family	Cooking Range	New	100%	33%	23
Residential	Multi Family	Dryer	Existing	19%	25%	35
Residential	Multi Family	Dryer	New	19%	25%	34
Residential	Multi Family	Other	Existing	100%	100%	28
Residential	Multi Family	Other	New	100%	100%	28
Residential	Multi Family	Water Heat	Existing	84%	27%	118
Residential	Multi Family	Water Heat	New	84%	73%	115
Residential	Single Family	Central Heat Boiler	Existing	2%	80%	858
Residential	Single Family	Central Heat Boiler	New	2%	80%	743
Residential	Single Family	Central Heat Furnace	Existing	94%	94%	709
Residential	Single Family	Central Heat Furnace	New	94%	94%	563

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Natural Gas for End Use	End Use Unit Energy Consumption (therms)
Residential	Single Family	Cooking Oven	Existing	106%	48%	19
Residential	Single Family	Cooking Oven	New	106%	48%	19
Residential	Single Family	Cooking Range	Existing	102%	53%	23
Residential	Single Family	Cooking Range	New	102%	53%	23
Residential	Single Family	Dryer	Existing	95%	31%	35
Residential	Single Family	Dryer	New	95%	31%	34
Residential	Single Family	Other	Existing	100%	100%	59
Residential	Single Family	Other	New	100%	100%	59
Residential	Single Family	Pool Heat	Existing	11%	10%	251
Residential	Single Family	Pool Heat	New	11%	10%	251
Residential	Single Family	Water Heat	Existing	100%	76%	190
Residential	Single Family	Water Heat	New	100%	73%	186

Table E.3. End Use Saturations, Fuel Shares, and EUIs for Commercial Electric Sector

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Education	Cooking	Existing	100%	33%	0.18
Commercial	Education	Cooking	New	100%	33%	0.18
Commercial	Education	Cooling Chillers	Existing	11%	100%	1.74
Commercial	Education	Cooling Chillers	New	11%	100%	0.99
Commercial	Education	Cooling DX	Existing	33%	100%	1.64
Commercial	Education	Cooling DX	New	33%	100%	1.19
Commercial	Education	HVAC Aux	Existing	98%	100%	1.60
Commercial	Education	HVAC Aux	New	98%	100%	0.47
Commercial	Education	Heat Pump	Existing	0%	100%	NA
Commercial	Education	Heat Pump	New	0%	100%	NA
Commercial	Education	Lighting	Existing	100%	100%	5.01
Commercial	Education	Lighting	New	100%	100%	3.24
Commercial	Education	Other	Existing	100%	100%	0.00
Commercial	Education	Other	New	100%	100%	0.00
Commercial	Education	Plug Load	Existing	100%	100%	3.24
Commercial	Education	Plug Load	New	100%	100%	3.24
Commercial	Education	Refrigeration	Existing	100%	100%	0.50
Commercial	Education	Refrigeration	New	100%	100%	0.50
Commercial	Education	Space Heat	Existing	98%	13%	10.4
Commercial	Education	Space Heat	New	98%	13%	12.6
Commercial	Education	Water Heat	Existing	100%	38%	0.52
Commercial	Education	Water Heat	New	100%	38%	0.50
Commercial	Grocery	Cooking	Existing	100%	0%	NA
Commercial	Grocery	Cooking	New	100%	0%	NA
Commercial	Grocery	Cooling Chillers	Existing	0%	100%	NA
Commercial	Grocery	Cooling Chillers	New	0%	100%	NA
Commercial	Grocery	Cooling DX	Existing	50%	100%	2.68
Commercial	Grocery	Cooling DX	New	50%	100%	1.79
Commercial	Grocery	HVAC Aux	Existing	100%	100%	2.13
Commercial	Grocery	HVAC Aux	New	100%	100%	0.89
Commercial	Grocery	Heat Pump	Existing	0%	100%	NA
Commercial	Grocery	Heat Pump	New	0%	100%	NA
Commercial	Grocery	Lighting	Existing	100%	100%	11.0
Commercial	Grocery	Lighting	New	100%	100%	11.0
Commercial	Grocery	Other	Existing	100%	100%	0.00

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Grocery	Other	New	100%	100%	0.00
Commercial	Grocery	Plug Load	Existing	100%	100%	2.38
Commercial	Grocery	Plug Load	New	100%	100%	2.38
Commercial	Grocery	Refrigeration	Existing	100%	100%	20.2
Commercial	Grocery	Refrigeration	New	100%	100%	20.2
Commercial	Grocery	Space Heat	Existing	100%	0%	NA
Commercial	Grocery	Space Heat	New	100%	0%	NA
Commercial	Grocery	Water Heat	Existing	100%	50%	0.11
Commercial	Grocery	Water Heat	New	100%	50%	0.11
Commercial	Health	Cooking	Existing	100%	0%	NA
Commercial	Health	Cooking	New	100%	0%	NA
Commercial	Health	Cooling Chillers	Existing	0%	100%	NA
Commercial	Health	Cooling Chillers	New	0%	100%	NA
Commercial	Health	Cooling DX	Existing	42%	100%	2.70
Commercial	Health	Cooling DX	New	42%	100%	1.90
Commercial	Health	HVAC Aux	Existing	75%	100%	2.01
Commercial	Health	HVAC Aux	New	75%	100%	0.65
Commercial	Health	Heat Pump	Existing	17%	100%	5.82
Commercial	Health	Heat Pump	New	17%	100%	4.69
Commercial	Health	Lighting	Existing	100%	100%	9.14
Commercial	Health	Lighting	New	100%	100%	5.79
Commercial	Health	Other	Existing	100%	100%	0.01
Commercial	Health	Other	New	100%	100%	0.01
Commercial	Health	Plug Load	Existing	100%	100%	3.86
Commercial	Health	Plug Load	New	100%	100%	3.86
Commercial	Health	Space Heat	Existing	58%	0%	NA
Commercial	Health	Space Heat	New	58%	0%	NA
Commercial	Health	Water Heat	Existing	100%	100%	0.27
Commercial	Health	Water Heat	New	100%	100%	0.26
Commercial	Large Office	Cooling Chillers	Existing	33%	100%	1.96
Commercial	Large Office	Cooling Chillers	New	33%	100%	1.06
Commercial	Large Office	Cooling DX	Existing	16%	100%	2.33
Commercial	Large Office	Cooling DX	New	16%	100%	1.46
Commercial	Large Office	HVAC Aux	Existing	100%	100%	1.22
Commercial	Large Office	HVAC Aux	New	100%	100%	0.17
Commercial	Large Office	Heat Pump	Existing	0%	100%	NA
Commercial	Large Office	Heat Pump	New	0%	100%	NA
Commercial	Large Office	Lighting	Existing	100%	100%	5.82
Commercial	Large Office	Lighting	New	100%	100%	3.64
Commercial	Large Office	Other	Existing	100%	100%	0.00
Commercial	Large Office	Other	New	100%	100%	0.00

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Large Office	Plug Load	Existing	100%	100%	3.11
Commercial	Large Office	Plug Load	New	100%	100%	3.11
Commercial	Large Office	Space Heat	Existing	100%	33%	2.67
Commercial	Large Office	Space Heat	New	100%	33%	7.39
Commercial	Large Office	Water Heat	Existing	100%	80%	0.28
Commercial	Large Office	Water Heat	New	100%	80%	0.27
Commercial	Lodging	Cooking	Existing	100%	33%	0.67
Commercial	Lodging	Cooking	New	100%	33%	0.67
Commercial	Lodging	Cooling DX	Existing	67%	100%	1.79
Commercial	Lodging	Cooling DX	New	67%	100%	1.05
Commercial	Lodging	HVAC Aux	Existing	97%	100%	0.53
Commercial	Lodging	HVAC Aux	New	97%	100%	0.43
Commercial	Lodging	Heat Pump	Existing	0%	100%	NA
Commercial	Lodging	Heat Pump	New	0%	100%	NA
Commercial	Lodging	Lighting	Existing	100%	100%	5.00
Commercial	Lodging	Lighting	New	100%	100%	2.35
Commercial	Lodging	Other	Existing	100%	100%	0.00
Commercial	Lodging	Other	New	100%	100%	0.00
Commercial	Lodging	Plug Load	Existing	100%	100%	2.14
Commercial	Lodging	Plug Load	New	100%	100%	2.14
Commercial	Lodging	Refrigeration	Existing	100%	100%	0.30
Commercial	Lodging	Refrigeration	New	100%	100%	0.30
Commercial	Lodging	Space Heat	Existing	97%	100%	3.78
Commercial	Lodging	Space Heat	New	97%	100%	5.70
Commercial	Lodging	Water Heat	Existing	100%	0%	NA
Commercial	Lodging	Water Heat	New	100%	0%	NA
Commercial	Miscellaneous	Cooking	Existing	100%	13%	0.22
Commercial	Miscellaneous	Cooking	New	100%	13%	0.22
Commercial	Miscellaneous	Cooling Chillers	Existing	0%	100%	NA
Commercial	Miscellaneous	Cooling Chillers	New	0%	100%	NA
Commercial	Miscellaneous	Cooling DX	Existing	45%	100%	2.76
Commercial	Miscellaneous	Cooling DX	New	45%	100%	1.74
Commercial	Miscellaneous	HVAC Aux	Existing	86%	100%	2.20
Commercial	Miscellaneous	HVAC Aux	New	86%	100%	1.04
Commercial	Miscellaneous	Heat Pump	Existing	0%	100%	NA
Commercial	Miscellaneous	Heat Pump	New	0%	100%	NA
Commercial	Miscellaneous	Lighting	Existing	100%	100%	8.46
Commercial	Miscellaneous	Lighting	New	100%	100%	6.50
Commercial	Miscellaneous	Other	Existing	100%	100%	0.00
Commercial	Miscellaneous	Other	New	100%	100%	0.00
Commercial	Miscellaneous	Plug Load	Existing	100%	100%	2.49

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Miscellaneous	Plug Load	New	100%	100%	2.49
Commercial	Miscellaneous	Refrigeration	Existing	100%	100%	0.20
Commercial	Miscellaneous	Refrigeration	New	100%	100%	0.20
Commercial	Miscellaneous	Space Heat	Existing	86%	38%	9.15
Commercial	Miscellaneous	Space Heat	New	86%	38%	8.65
Commercial	Miscellaneous	Water Heat	Existing	100%	63%	0.69
Commercial	Miscellaneous	Water Heat	New	100%	63%	0.66
Commercial	Multifamily Common	Lighting	Existing	100%	100%	4.95
Commercial	Multifamily Common	Lighting	New	100%	100%	2.33
Commercial	Restaurant	Cooking	Existing	100%	25%	7.01
Commercial	Restaurant	Cooking	New	100%	25%	7.01
Commercial	Restaurant	Cooling DX	Existing	92%	100%	5.89
Commercial	Restaurant	Cooling DX	New	92%	100%	2.96
Commercial	Restaurant	HVAC Aux	Existing	92%	100%	4.87
Commercial	Restaurant	HVAC Aux	New	92%	100%	3.46
Commercial	Restaurant	Heat Pump	Existing	0%	100%	NA
Commercial	Restaurant	Heat Pump	New	0%	100%	NA
Commercial	Restaurant	Lighting	Existing	100%	100%	7.68
Commercial	Restaurant	Lighting	New	100%	100%	6.54
Commercial	Restaurant	Other	Existing	100%	100%	0.00
Commercial	Restaurant	Other	New	100%	100%	0.00
Commercial	Restaurant	Plug Load	Existing	100%	100%	2.06
Commercial	Restaurant	Plug Load	New	100%	100%	2.06
Commercial	Restaurant	Refrigeration	Existing	100%	100%	5.35
Commercial	Restaurant	Refrigeration	New	100%	100%	5.35
Commercial	Restaurant	Space Heat	Existing	92%	33%	8.74
Commercial	Restaurant	Space Heat	New	92%	33%	5.64
Commercial	Restaurant	Water Heat	Existing	100%	50%	1.19
Commercial	Restaurant	Water Heat	New	100%	50%	1.13
Commercial	Retail	Cooling Chillers	Existing	0%	100%	NA
Commercial	Retail	Cooling Chillers	New	0%	100%	NA
Commercial	Retail	Cooling DX	Existing	40%	100%	2.16
Commercial	Retail	Cooling DX	New	40%	100%	1.64
Commercial	Retail	HVAC Aux	Existing	75%	100%	1.78
Commercial	Retail	HVAC Aux	New	75%	100%	0.90
Commercial	Retail	Heat Pump	Existing	0%	100%	NA
Commercial	Retail	Heat Pump	New	0%	100%	NA
Commercial	Retail	Lighting	Existing	100%	100%	9.23
Commercial	Retail	Lighting	New	100%	100%	5.80
Commercial	Retail	Other	Existing	100%	100%	0.02
Commercial	Retail	Other	New	100%	100%	0.02

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Retail	Plug Load	Existing	100%	100%	2.18
Commercial	Retail	Plug Load	New	100%	100%	2.18
Commercial	Retail	Space Heat	Existing	75%	6%	14.3
Commercial	Retail	Space Heat	New	75%	6%	16.5
Commercial	Retail	Water Heat	Existing	100%	67%	0.11
Commercial	Retail	Water Heat	New	100%	67%	0.11
Commercial	Small Office	Cooling DX	Existing	70%	100%	1.98
Commercial	Small Office	Cooling DX	New	70%	100%	1.47
Commercial	Small Office	HVAC Aux	Existing	81%	100%	1.73
Commercial	Small Office	HVAC Aux	New	81%	100%	0.32
Commercial	Small Office	Heat Pump	Existing	0%	100%	NA
Commercial	Small Office	Heat Pump	New	0%	100%	NA
Commercial	Small Office	Lighting	Existing	100%	100%	6.05
Commercial	Small Office	Lighting	New	100%	100%	3.46
Commercial	Small Office	Other	Existing	100%	100%	0.00
Commercial	Small Office	Other	New	100%	100%	0.00
Commercial	Small Office	Plug Load	Existing	100%	100%	2.23
Commercial	Small Office	Plug Load	New	100%	100%	2.23
Commercial	Small Office	Space Heat	Existing	81%	33%	8.25
Commercial	Small Office	Space Heat	New	81%	33%	12.3
Commercial	Small Office	Water Heat	Existing	100%	33%	0.30
Commercial	Small Office	Water Heat	New	100%	33%	0.28
Commercial	Street Lighting	Street Lighting	Existing	100%	100%	12E4
Commercial	Street Lighting	Street Lighting	New	100%	100%	12E4
Commercial	Warehouse	Cooling Chillers	Existing	0%	100%	NA
Commercial	Warehouse	Cooling Chillers	New	0%	100%	NA
Commercial	Warehouse	Cooling DX	Existing	4%	100%	0.62
Commercial	Warehouse	Cooling DX	New	4%	100%	0.39
Commercial	Warehouse	HVAC Aux	Existing	46%	100%	1.93
Commercial	Warehouse	HVAC Aux	New	46%	100%	1.22
Commercial	Warehouse	Heat Pump	Existing	20%	100%	5.09
Commercial	Warehouse	Heat Pump	New	20%	100%	5.05
Commercial	Warehouse	Lighting	Existing	100%	100%	3.69
Commercial	Warehouse	Lighting	New	100%	100%	2.48
Commercial	Warehouse	Other	Existing	100%	100%	0.00
Commercial	Warehouse	Other	New	100%	100%	0.00
Commercial	Warehouse	Plug Load	Existing	100%	100%	0.49
Commercial	Warehouse	Plug Load	New	100%	100%	0.49
Commercial	Warehouse	Refrigeration	Existing	100%	100%	0.49
Commercial	Warehouse	Refrigeration	New	100%	100%	0.49
Commercial	Warehouse	Space Heat	Existing	26%	25%	7.28

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Electricity for End Use	End Use Energy Unit Intensity (kWh/sqft)
Commercial	Warehouse	Space Heat	New	26%	25%	7.16
Commercial	Warehouse	Water Heat	Existing	100%	33%	0.04
Commercial	Warehouse	Water Heat	New	100%	33%	0.04

Table E.4. End Use Saturations, Fuel Shares, and EUIs for Commercial Gas Sector

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Natural Gas for End Use	End Use Energy Unit Intensity (therms/sqft)
Commercial	Education	Cooking	Existing	100%	2%	0.11
Commercial	Education	Cooking	New	100%	2%	NA
Commercial	Education	Space Heat Boiler	Existing	62%	100%	0.47
Commercial	Education	Space Heat Boiler	New	62%	100%	NA
Commercial	Education	Space Heat Furnace	Existing	37%	100%	0.52
Commercial	Education	Space Heat Furnace	New	37%	100%	NA
Commercial	Education	Water Heat	Existing	100%	80%	0.05
Commercial	Education	Water Heat	New	100%	80%	NA
Commercial	Grocery	Cooking	Existing	100%	100%	0.25
Commercial	Grocery	Cooking	New	100%	100%	NA
Commercial	Grocery	Space Heat Boiler	Existing	0%	100%	NA
Commercial	Grocery	Space Heat Boiler	New	0%	100%	NA
Commercial	Grocery	Space Heat Furnace	Existing	100%	100%	0.48
Commercial	Grocery	Space Heat Furnace	New	100%	100%	NA
Commercial	Grocery	Water Heat	Existing	100%	50%	0.03
Commercial	Grocery	Water Heat	New	100%	50%	NA
Commercial	Health	Cooking	Existing	100%	100%	0.00
Commercial	Health	Cooking	New	100%	100%	NA
Commercial	Health	Space Heat Boiler	Existing	20%	100%	0.45
Commercial	Health	Space Heat Boiler	New	20%	100%	NA
Commercial	Health	Space Heat Furnace	Existing	70%	100%	0.22
Commercial	Health	Space Heat Furnace	New	70%	100%	NA
Commercial	Health	Water Heat	Existing	100%	57%	0.26
Commercial	Health	Water Heat	New	100%	57%	NA
Commercial	Large Office	Space Heat Boiler	Existing	80%	75%	0.57
Commercial	Large Office	Space Heat Boiler	New	80%	75%	NA
Commercial	Large Office	Space Heat Furnace	Existing	20%	100%	0.34
Commercial	Large Office	Space Heat Furnace	New	20%	100%	NA
Commercial	Large Office	Water Heat	Existing	100%	20%	0.01
Commercial	Large Office	Water Heat	New	100%	20%	NA
Commercial	Lodging	Cooking	Existing	100%	100%	0.14
Commercial	Lodging	Cooking	New	100%	100%	NA
Commercial	Lodging	Pool Heat	Existing	100%	44%	0.31
Commercial	Lodging	Pool Heat	New	100%	44%	NA
Commercial	Lodging	Space Heat Boiler	Existing	0%	100%	NA

Sector	Building Type	End Use	Vintage	Percent of Sites with End Use	Percent of Sites using Natural Gas for End Use	End Use Energy Unit Intensity (therms/sqft)
Commercial	Lodging	Space Heat Boiler	New	0%	100%	NA
Commercial	Lodging	Space Heat Furnace	Existing	97%	100%	0.23
Commercial	Lodging	Space Heat Furnace	New	97%	100%	NA
Commercial	Lodging	Water Heat	Existing	100%	100%	0.28
Commercial	Lodging	Water Heat	New	100%	100%	NA
Commercial	Miscellaneous	Cooking	Existing	100%	2%	0.11
Commercial	Miscellaneous	Cooking	New	100%	2%	NA
Commercial	Miscellaneous	Space Heat Boiler	Existing	25%	100%	0.50
Commercial	Miscellaneous	Space Heat Boiler	New	25%	100%	NA
Commercial	Miscellaneous	Space Heat Furnace	Existing	61%	100%	0.49
Commercial	Miscellaneous	Space Heat Furnace	New	61%	100%	NA
Commercial	Miscellaneous	Water Heat	Existing	100%	80%	0.02
Commercial	Miscellaneous	Water Heat	New	100%	80%	NA
Commercial	Restaurant	Cooking	Existing	100%	84%	1.66
Commercial	Restaurant	Cooking	New	100%	84%	NA
Commercial	Restaurant	Space Heat Furnace	Existing	90%	100%	0.44
Commercial	Restaurant	Space Heat Furnace	New	90%	100%	NA
Commercial	Restaurant	Water Heat	Existing	100%	67%	0.35
Commercial	Restaurant	Water Heat	New	100%	67%	NA
Commercial	Retail	Space Heat Boiler	Existing	15%	100%	0.34
Commercial	Retail	Space Heat Boiler	New	15%	100%	NA
Commercial	Retail	Space Heat Furnace	Existing	62%	100%	0.68
Commercial	Retail	Space Heat Furnace	New	62%	100%	NA
Commercial	Retail	Water Heat	Existing	100%	30%	0.02
Commercial	Retail	Water Heat	New	100%	30%	NA
Commercial	Small Office	Space Heat Furnace	Existing	81%	83%	0.43
Commercial	Small Office	Space Heat Furnace	New	81%	83%	NA
Commercial	Small Office	Water Heat	Existing	100%	83%	0.02
Commercial	Small Office	Water Heat	New	100%	83%	NA
Commercial	Warehouse	Space Heat Boiler	Existing	8%	100%	0.29
Commercial	Warehouse	Space Heat Boiler	New	8%	100%	NA
Commercial	Warehouse	Space Heat Furnace	Existing	25%	100%	0.37
Commercial	Warehouse	Space Heat Furnace	New	25%	100%	NA
Commercial	Warehouse	Water Heat	Existing	100%	100%	0.01
Commercial	Warehouse	Water Heat	New	100%	100%	NA

Table E.5. End Use Percents for Industrial Electric Sector

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Fabricated Metal Products	Fans	6%
Industrial	Fabricated Metal Products	HVAC	10%
Industrial	Fabricated Metal Products	Indirect Boiler	0%
Industrial	Fabricated Metal Products	Lighting	9%
Industrial	Fabricated Metal Products	Motors Other	17%
Industrial	Fabricated Metal Products	Other	9%
Industrial	Fabricated Metal Products	Process AirComp	7%
Industrial	Fabricated Metal Products	Process Cool	3%
Industrial	Fabricated Metal Products	Process Electro Chemical	1%
Industrial	Fabricated Metal Products	Process Heat	23%
Industrial	Fabricated Metal Products	Process Other	0%
Industrial	Fabricated Metal Products	Process Refrig	3%
Industrial	Fabricated Metal Products	Pumps	11%
Industrial	Food Mfg	Fans	4%
Industrial	Food Mfg	HVAC	7%
Industrial	Food Mfg	Indirect Boiler	0%
Industrial	Food Mfg	Lighting	7%
Industrial	Food Mfg	Motors Other	20%
Industrial	Food Mfg	Other	8%
Industrial	Food Mfg	Process AirComp	4%
Industrial	Food Mfg	Process Cool	25%
Industrial	Food Mfg	Process Electro Chemical	0%
Industrial	Food Mfg	Process Heat	3%
Industrial	Food Mfg	Process Other	0%
Industrial	Food Mfg	Process Refrig	15%
Industrial	Food Mfg	Pumps	8%
Industrial	Industrial Machinery	Fans	7%
Industrial	Industrial Machinery	HVAC	18%
Industrial	Industrial Machinery	Indirect Boiler	0%
Industrial	Industrial Machinery	Lighting	14%
Industrial	Industrial Machinery	Motors Other	19%
Industrial	Industrial Machinery	Other	7%
Industrial	Industrial Machinery	Process AirComp	8%
Industrial	Industrial Machinery	Process Cool	3%
Industrial	Industrial Machinery	Process Electro Chemical	1%
Industrial	Industrial Machinery	Process Heat	7%

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Industrial Machinery	Process Other	1%
Industrial	Industrial Machinery	Process Refrig	3%
Industrial	Industrial Machinery	Pumps	12%
Industrial	Mining	Fans	0%
Industrial	Mining	HVAC	0%
Industrial	Mining	Indirect Boiler	0%
Industrial	Mining	Lighting	0%
Industrial	Mining	Motors Other	77%
Industrial	Mining	Other	22%
Industrial	Mining	Process AirComp	0%
Industrial	Mining	Process Cool	0%
Industrial	Mining	Process Electro Chemical	0%
Industrial	Mining	Process Heat	0%
Industrial	Mining	Process Other	0%
Industrial	Mining	Process Refrig	0%
Industrial	Mining	Pumps	1%
Industrial	Miscellaneous Mfg	Fans	6%
Industrial	Miscellaneous Mfg	HVAC	22%
Industrial	Miscellaneous Mfg	Indirect Boiler	0%
Industrial	Miscellaneous Mfg	Lighting	16%
Industrial	Miscellaneous Mfg	Motors Other	25%
Industrial	Miscellaneous Mfg	Other	5%
Industrial	Miscellaneous Mfg	Process AirComp	6%
Industrial	Miscellaneous Mfg	Process Cool	7%
Industrial	Miscellaneous Mfg	Process Electro Chemical	0%
Industrial	Miscellaneous Mfg	Process Heat	10%
Industrial	Miscellaneous Mfg	Process Other	0%
Industrial	Miscellaneous Mfg	Process Refrig	0%
Industrial	Miscellaneous Mfg	Pumps	3%
Industrial	Nonmetallic Mineral Products	Fans	8%
Industrial	Nonmetallic Mineral Products	HVAC	6%
Industrial	Nonmetallic Mineral Products	Indirect Boiler	0%
Industrial	Nonmetallic Mineral Products	Lighting	5%
Industrial	Nonmetallic Mineral Products	Motors Other	23%
Industrial	Nonmetallic Mineral Products	Other	5%
Industrial	Nonmetallic Mineral Products	Process AirComp	9%
Industrial	Nonmetallic Mineral Products	Process Cool	3%
Industrial	Nonmetallic Mineral Products	Process Electro Chemical	0%
Industrial	Nonmetallic Mineral Products	Process Heat	20%
Industrial	Nonmetallic Mineral Products	Process Other	1%
Industrial	Nonmetallic Mineral Products	Process Refrig	4%
Industrial	Nonmetallic Mineral Products	Pumps	15%

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Paper Mfg	Fans	16%
Industrial	Paper Mfg	HVAC	4%
Industrial	Paper Mfg	Indirect Boiler	1%
Industrial	Paper Mfg	Lighting	4%
Industrial	Paper Mfg	Motors Other	32%
Industrial	Paper Mfg	Other	4%
Industrial	Paper Mfg	Process AirComp	4%
Industrial	Paper Mfg	Process Cool	1%
Industrial	Paper Mfg	Process Electro Chemical	2%
Industrial	Paper Mfg	Process Heat	2%
Industrial	Paper Mfg	Process Other	0%
Industrial	Paper Mfg	Process Refrig	4%
Industrial	Paper Mfg	Pumps	25%
Industrial	Petroleum Coal Products	Fans	11%
Industrial	Petroleum Coal Products	HVAC	3%
Industrial	Petroleum Coal Products	Indirect Boiler	0%
Industrial	Petroleum Coal Products	Lighting	2%
Industrial	Petroleum Coal Products	Motors Other	31%
Industrial	Petroleum Coal Products	Other	1%
Industrial	Petroleum Coal Products	Process AirComp	13%
Industrial	Petroleum Coal Products	Process Cool	6%
Industrial	Petroleum Coal Products	Process Electro Chemical	0%
Industrial	Petroleum Coal Products	Process Heat	6%
Industrial	Petroleum Coal Products	Process Other	0%
Industrial	Petroleum Coal Products	Process Refrig	5%
Industrial	Petroleum Coal Products	Pumps	20%
Industrial	Plastics Rubber Products	Fans	7%
Industrial	Plastics Rubber Products	HVAC	10%
Industrial	Plastics Rubber Products	Indirect Boiler	0%
Industrial	Plastics Rubber Products	Lighting	8%
Industrial	Plastics Rubber Products	Motors Other	21%
Industrial	Plastics Rubber Products	Other	3%
Industrial	Plastics Rubber Products	Process AirComp	9%
Industrial	Plastics Rubber Products	Process Cool	8%
Industrial	Plastics Rubber Products	Process Electro Chemical	0%
Industrial	Plastics Rubber Products	Process Heat	15%
Industrial	Plastics Rubber Products	Process Other	1%
Industrial	Plastics Rubber Products	Process Refrig	4%
Industrial	Plastics Rubber Products	Pumps	13%
Industrial	Primary Metal Mfg	Fans	5%
Industrial	Primary Metal Mfg	HVAC	4%
Industrial	Primary Metal Mfg	Indirect Boiler	0%

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Primary Metal Mfg	Lighting	3%
Industrial	Primary Metal Mfg	Motors Other	20%
Industrial	Primary Metal Mfg	Other	1%
Industrial	Primary Metal Mfg	Process AirComp	5%
Industrial	Primary Metal Mfg	Process Cool	1%
Industrial	Primary Metal Mfg	Process Electro Chemical	31%
Industrial	Primary Metal Mfg	Process Heat	28%
Industrial	Primary Metal Mfg	Process Other	0%
Industrial	Primary Metal Mfg	Process Refrig	0%
Industrial	Primary Metal Mfg	Pumps	3%
Industrial	Transportation Equipment Mfg	Fans	5%
Industrial	Transportation Equipment Mfg	HVAC	19%
Industrial	Transportation Equipment Mfg	Indirect Boiler	0%
Industrial	Transportation Equipment Mfg	Lighting	15%
Industrial	Transportation Equipment Mfg	Motors Other	12%
Industrial	Transportation Equipment Mfg	Other	4%
Industrial	Transportation Equipment Mfg	Process AirComp	12%
Industrial	Transportation Equipment Mfg	Process Cool	5%
Industrial	Transportation Equipment Mfg	Process Electro Chemical	1%
Industrial	Transportation Equipment Mfg	Process Heat	10%
Industrial	Transportation Equipment Mfg	Process Other	1%
Industrial	Transportation Equipment Mfg	Process Refrig	3%
Industrial	Transportation Equipment Mfg	Pumps	11%

Table E.6. End Use Percents for Industrial Gas Sector

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Fabricated Metal Products	HVAC	25%
Industrial	Fabricated Metal Products	Indirect Boiler	0%
Industrial	Fabricated Metal Products	Other	2%
Industrial	Fabricated Metal Products	Process Heat	74%
Industrial	Fabricated Metal Products	Process Other	0%
Industrial	Food Mfg	HVAC	7%
Industrial	Food Mfg	Indirect Boiler	52%
Industrial	Food Mfg	Other	3%
Industrial	Food Mfg	Process Heat	38%
Industrial	Food Mfg	Process Other	1%
Industrial	Industrial Machinery	HVAC	37%
Industrial	Industrial Machinery	Indirect Boiler	18%
Industrial	Industrial Machinery	Other	9%
Industrial	Industrial Machinery	Process Heat	37%
Industrial	Industrial Machinery	Process Other	0%
Industrial	Miscellaneous Mfg	HVAC	33%
Industrial	Miscellaneous Mfg	Indirect Boiler	30%
Industrial	Miscellaneous Mfg	Other	10%
Industrial	Miscellaneous Mfg	Process Heat	27%
Industrial	Miscellaneous Mfg	Process Other	0%
Industrial	Nonmetallic Mineral Products	HVAC	5%
Industrial	Nonmetallic Mineral Products	Indirect Boiler	3%
Industrial	Nonmetallic Mineral Products	Other	6%
Industrial	Nonmetallic Mineral Products	Process Heat	86%
Industrial	Nonmetallic Mineral Products	Process Other	0%
Industrial	Paper Mfg	HVAC	4%
Industrial	Paper Mfg	Indirect Boiler	61%
Industrial	Paper Mfg	Other	9%
Industrial	Paper Mfg	Process Heat	26%
Industrial	Paper Mfg	Process Other	0%
Industrial	Petroleum Coal Products	HVAC	1%

Sector	Building Type	End Use	End Use Sales Percent
Industrial	Petroleum Coal Products	Indirect Boiler	33%
Industrial	Petroleum Coal Products	Other	6%
Industrial	Petroleum Coal Products	Process Heat	60%
Industrial	Petroleum Coal Products	Process Other	0%
Industrial	Primary Metal Mfg	HVAC	7%
Industrial	Primary Metal Mfg	Indirect Boiler	11%
Industrial	Primary Metal Mfg	Other	2%
Industrial	Primary Metal Mfg	Process Heat	80%
Industrial	Primary Metal Mfg	Process Other	0%

Appendix E.2: Detailed Technical and Economic Potential

This appendix contains technical and economic potential by sector, segment, and end use. For each sector and potential, results are first presented by segment and end use, and then by end use for each segment in that sector.

Residential Sector Electric Technical Potential

Figure E.1. Residential Electric Technical Potential in 2016 by Segment

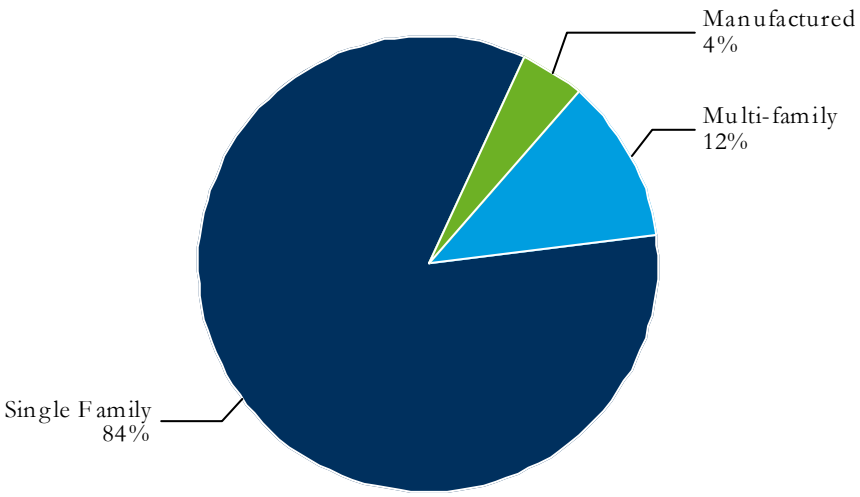
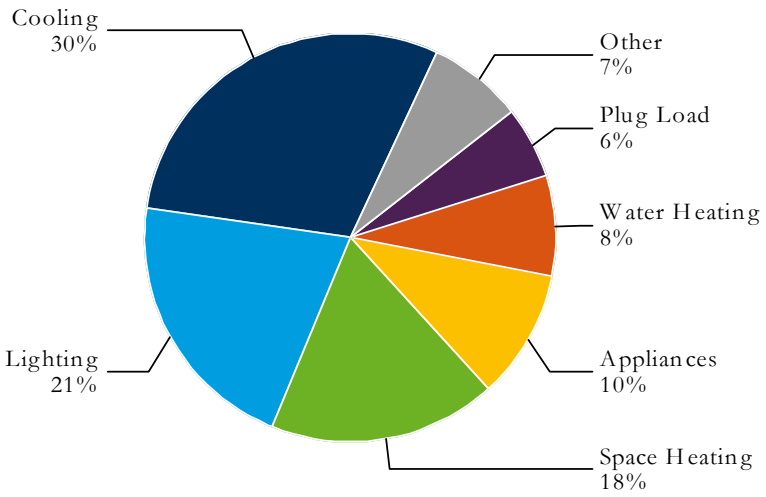
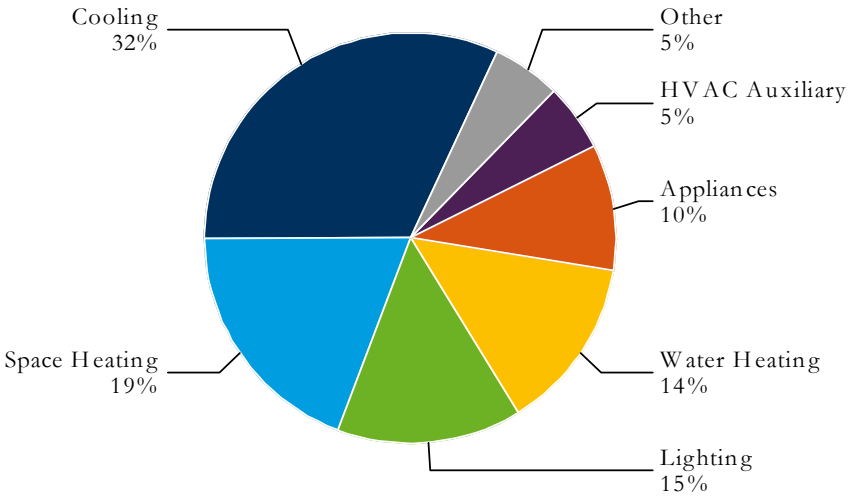


Figure E.2. Residential Electric Technical Potential in 2016 by End Use



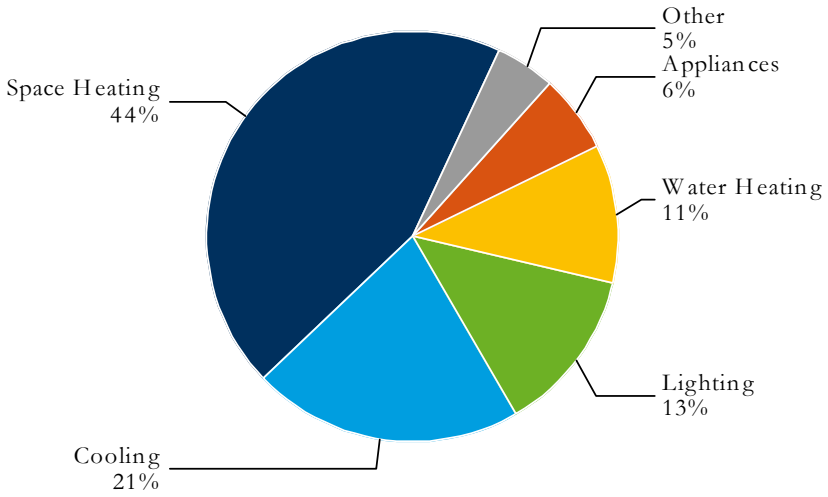
Note: "Other" includes:
HVAC Auxiliary: 4%, Heat Pump: 3%, Pool Pumps: <1%

Figure E.3. Residential Electric Technical Potential in 2016 by End Use, Manufactured



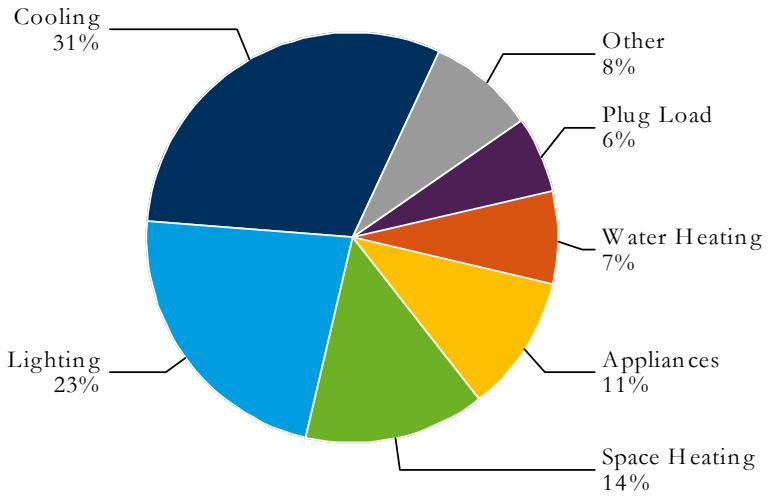
Note: "Other" includes:
Plug Load: 5%, Heat Pump: <1%

Figure E.4. Residential Electric Technical Potential in 2016 by End Use, Multi-family



Note: "Other" includes:
Plug Load: 3%, HVAC Auxiliary: <1%, Heat Pump: <1%

Figure E.5. Residential Electric Technical Potential in 2016 by End Use, Single Family



Note: "Other" includes:
HVAC Auxiliary: 5%, Heat Pump: 3%, Pool Pumps: <1%

Residential Sector Electric Economic Potential

Figure E.6. Residential Electric Economic Potential in 2016 by Segment

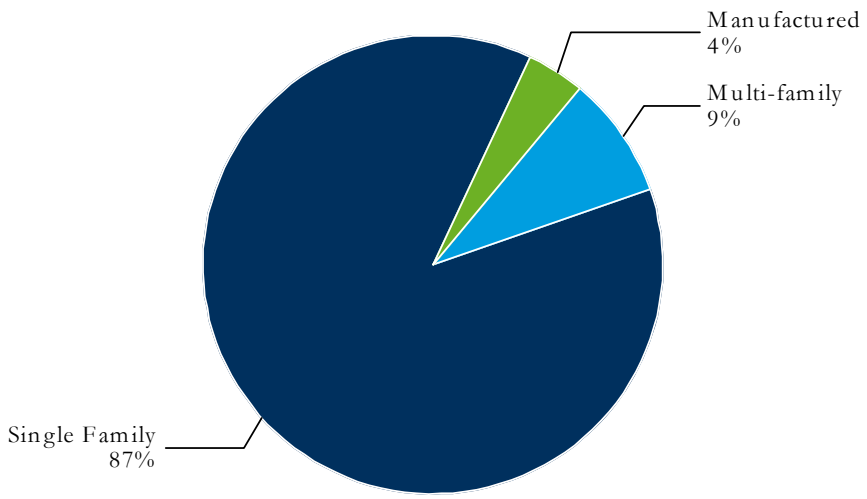
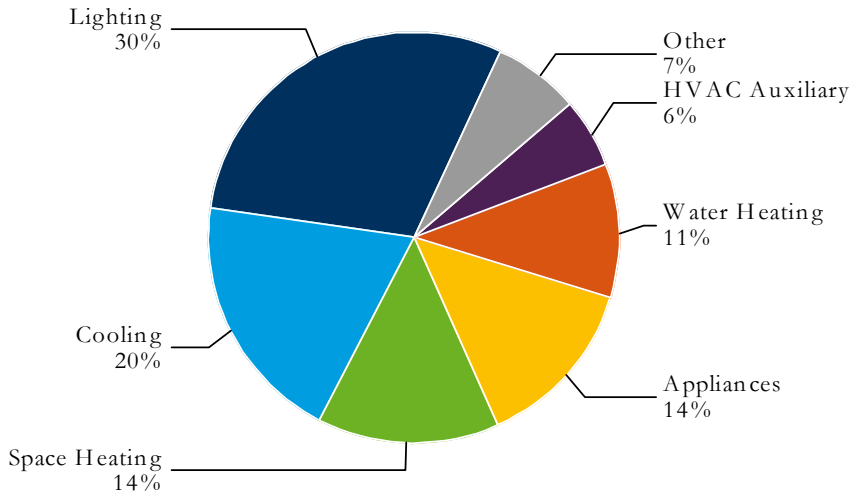
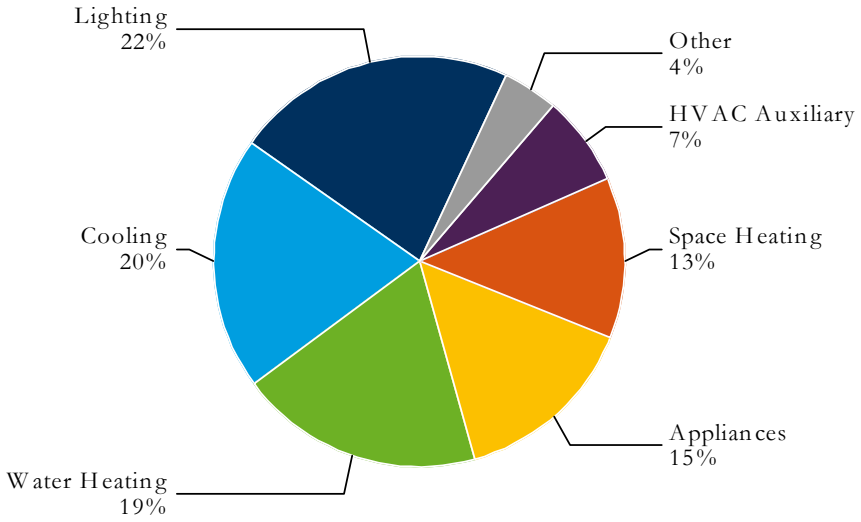


Figure E.7. Residential Electric Economic Potential in 2016 by End Use



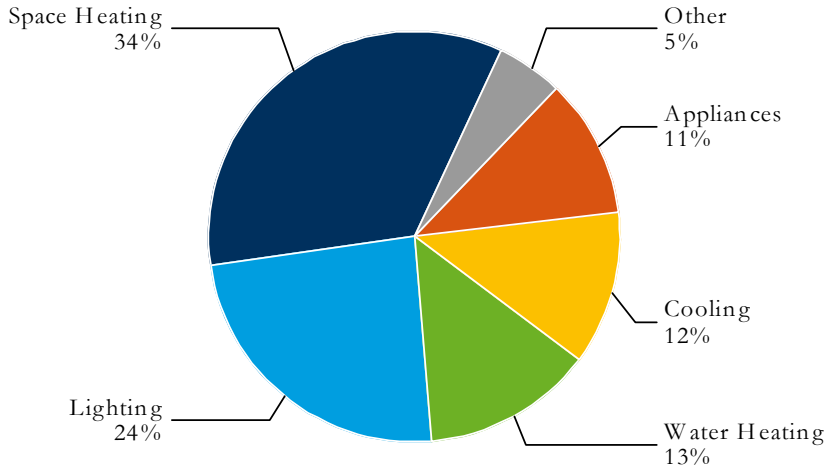
Note: "Other" includes:
Plug Load: 4%, Heat Pump: 3%, Pool Pumps: <1%

Figure E.8. Residential Electric Economic Potential in 2016 by End Use, Manufactured



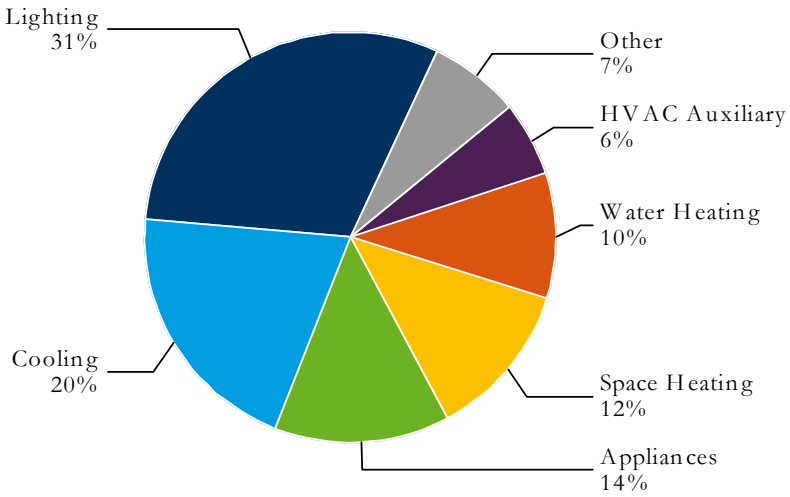
Note: "Other" includes:
Plug Load: 4%, Heat Pump: <1%

Figure E.9. Residential Electric Economic Potential in 2016 by End Use, Multi-family



Note: "Other" includes:
Plug Load: 4%, HVAC Auxiliary: 1%, Heat Pump: <1%

Figure E.10. Residential Electric Economic Potential in 2016 by End Use, Single Family



Note: "Other" includes:
Plug Load: 4%, Heat Pump: 3%, Pool Pumps: <1%

Residential Sector Gas Technical Potential

Figure E.11. Residential Gas Technical Potential in 2016 by Segment

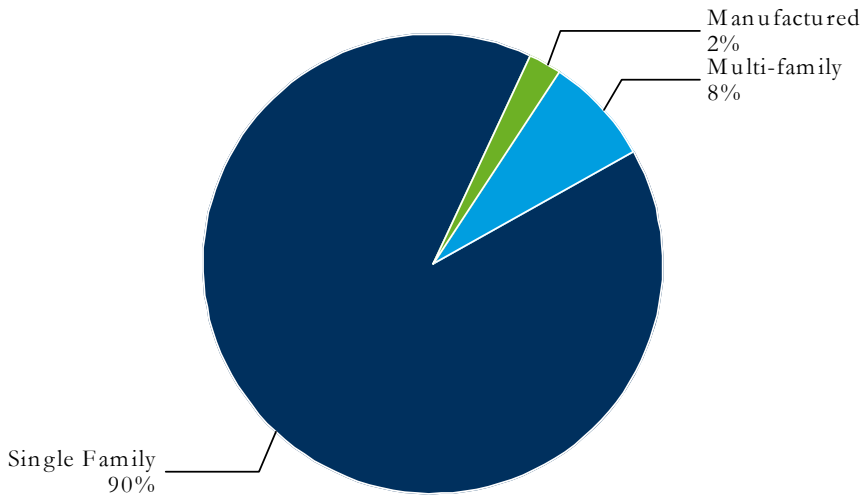
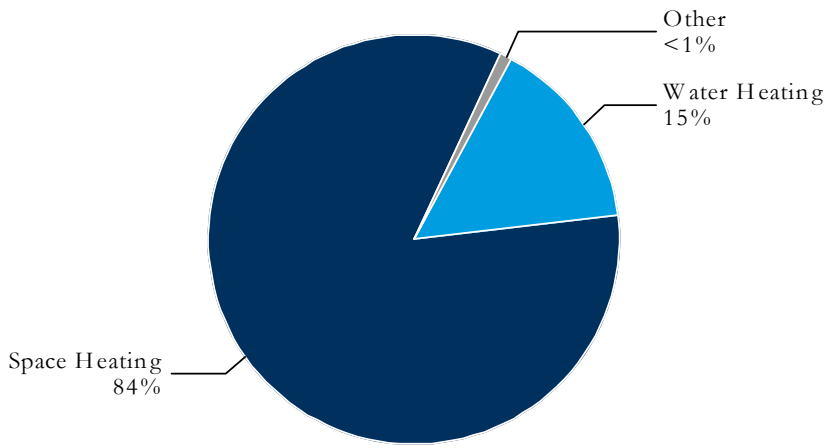
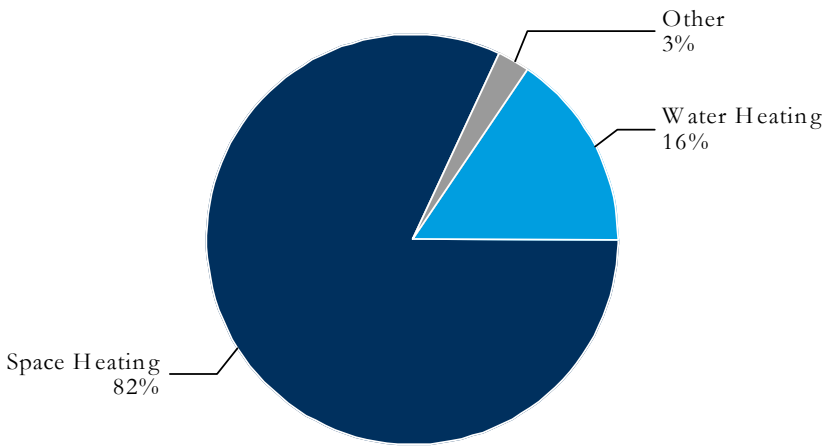


Figure E.12. Residential Gas Technical Potential in 2016 by End Use



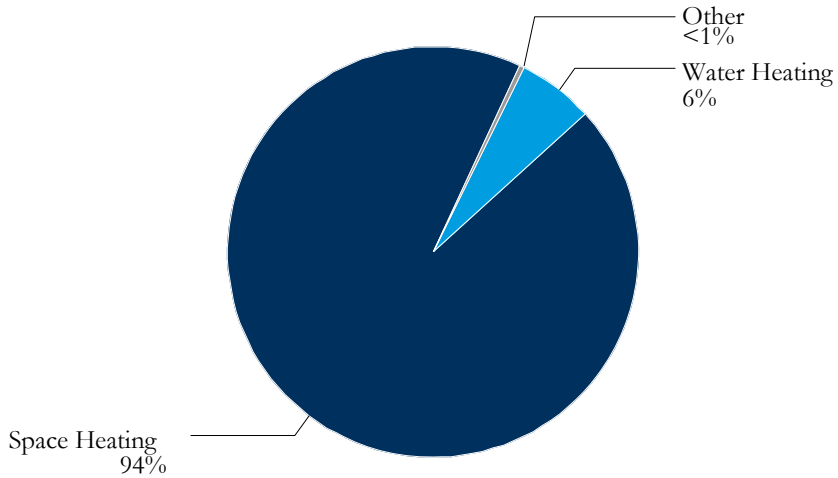
Note: "Other" includes:
Dryer: <1%, Cooking: <1%, Pool Heating: <1%

Figure E.13. Residential Gas Technical Potential in 2016 by End Use, Manufactured



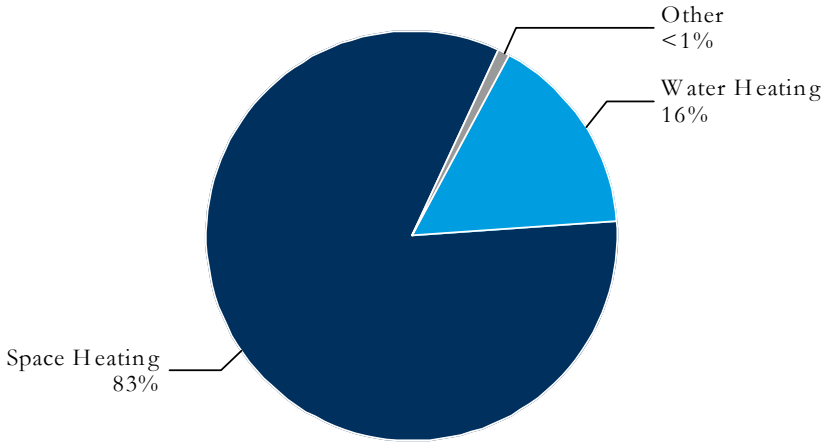
Note: "Other" includes:
Dryer: 1%, Cooking: 1%

Figure E.14. Residential Gas Technical Potential in 2016 by End Use, Multi-family



Note: "Other" includes:
Cooking: <1%, Dryer: <1%

Figure E.15. Residential Gas Technical Potential in 2016 by End Use, Single Family



Note: "Other" includes:
Dryer: <1%, Cooking: <1%, Pool Heating: <1%

Residential Sector Gas Economic Potential

Figure E.16. Residential Gas Economic Potential in 2016 by Segment

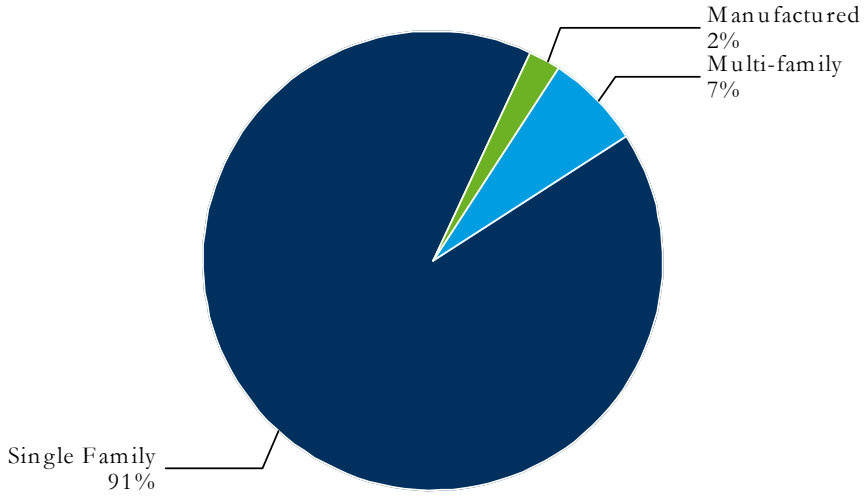


Figure E.17. Residential Gas Economic Potential in 2016 by End Use

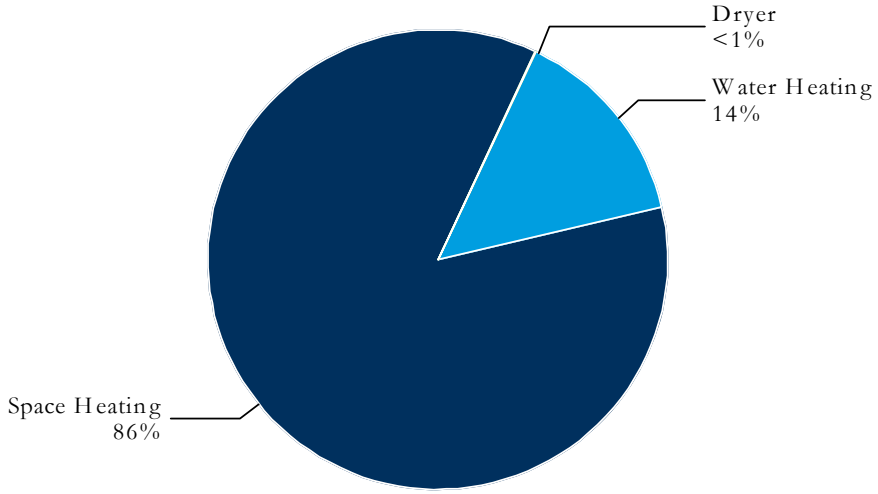


Figure E.18. Residential Gas Economic Potential in 2016 by End Use, Manufactured

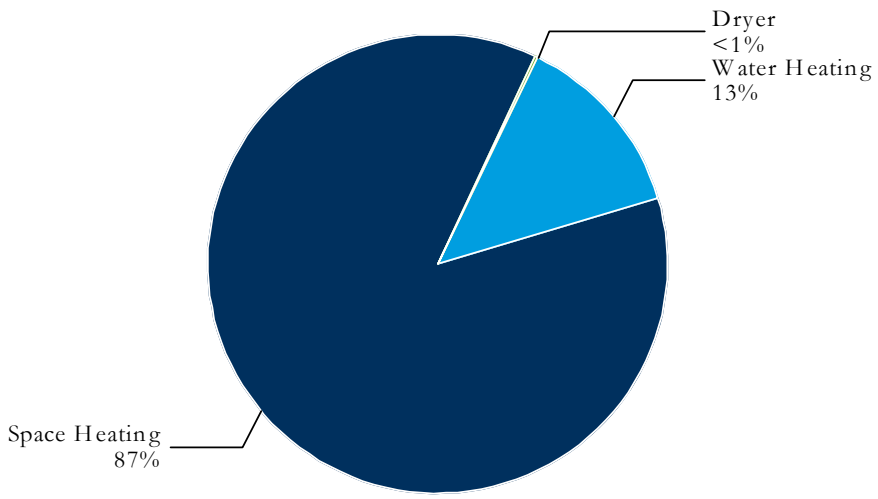


Figure E.19. Residential Gas Economic Potential in 2016 by End Use, Multi-family

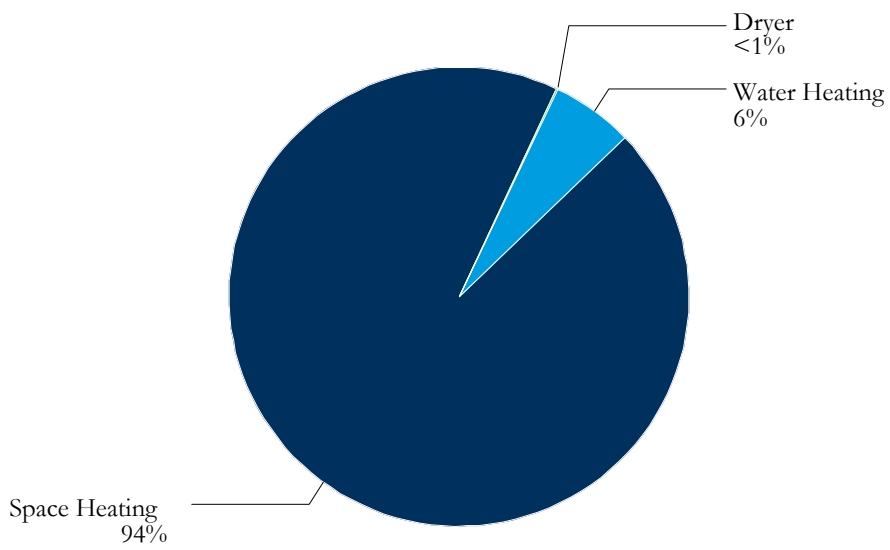
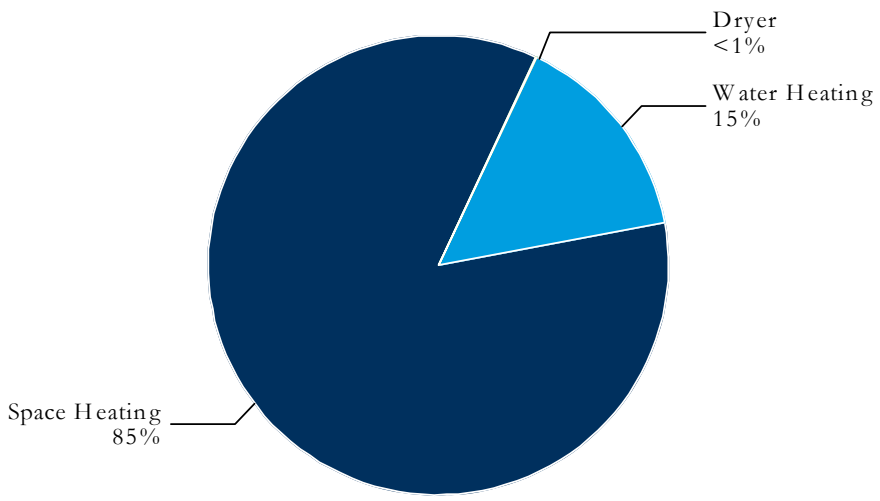


Figure E.20. Residential Gas Economic Potential in 2016 by End Use, Single Family



Commercial Sector Electric Technical Potential

Figure E.21. Commercial Electric Technical Potential in 2016 by Segment

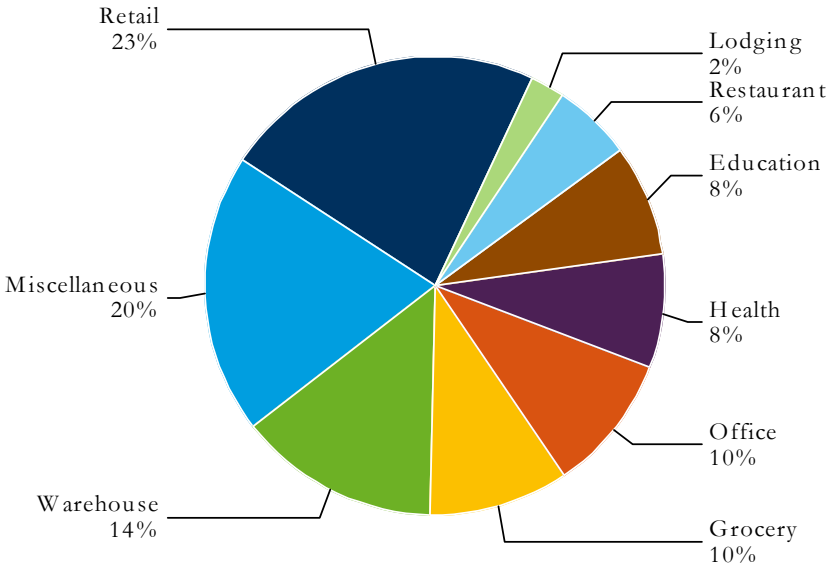
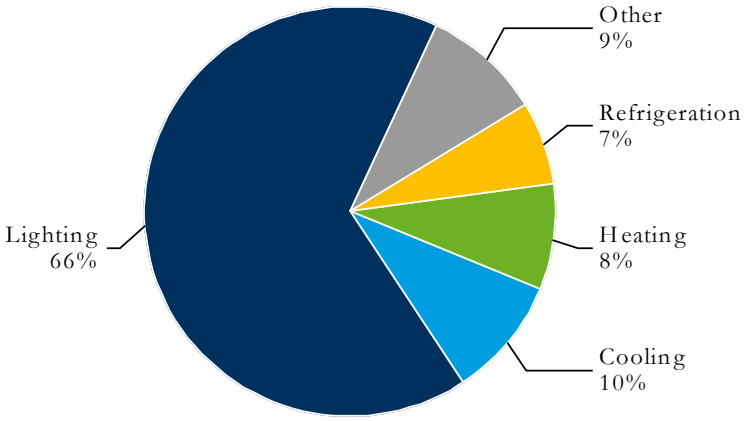
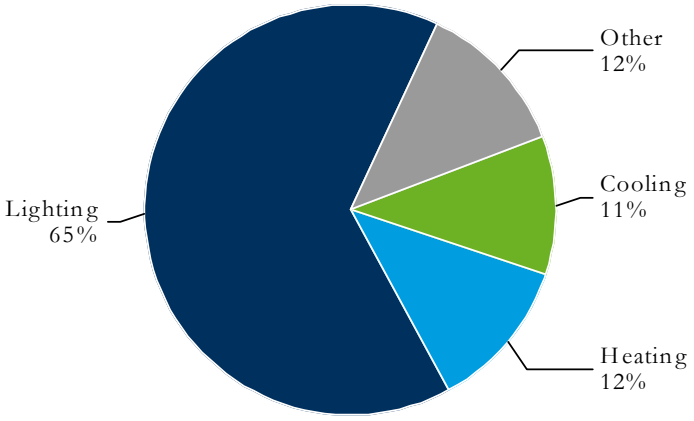


Figure E.22. Commercial Electric Technical Potential in 2016 by End Use



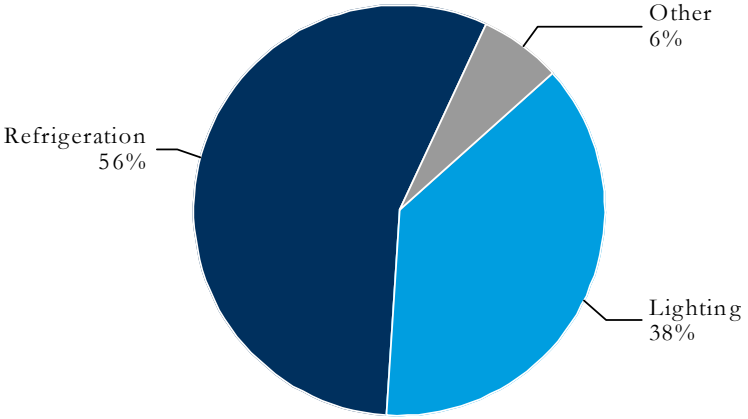
Note: "Other" includes:
Plug Loads: 3%, HVAC Auxiliary: 3%, Heat Pump: 2%, Water Heating: <1%, Cooking: <1%

Figure E.23. Commercial Electric Technical Potential in 2016 by End Use, Education



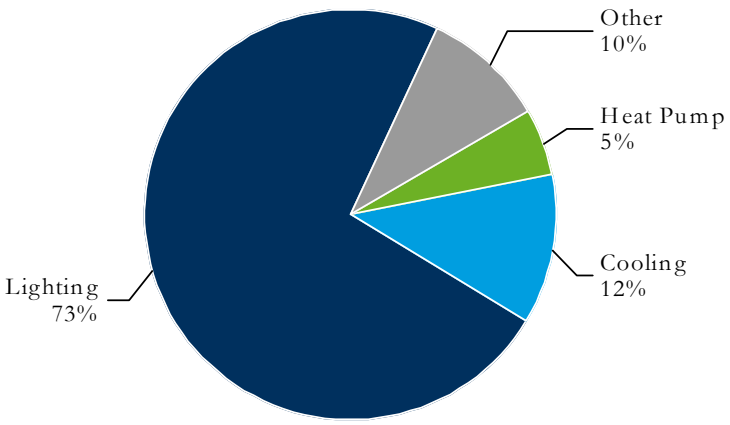
Note: "Other" includes:
HVAC Auxiliary: 5%, Plug Loads: 4%, Refrigeration: 2%, Water Heating: 1%, Cooking: <1%

Figure E.24. Commercial Electric Technical Potential in 2016 by End Use, Grocery



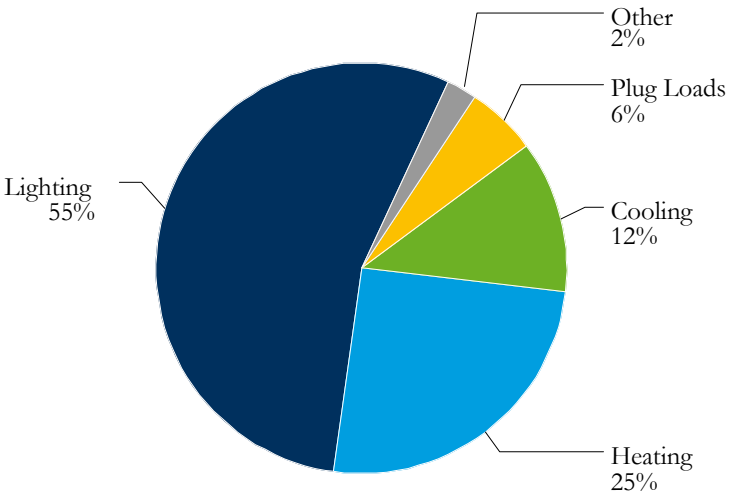
Note: "Other" includes:
Cooling: 3%, Plug Loads: 2%, HVAC Auxiliary: <1%, Water Heating: <1%

Figure E.25. Commercial Electric Technical Potential in 2016 by End Use, Health



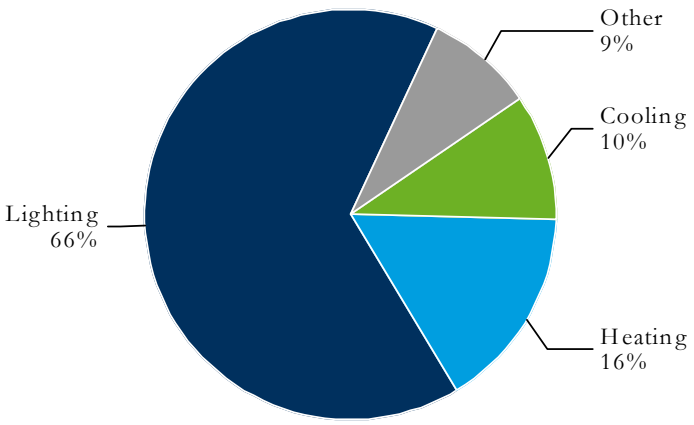
Note: "Other" includes:
Plug Loads: 4%, HVAC Auxiliary: 4%, Water Heating: 1%

Figure E.26. Commercial Electric Technical Potential in 2016 by End Use, Lodging



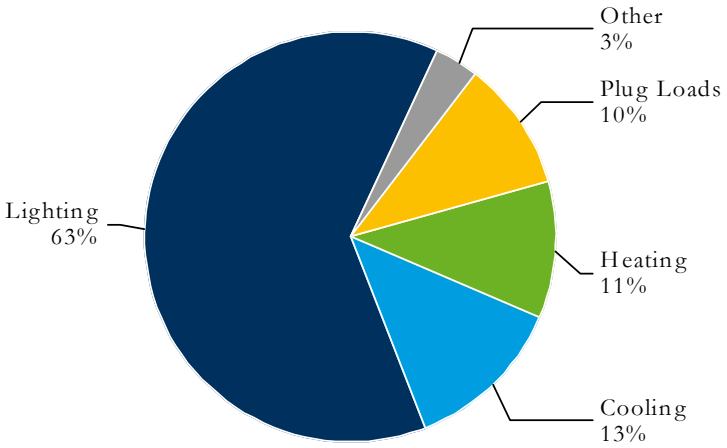
Note: "Other" includes:
Refrigeration: 1%, HVAC Auxiliary: <1%, Cooking: <1%

Figure E.27. Commercial Electric Technical Potential in 2016 by End Use, Miscellaneous



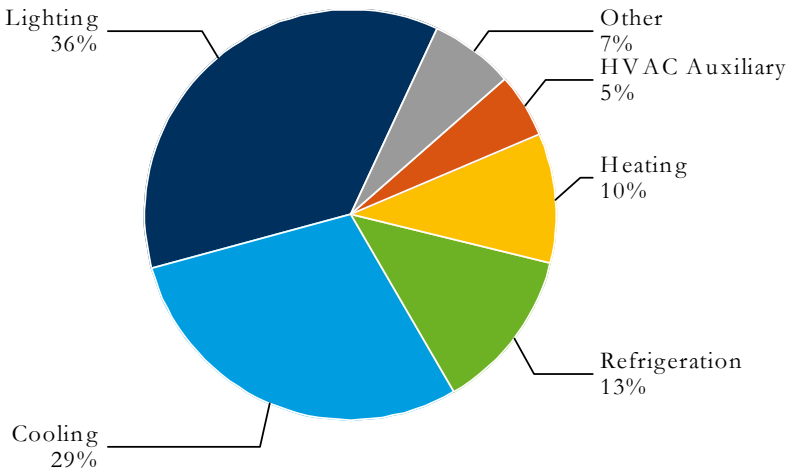
Note: "Other" includes:
Plug Loads: 4%, HVAC Auxiliary: 3%, Water Heating: 2%, Refrigeration: <1%

Figure E.28. Commercial Electric Technical Potential in 2016 by End Use, Office



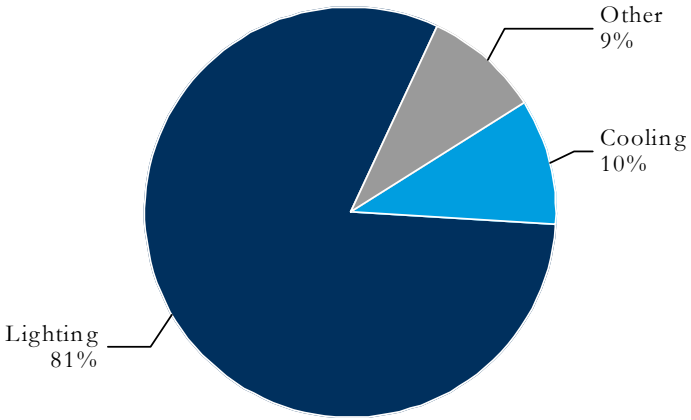
Note: "Other" includes:
HVAC Auxiliary: 3%, Water Heating: <1%

Figure E.29. Commercial Electric Technical Potential in 2016 by End Use, Restaurant



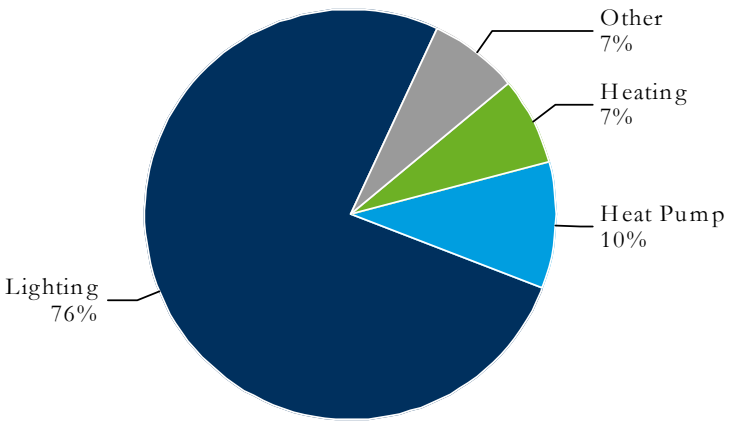
Note: "Other" includes:
Cooking: 3%, Plug Loads: 2%, Water Heating: 2%

Figure E.30. Commercial Electric Technical Potential in 2016 by End Use, Retail



Note: "Other" includes:
Heating: 4%, HVAC Auxiliary: 3%, Plug Loads: 1%, Water Heating: <1%

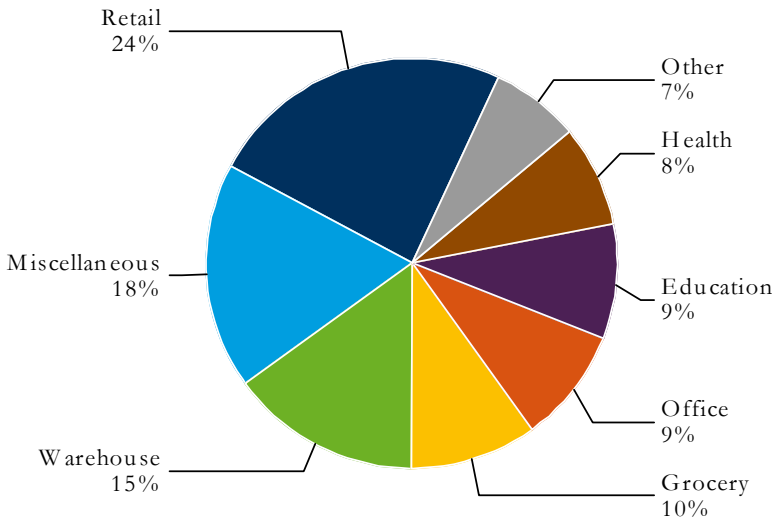
Figure E.31. Commercial Electric Technical Potential in 2016 by End Use, Warehouse



Note: "Other" includes:
HVAC Auxiliary: 4%, Plug Loads: 2%, Refrigeration: <1%, Cooling: <1%, Water Heating: <1%

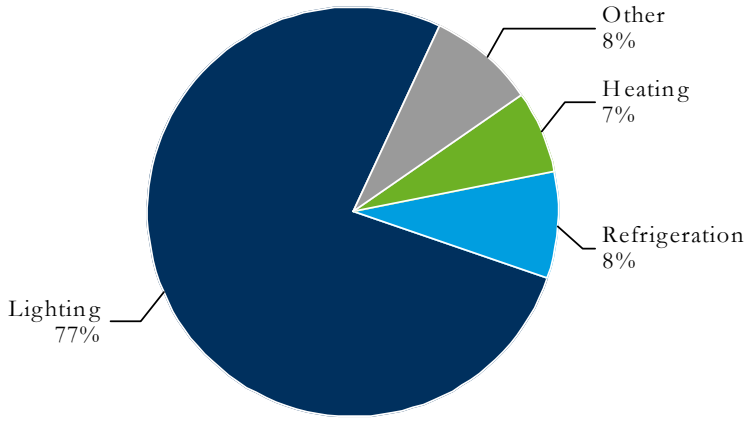
Commercial Sector Electric Economic Potential

Figure E.32. Commercial Electric Economic Potential in 2016 by Segment



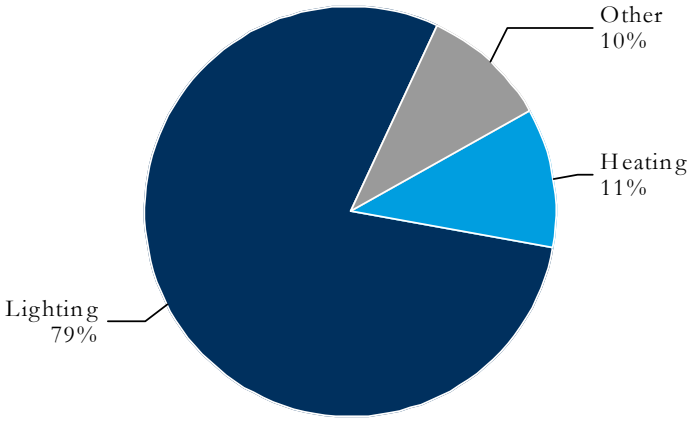
Note: "Other" includes:
Restaurant: 4%, Lodging: 2%

Figure E.33. Commercial Electric Economic Potential in 2016 by End Use



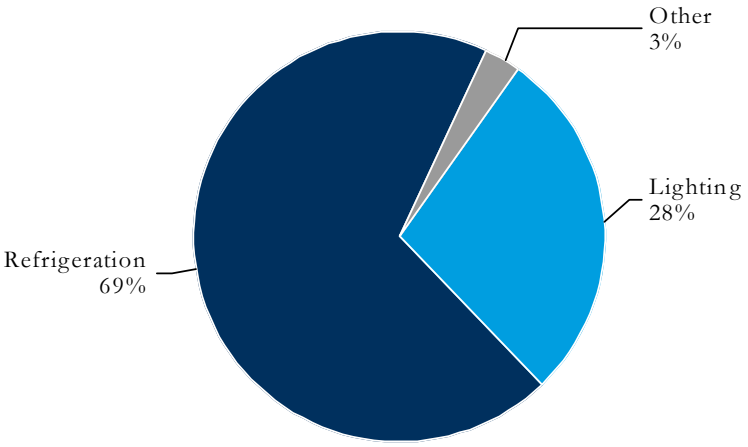
Note: "Other" includes:
Plug Loads: 4%, Cooling: 2%, HVAC Auxiliary: 1%, Water Heating: <1%, Heat Pump: <1%, Cooking: <1%

Figure E.34. Commercial Electric Economic Potential in 2016 by End Use, Education



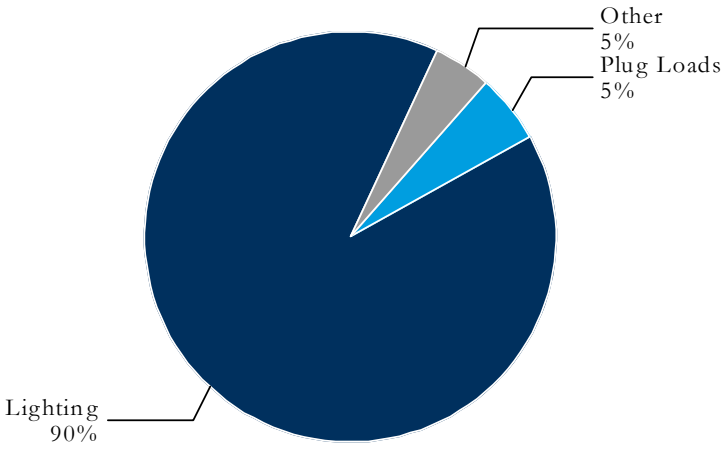
Note: "Other" includes:
Plug Loads: 4%, Refrigeration: 3%, Cooling: 1%, Water Heating: <1%, HVAC Auxiliary: <1%, Cooking: <1%

Figure E.35. Commercial Electric Economic Potential in 2016 by End Use, Grocery



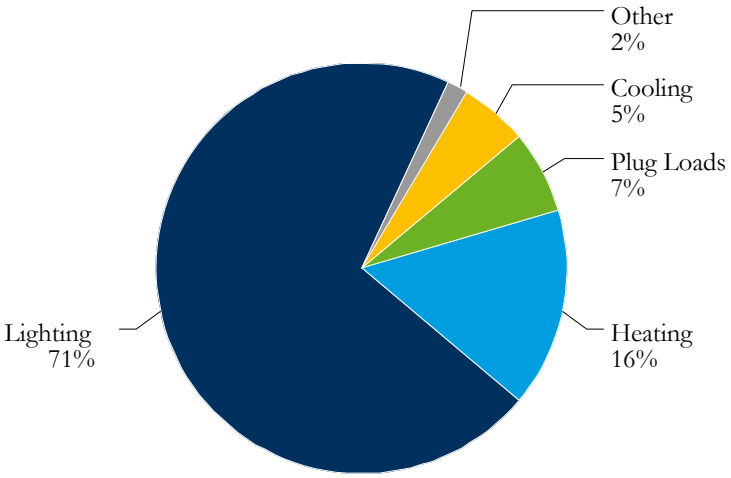
Note: "Other" includes:
Plug Loads: 2%, Cooling: <1%, HVAC Auxiliary: <1%, Water Heating: <1%

Figure E.36. Commercial Electric Economic Potential in 2016 by End Use, Health



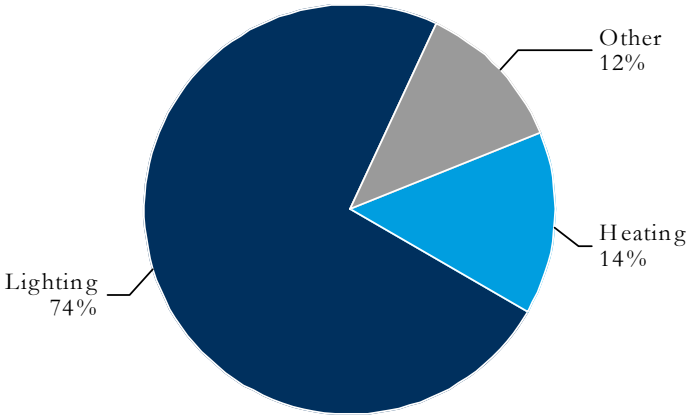
Note: "Other" includes:
Cooling: 2%, Heat Pump: 2%, HVAC Auxiliary: <1%, Water Heating: <1%

Figure E.37. Commercial Electric Economic Potential in 2016 by End Use, Lodging



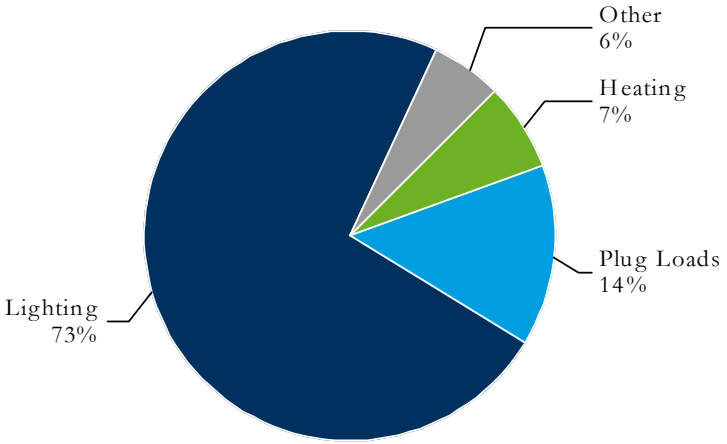
Note: "Other" includes:
Refrigeration: 2%, Cooking: <1%

Figure E.38. Commercial Electric Economic Potential in 2016 by End Use, Miscellaneous



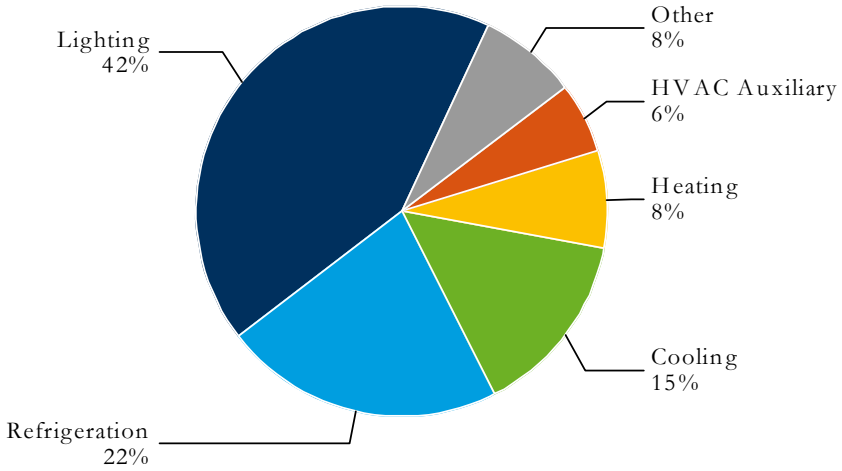
Note: "Other" includes:
Plug Loads: 4%, Cooling: 3%, HVAC Auxiliary: 3%, Water Heating: 1%, Refrigeration: <1%

Figure E.39. Commercial Electric Economic Potential in 2016 by End Use, Office



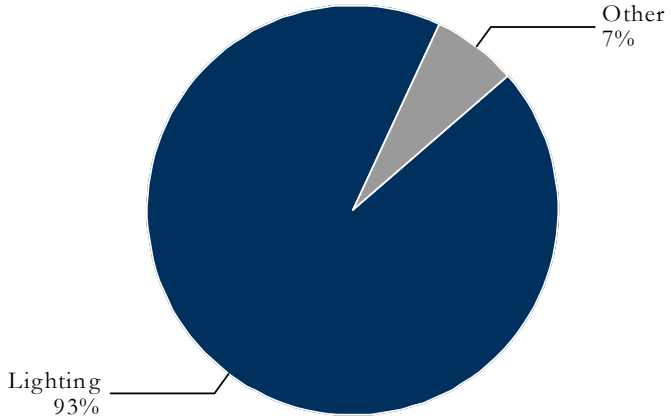
Note: "Other" includes:
Cooling: 5%, Water Heating: <1%, HVAC Auxiliary: <1%

Figure E.40. Commercial Electric Economic Potential in 2016 by End Use, Restaurant



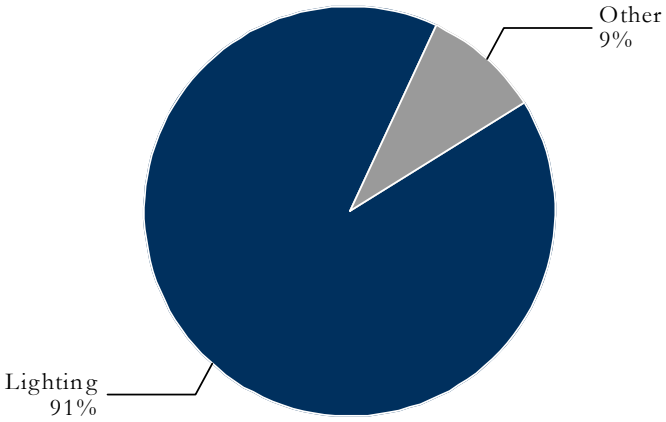
Note: "Other" includes:
Cooking: 4%, Plug Loads: 2%, Water Heating: 1%

Figure E.41. Commercial Electric Economic Potential in 2016 by End Use, Retail



Note: "Other" includes:
Heating: 4%, Plug Loads: 1%, Cooling: <1%, HVAC Auxiliary: <1%, Water Heating: <1%

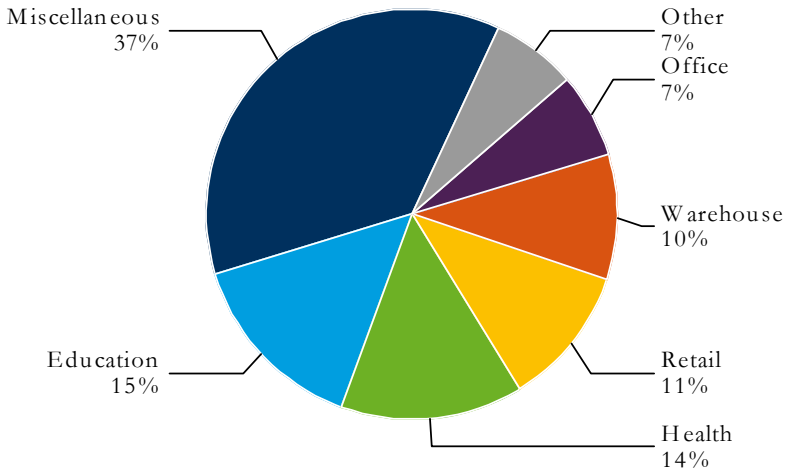
Figure E.42. Commercial Electric Economic Potential in 2016 by End Use, Warehouse



Note: "Other" includes:
Heating: 4%, Plug Loads: 2%, Heat Pump: 1%, Refrigeration: 1%, HVAC Auxiliary: <1%, Water Heating: <1%, Cooling: <1%

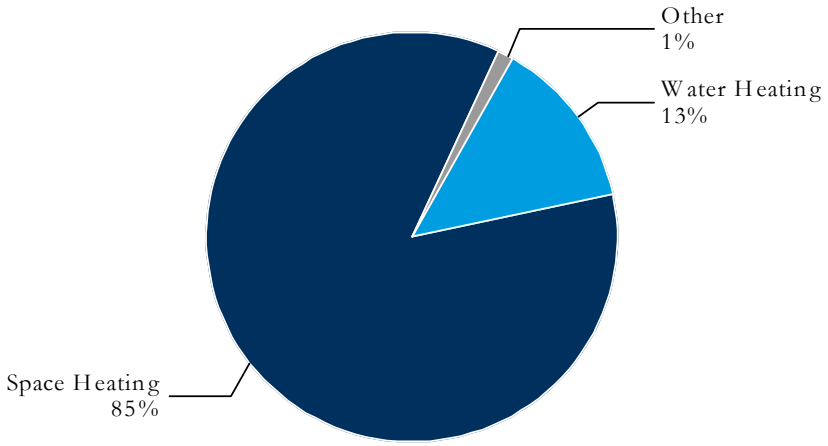
Commercial Sector Gas Technical Potential

Figure E.43. Commercial Gas Technical Potential in 2016 by Segment



Note: "Other" includes:
Restaurant: 4%, Lodging: 2%, Grocery: <1%

Figure E.44. Commercial Gas Technical Potential in 2016 by End Use



Note: "Other" includes:
Cooking: 1%, Pool Heating: <1%

Figure E.45. Commercial Gas Technical Potential in 2016 by End Use, Education

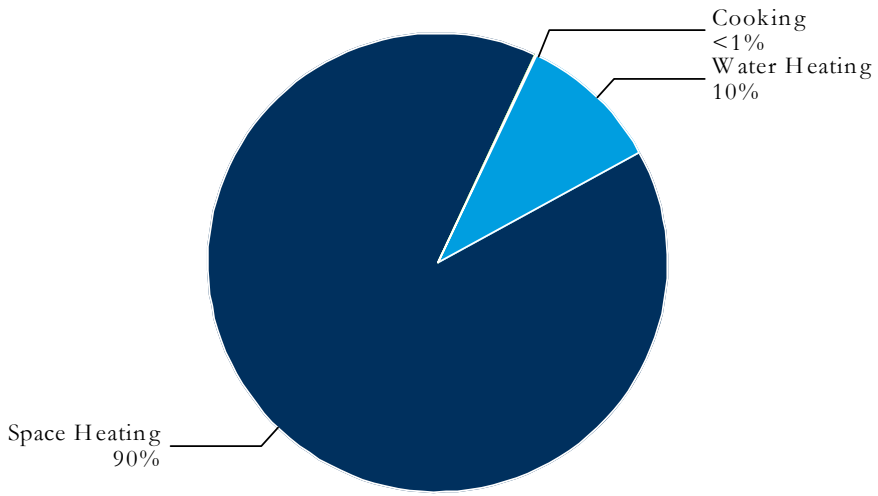


Figure E.46. Commercial Gas Technical Potential in 2016 by End Use, Grocery

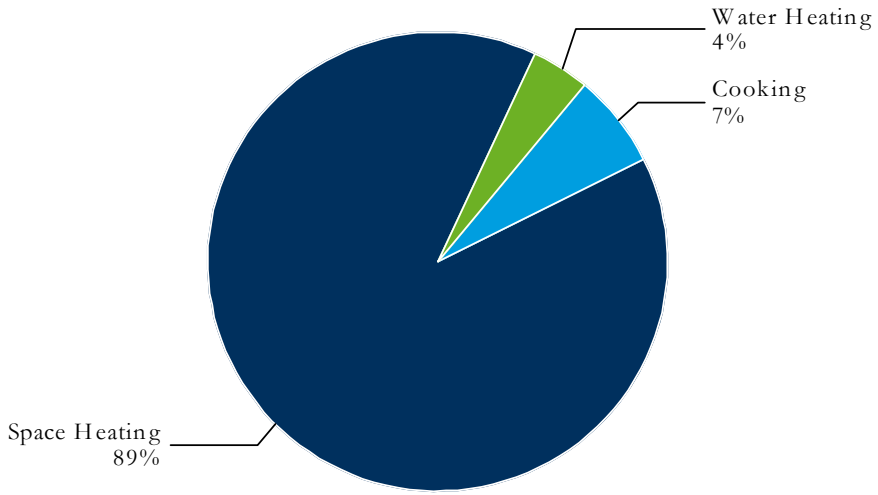


Figure E.47. Commercial Gas Technical Potential in 2016 by End Use, Health

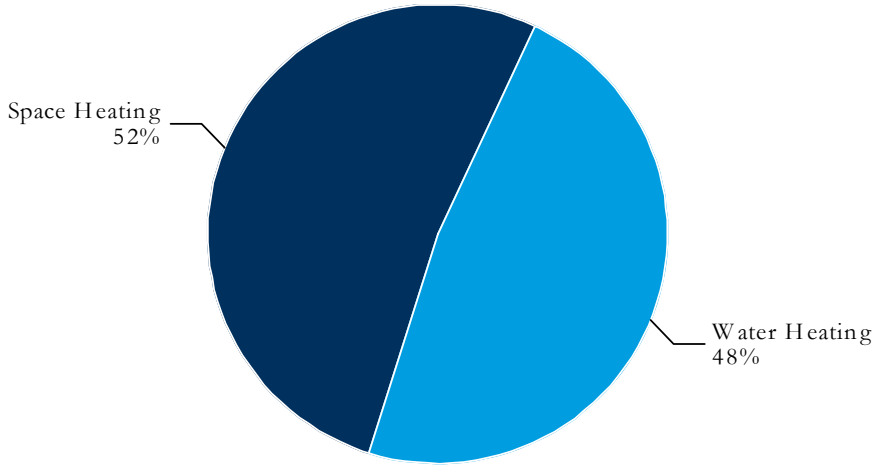


Figure E.48. Commercial Gas Technical Potential in 2016 by End Use, Lodging

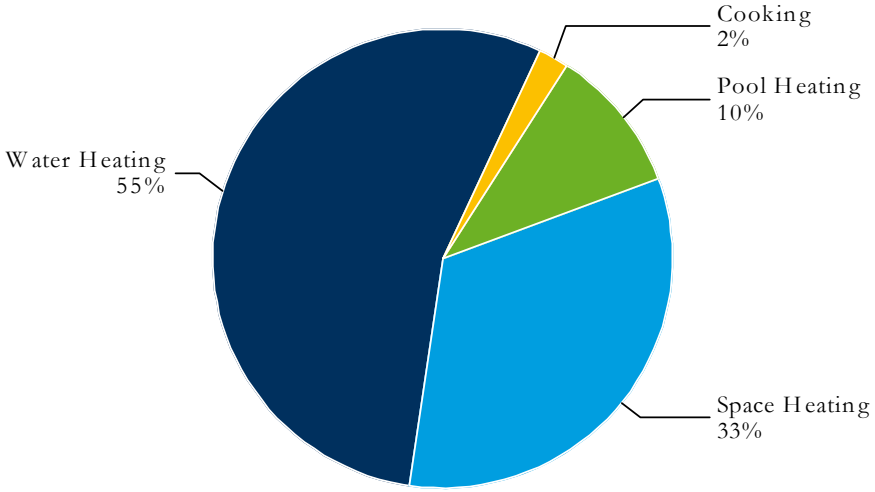
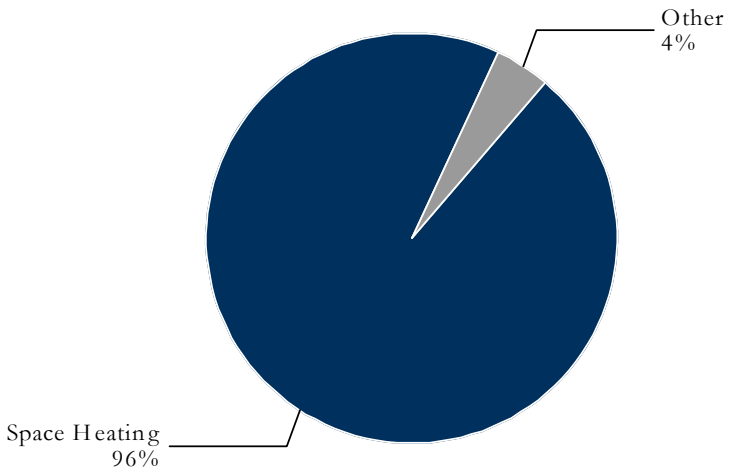


Figure E.49. Commercial Gas Technical Potential in 2016 by End Use, Miscellaneous



Note: "Other" includes:
Water Heating: 4%, Cooking: <1%

Figure E.50. Commercial Gas Technical Potential in 2016 by End Use, Office

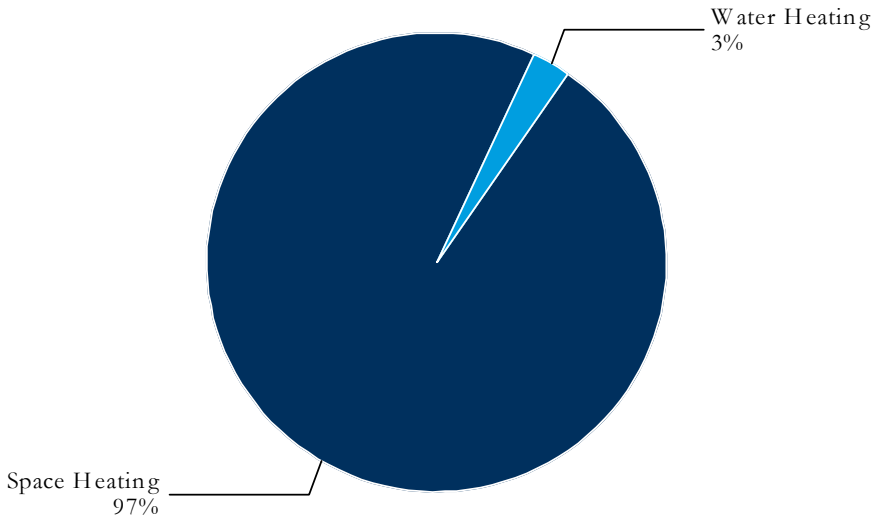


Figure E.51. Commercial Gas Technical Potential in 2016 by End Use, Restaurant

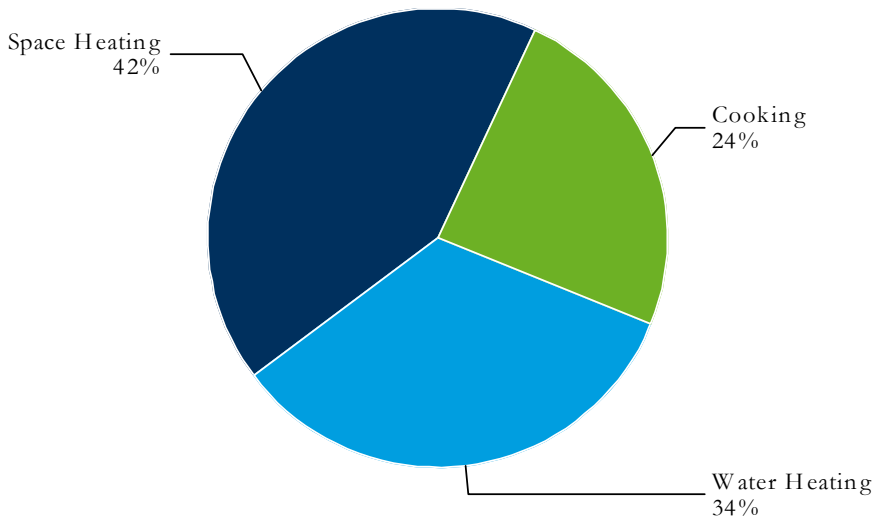


Figure E.52. Commercial Gas Technical Potential in 2016 by End Use, Retail

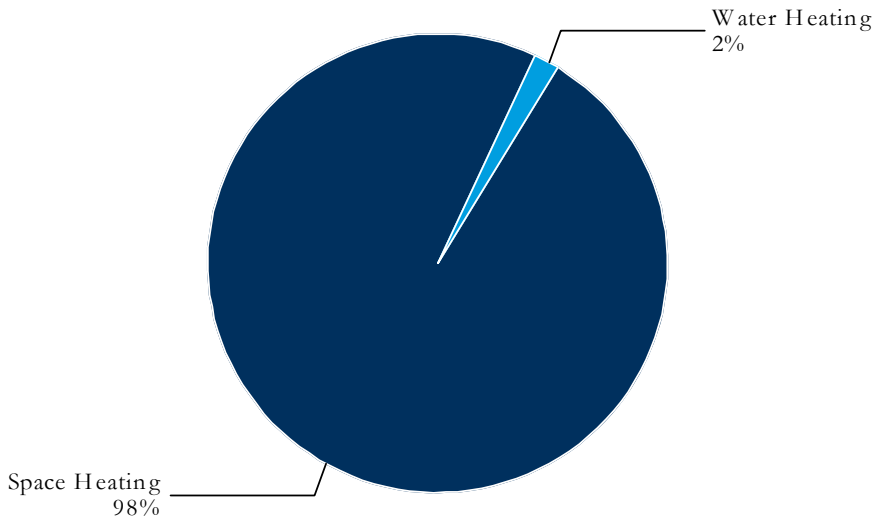
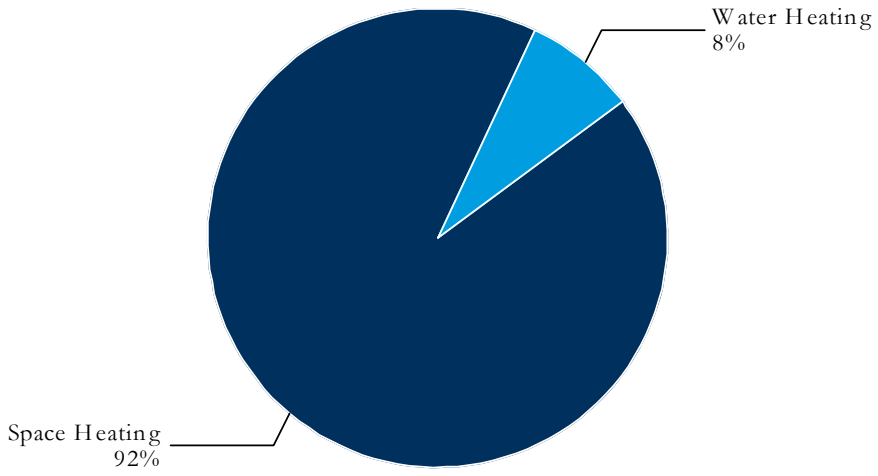
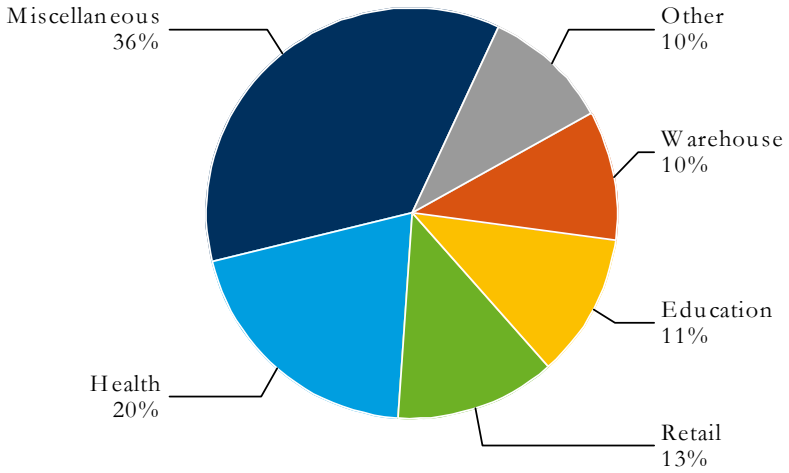


Figure E.53. Commercial Gas Technical Potential in 2016 by End Use, Warehouse



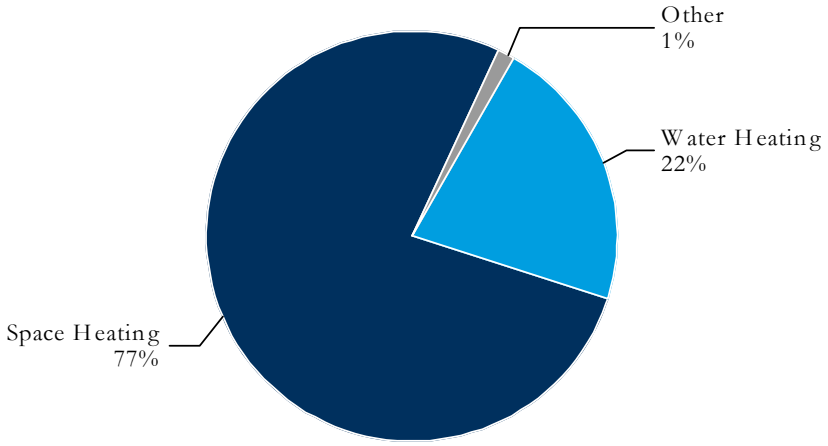
Commercial Sector Gas Economic Potential

Figure E.54. Commercial Gas Economic Potential in 2016 by Segment



Note: "Other" includes:
Restaurant: 4%, Office: 3%, Lodging: 2%, Grocery: <1%

Figure E.55. Commercial Gas Economic Potential in 2016 by End Use



Note: "Other" includes:
Cooking: <1%, Pool Heating: <1%

Figure E.56. Commercial Gas Economic Potential in 2016 by End Use, Education

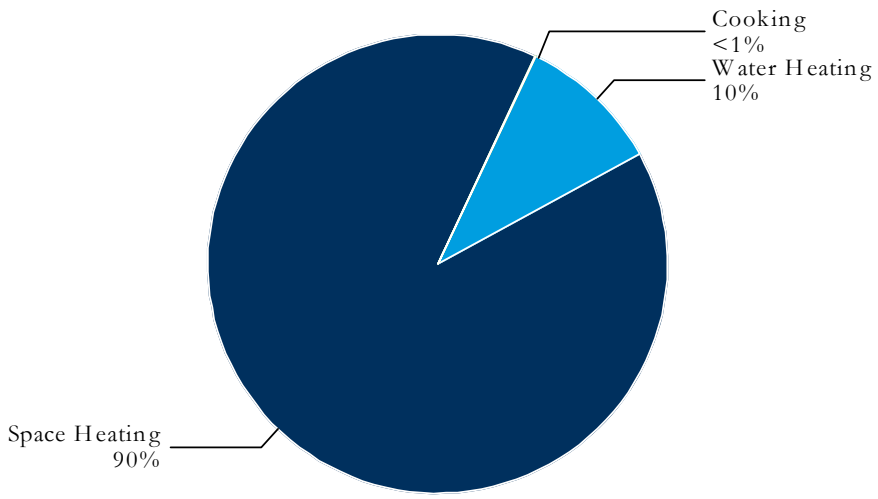


Figure E.57. Commercial Gas Economic Potential in 2016 by End Use, Grocery

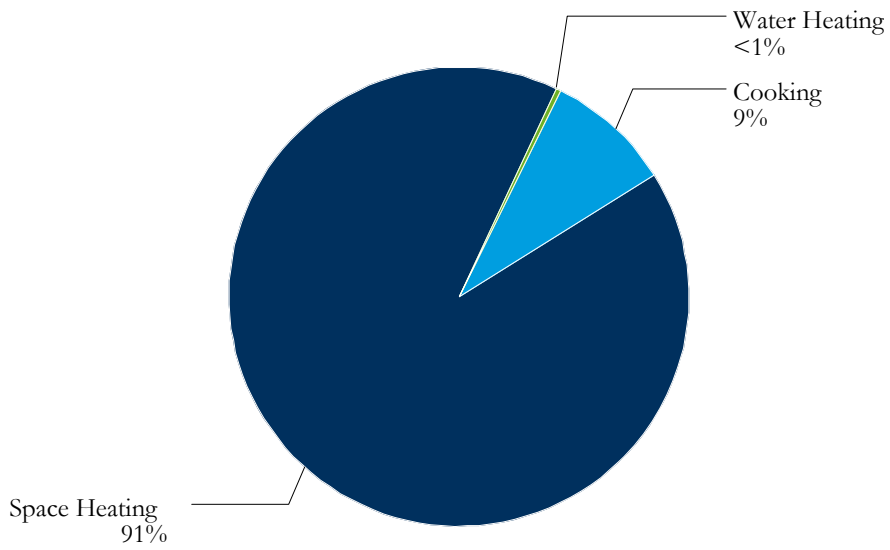


Figure E.58. Commercial Gas Economic Potential in 2016 by End Use, Health

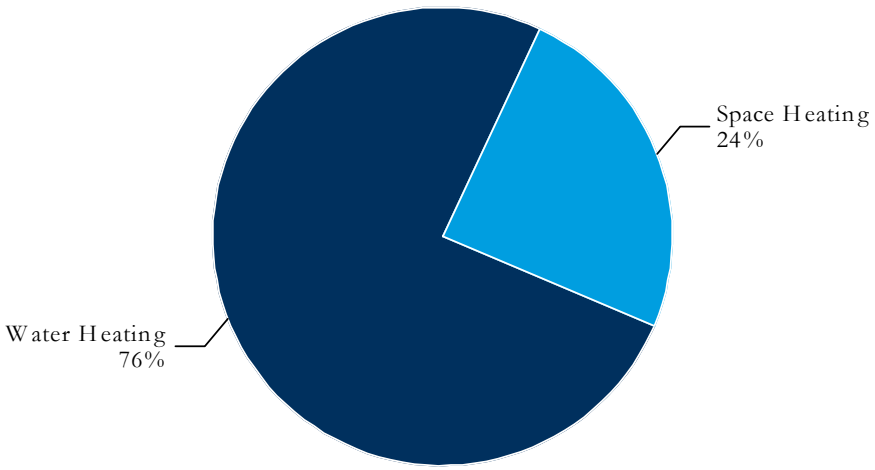


Figure E.59. Commercial Gas Economic Potential in 2016 by End Use, Lodging

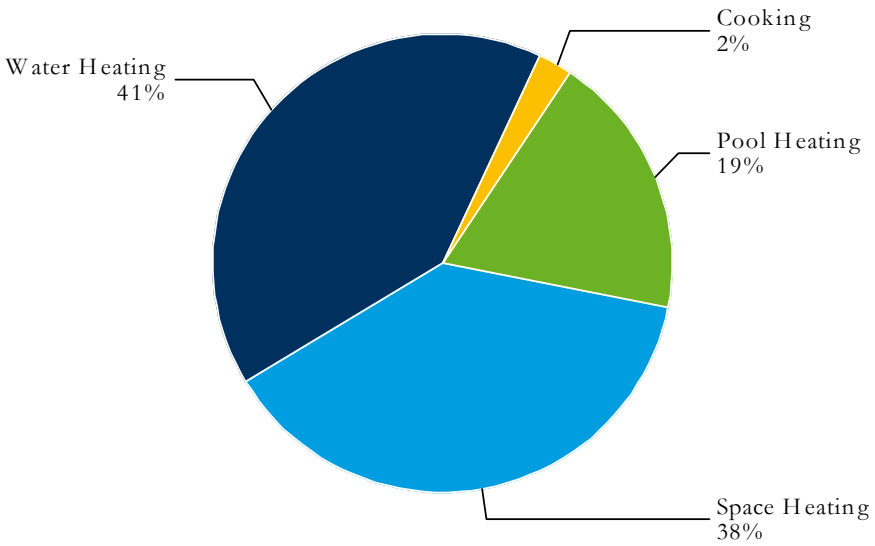


Figure E.60. Commercial Gas Economic Potential in 2016 by End Use, Miscellaneous

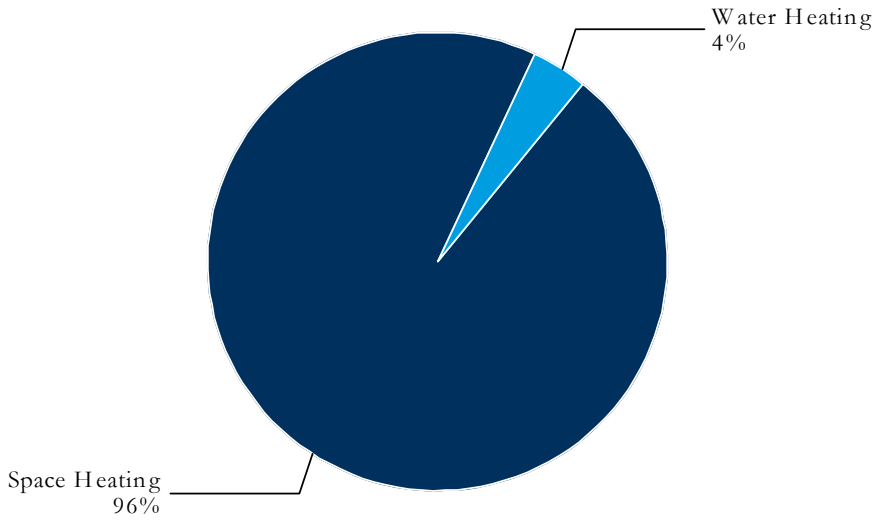


Figure E.61. Commercial Gas Economic Potential in 2016 by End Use, Office

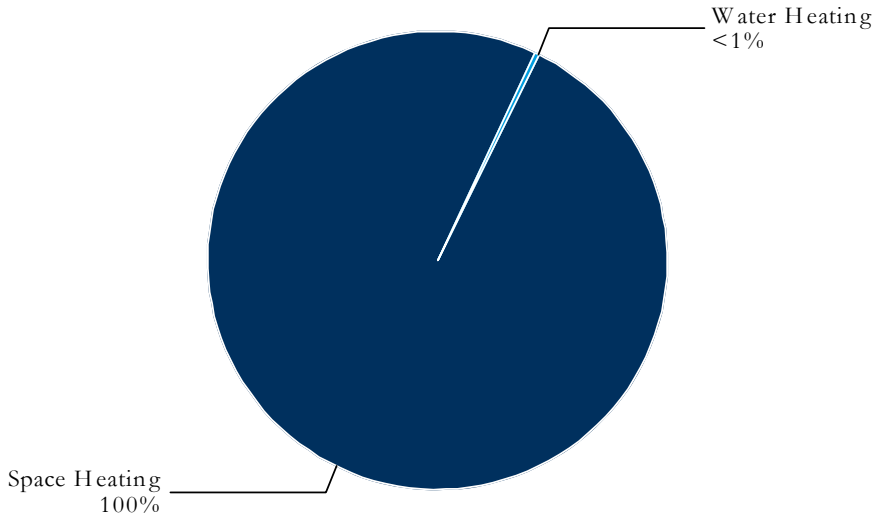


Figure E.62. Commercial Gas Economic Potential in 2016 by End Use, Restaurant

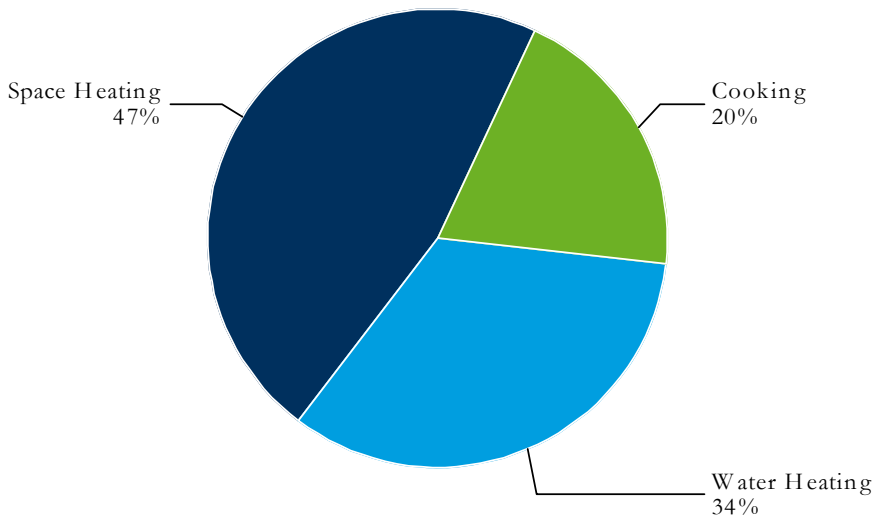


Figure E.63. Commercial Gas Economic Potential in 2016 by End Use, Retail

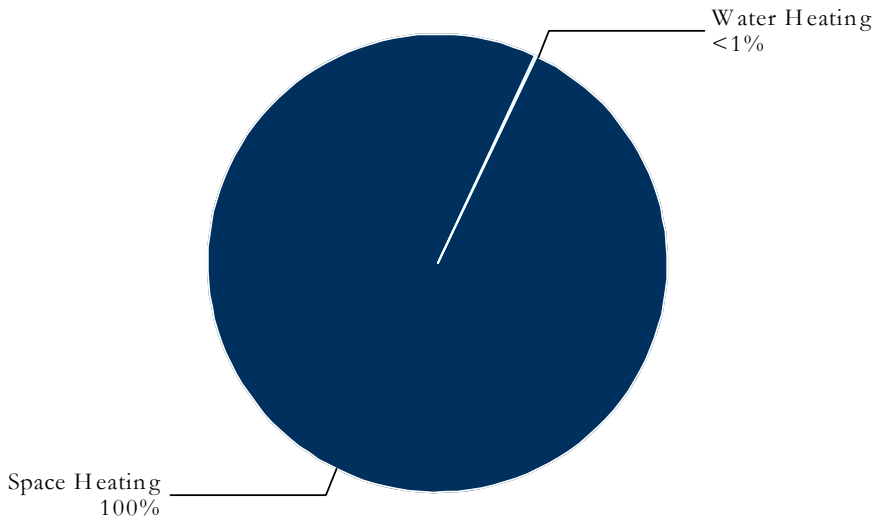
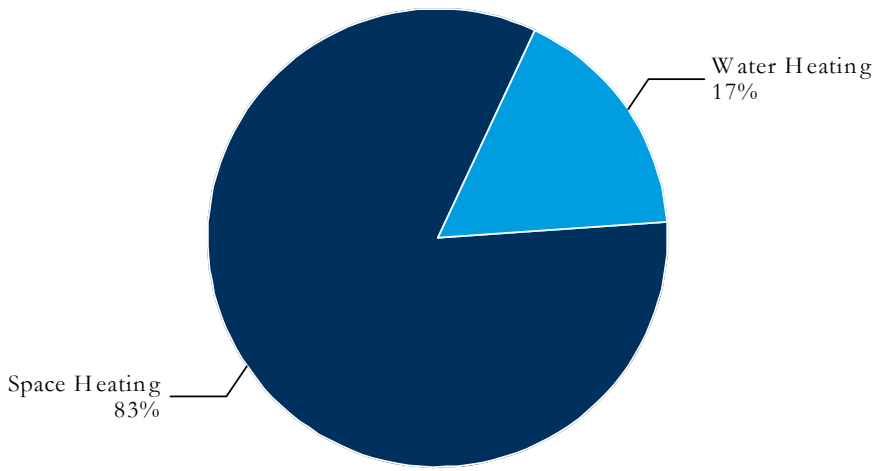
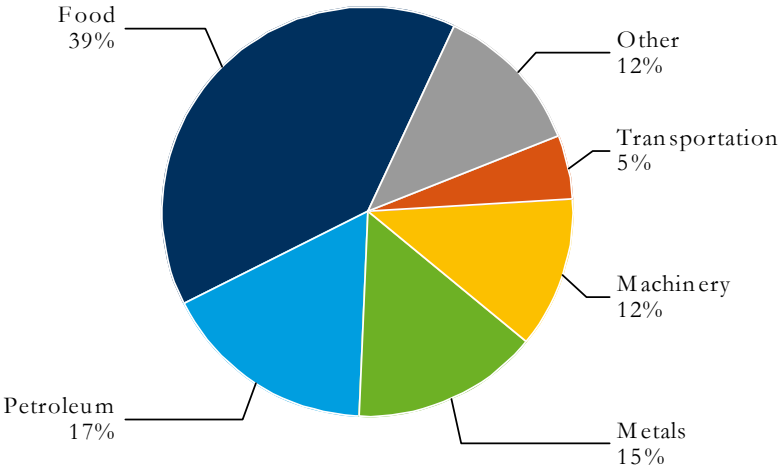


Figure E.64. Commercial Gas Economic Potential in 2016 by End Use, Warehouse



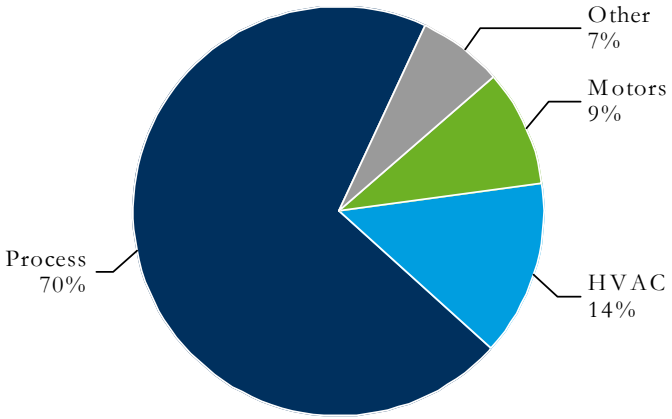
Industrial Sector Electric Technical Potential

Figure E.65. Industrial Electric Technical Potential in 2016 by Segment



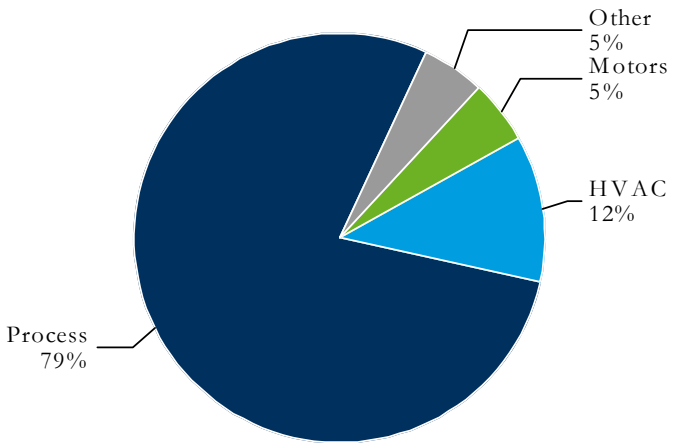
Note: "Other" includes:
Other Industrial: 4%, Plastic/Rubber: 4%, Minerals: 2%, Paper: 1%, Mining: <1%

Figure E.66. Industrial Electric Technical Potential in 2016 by End Use



Note: "Other" includes:
Lighting: 5%, Miscellaneous: 2%, Boiler: <1%

Figure E.67. Industrial Electric Technical Potential in 2016 by End Use, Food



Note: "Other" includes:
Lighting: 5%, Miscellaneous: <1%

Figure E.68. Industrial Electric Technical Potential in 2016 by End Use, Machinery

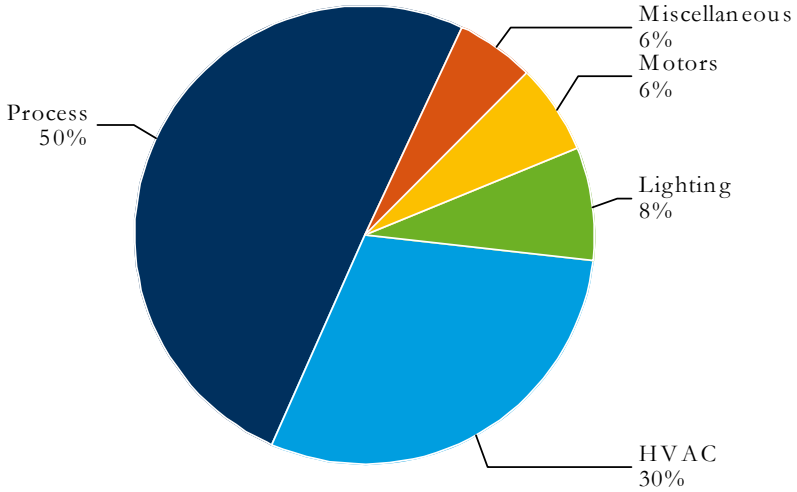
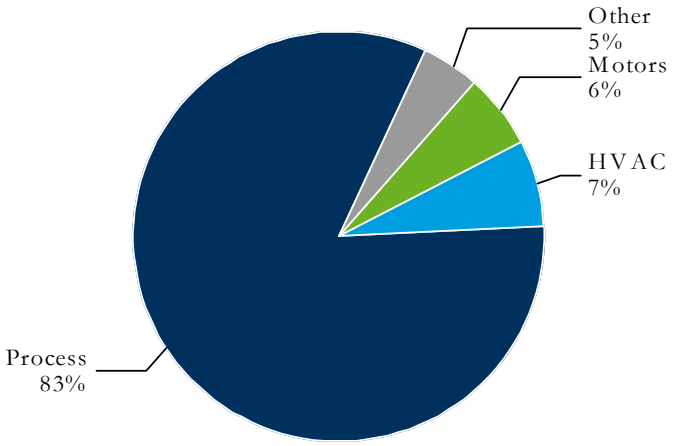


Figure E.69. Industrial Electric Technical Potential in 2016 by End Use, Metals



Note: "Other" includes:
Lighting: 3%, Miscellaneous: <1%, Boiler: <1%

Figure E.70. Industrial Electric Technical Potential in 2016 by End Use, Minerals

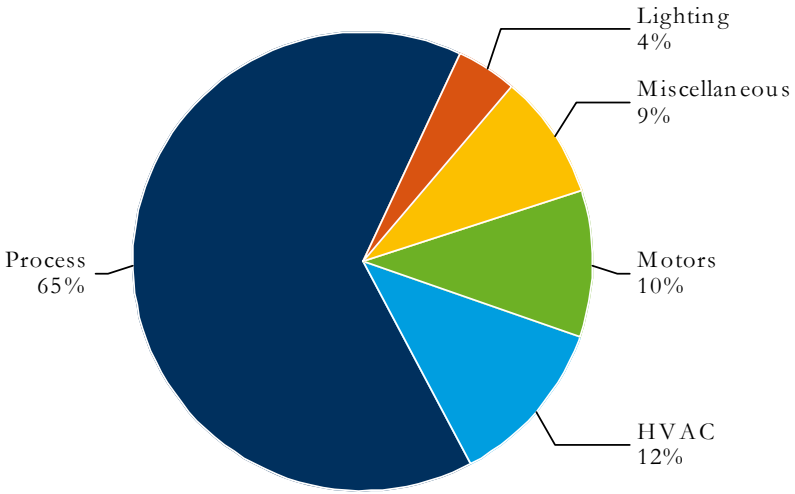


Figure E.71. Industrial Electric Technical Potential in 2016 by End Use, Mining

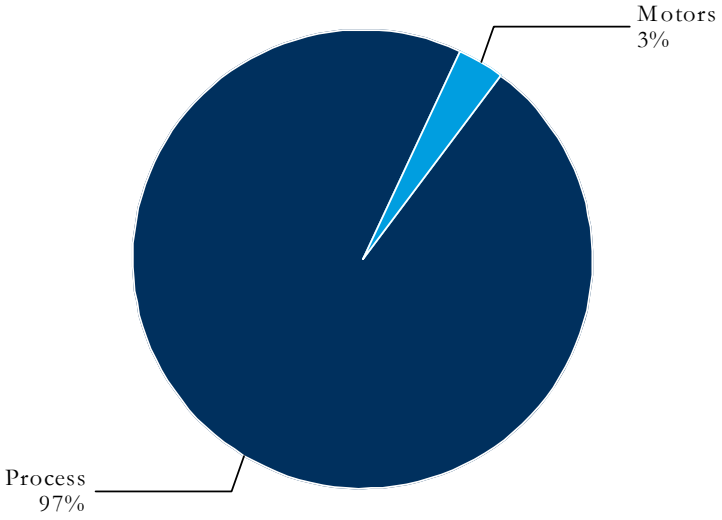
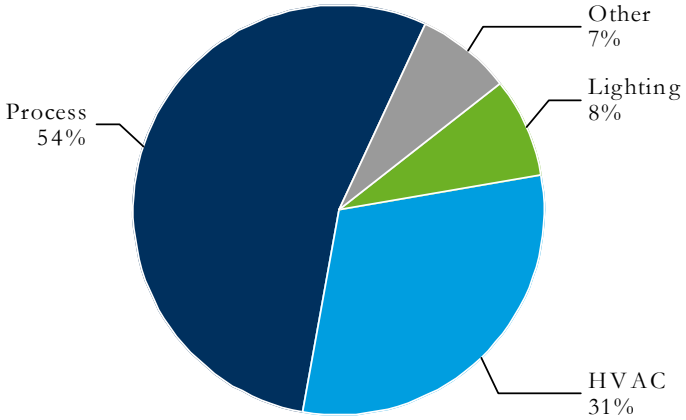
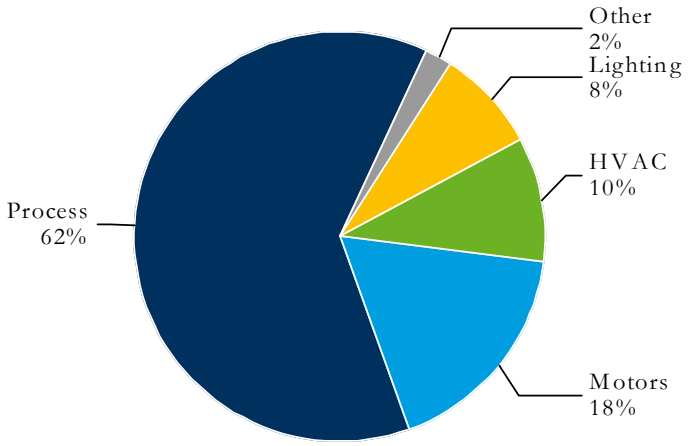


Figure E.72. Industrial Electric Technical Potential in 2016 by End Use, Other Industrial



Note: "Other" includes:
Motors: 5%, Miscellaneous: 2%

Figure E.73. Industrial Electric Technical Potential in 2016 by End Use, Paper



Note: "Other" includes:
Boiler: 1%, Miscellaneous: <1%

Figure E.74. Industrial Electric Technical Potential in 2016 by End Use, Petroleum

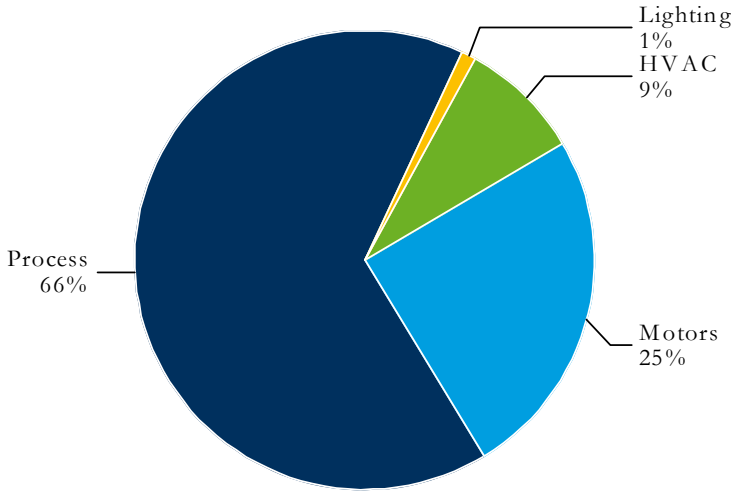


Figure E.75. Industrial Electric Technical Potential in 2016 by End Use, Plastic/Rubber

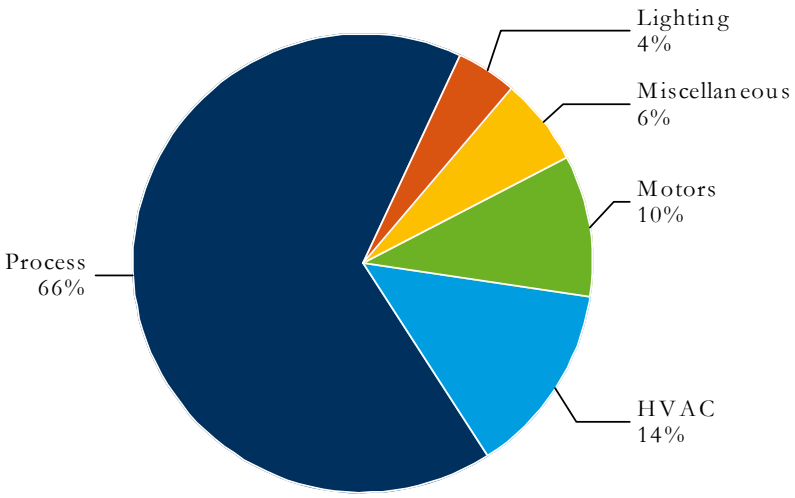
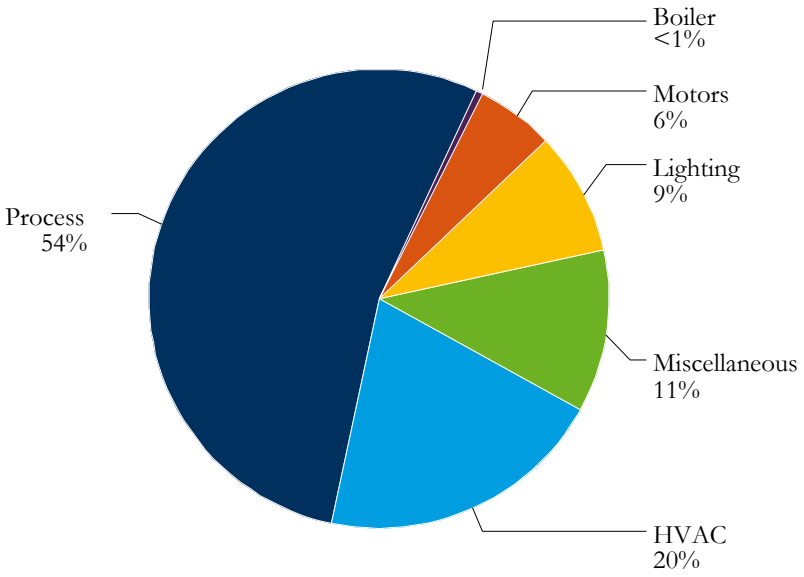
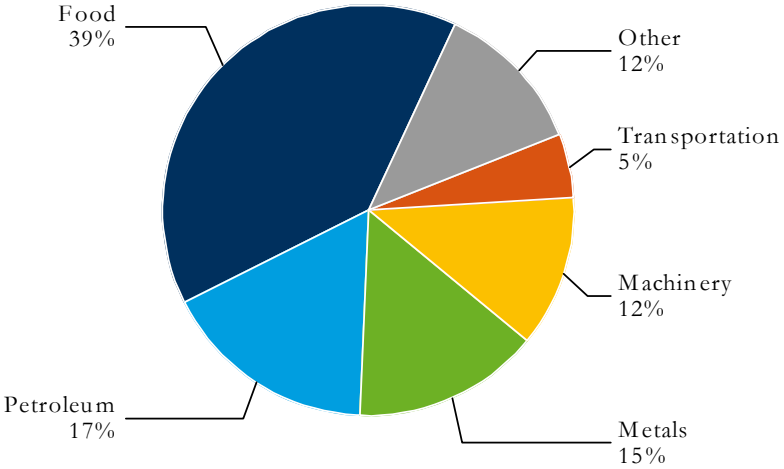


Figure E.76. Industrial Electric Technical Potential in 2016 by End Use, Transportation



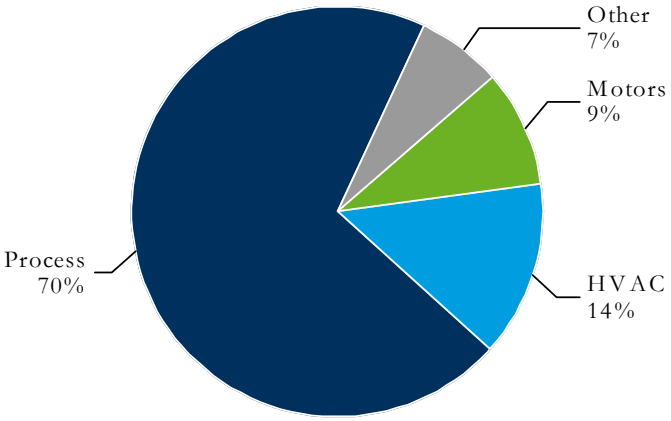
Industrial Sector Electric Economic Potential

Figure E.77. Industrial Electric Economic Potential in 2016 by Segment



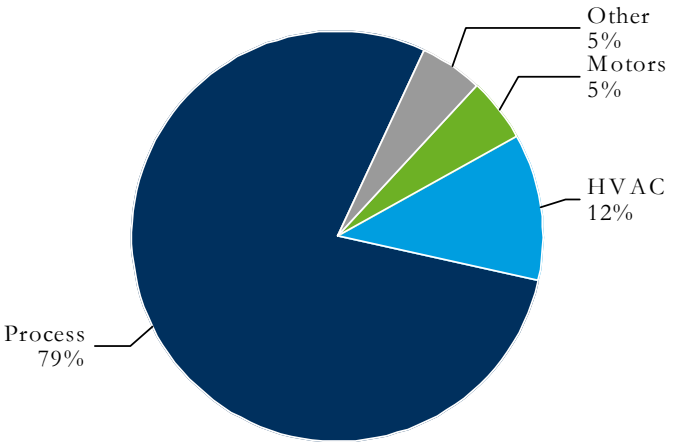
Note: "Other" includes:
Other Industrial: 4%, Plastic/Rubber: 4%, Minerals: 2%, Paper: 1%, Mining: <1%

Figure E.78. Industrial Electric Economic Potential in 2016 by End Use



Note: "Other" includes:
Lighting: 5%, Miscellaneous: 2%, Boiler: <1%

Figure E.79. Industrial Electric Economic Potential in 2016 by End Use, Food



Note: "Other" includes:
Lighting: 5%, Miscellaneous: <1%

Figure E.80. Industrial Electric Economic Potential in 2016 by End Use, Machinery

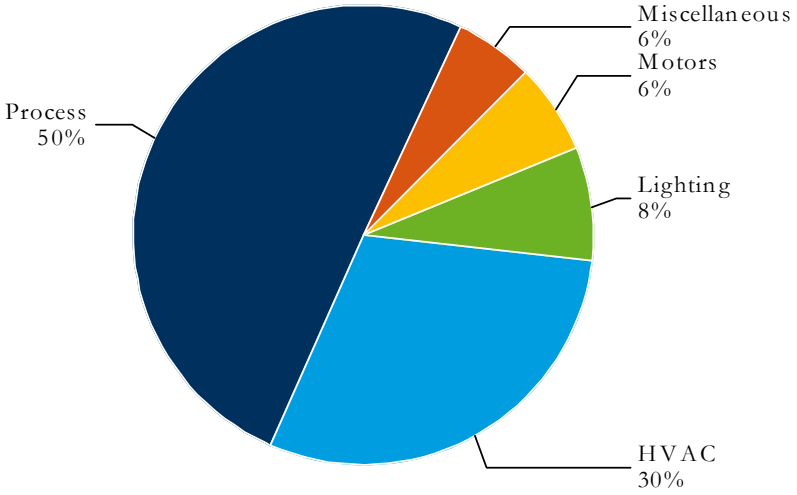
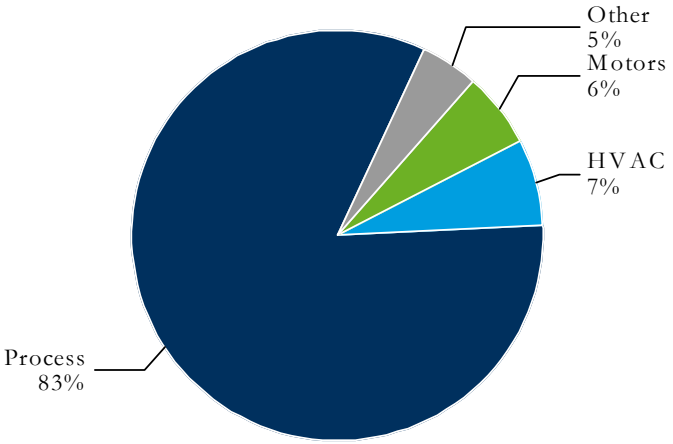


Figure E.81. Industrial Electric Economic Potential in 2016 by End Use, Metals



Note: "Other" includes:
Lighting: 3%, Miscellaneous: <1%, Boiler: <1%

Figure E.82. Industrial Electric Economic Potential in 2016 by End Use, Minerals

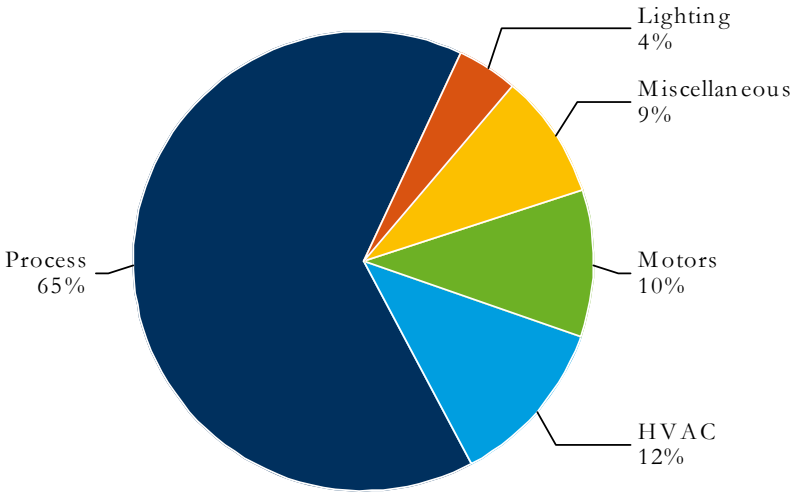


Figure E.83. Industrial Electric Economic Potential in 2016 by End Use, Mining

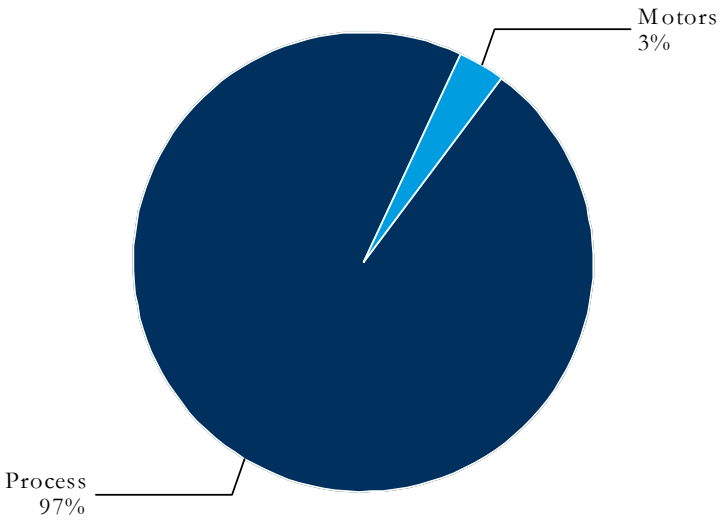
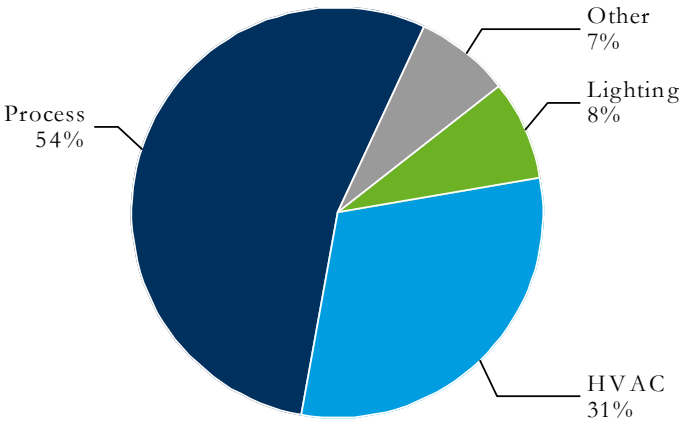
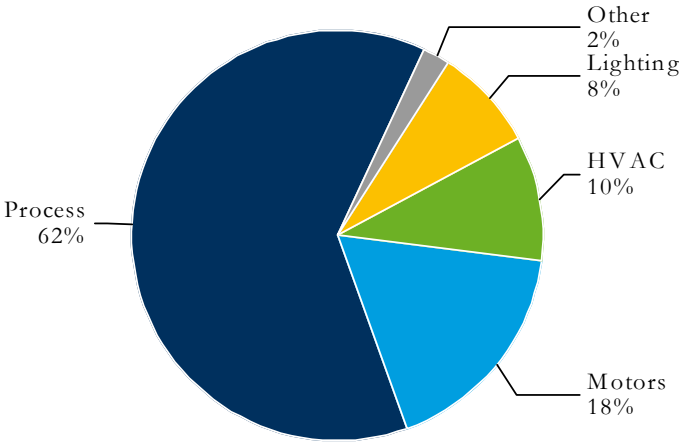


Figure E.84. Industrial Electric Economic Potential in 2016 by End Use, Other Industrial



Note: "Other" includes:
Motors: 5%, Miscellaneous: 2%

Figure E.85. Industrial Electric Economic Potential in 2016 by End Use, Paper



Note: "Other" includes:
Boiler: 1%, Miscellaneous: <1%

Figure E.86. Industrial Electric Economic Potential in 2016 by End Use, Petroleum

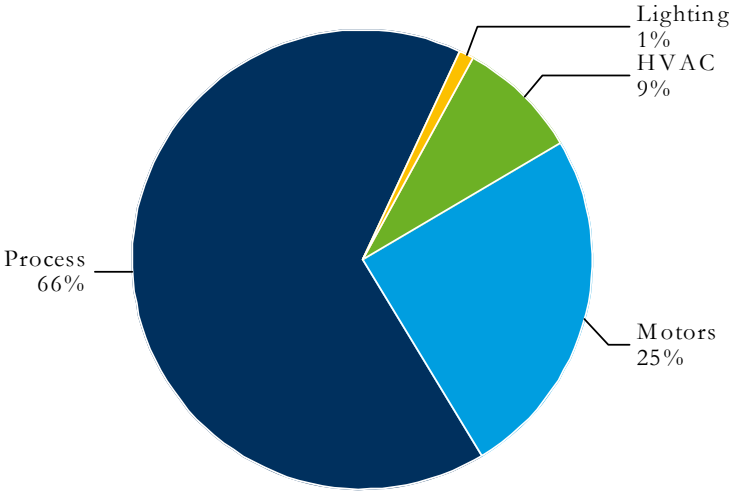


Figure E.87. Industrial Electric Economic Potential in 2016 by End Use, Plastic/Rubber

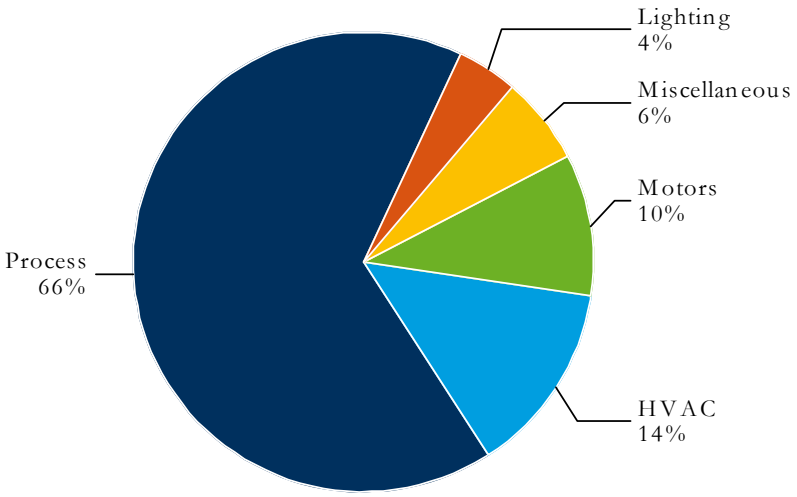
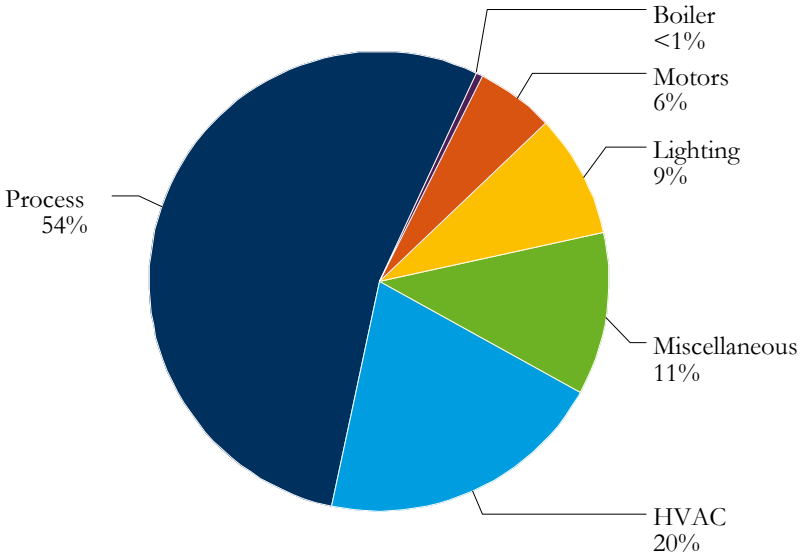


Figure E.88. Industrial Electric Economic Potential in 2016 by End Use, Transportation



Industrial Sector Gas Technical Potential

Figure E.89. Industrial Gas Technical Potential in 2016 by Segment

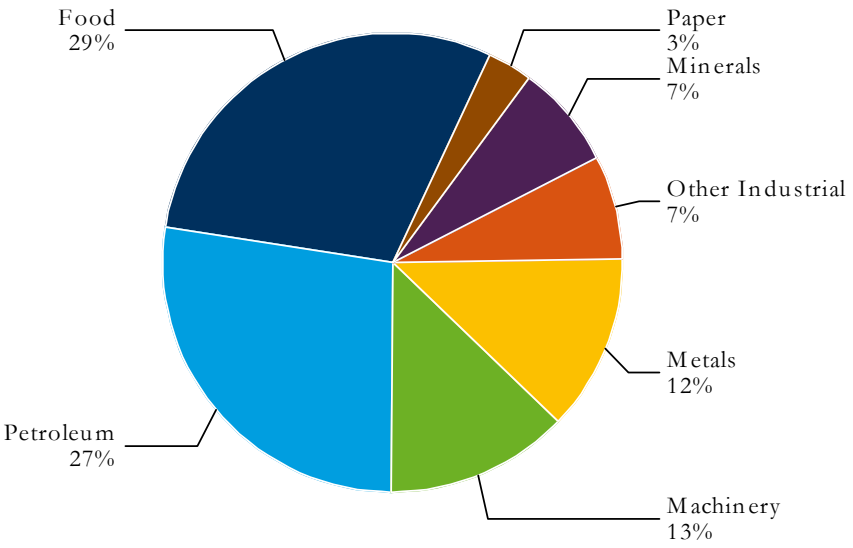


Figure E.90. Industrial Gas Technical Potential in 2016 by End Use

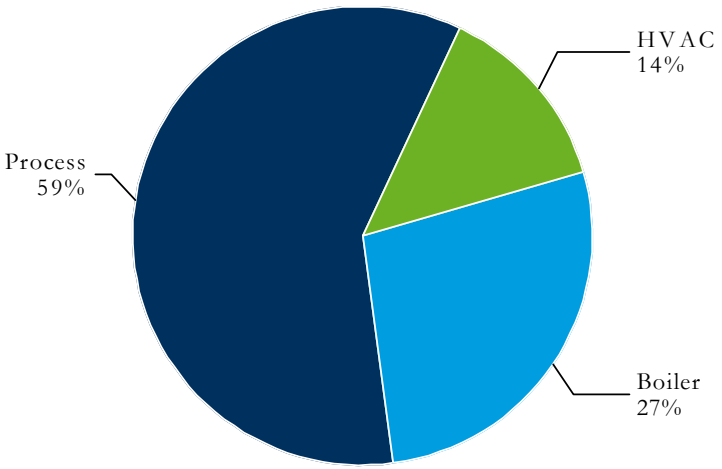


Figure E.91. Industrial Gas Technical Potential in 2016 by End Use, Food

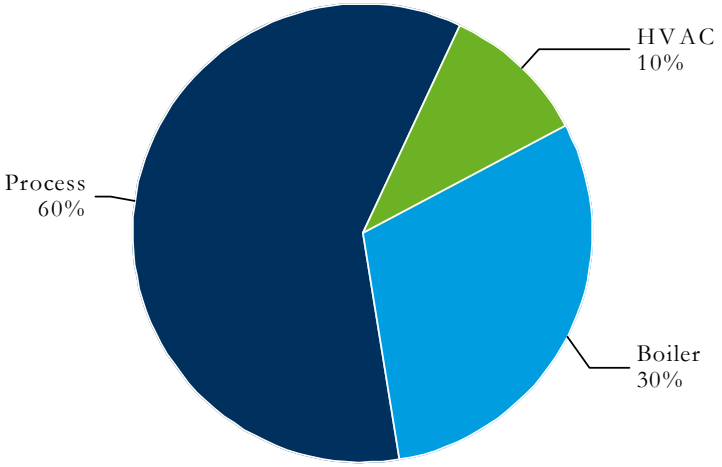


Figure E.92. Industrial Gas Technical Potential in 2016 by End Use, Machinery

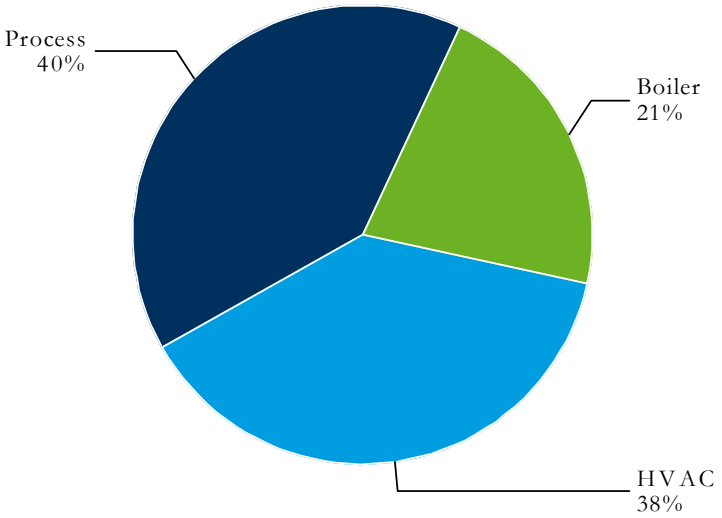


Figure E.93. Industrial Gas Technical Potential in 2016 by End Use, Metals

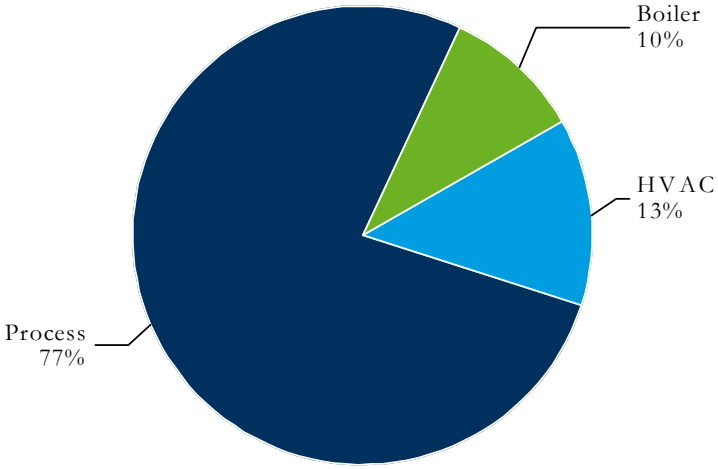
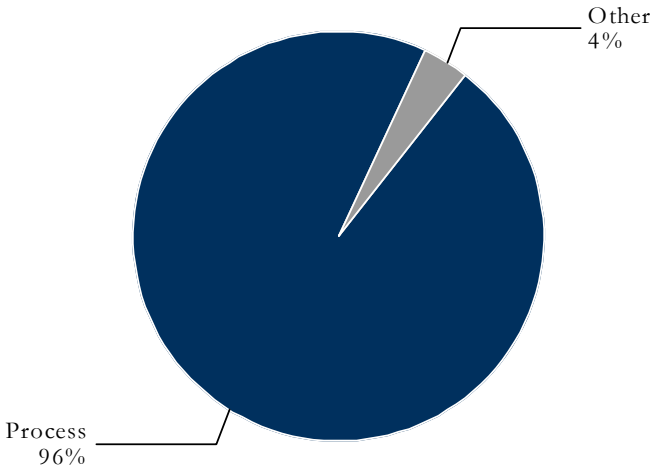


Figure E.94. Industrial Gas Technical Potential in 2016 by End Use, Minerals



Note: "Other" includes:
HVAC: 2%, Boiler: 2%

Figure E.95. Industrial Gas Technical Potential in 2016 by End Use, Other Industrial

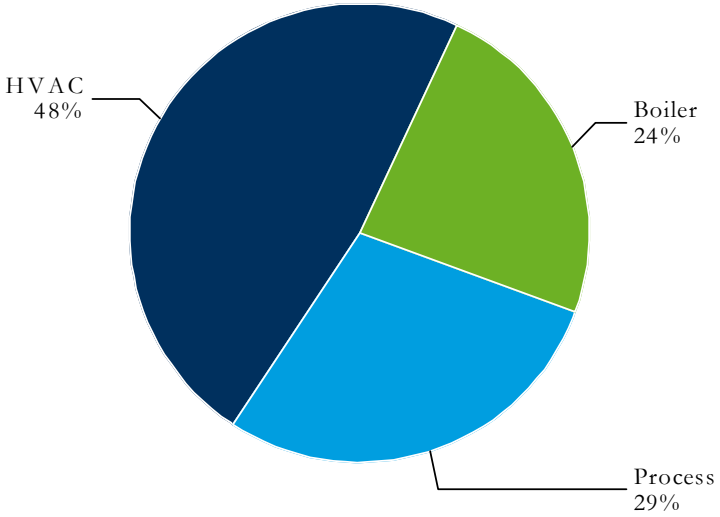


Figure E.96. Industrial Gas Technical Potential in 2016 by End Use, Paper

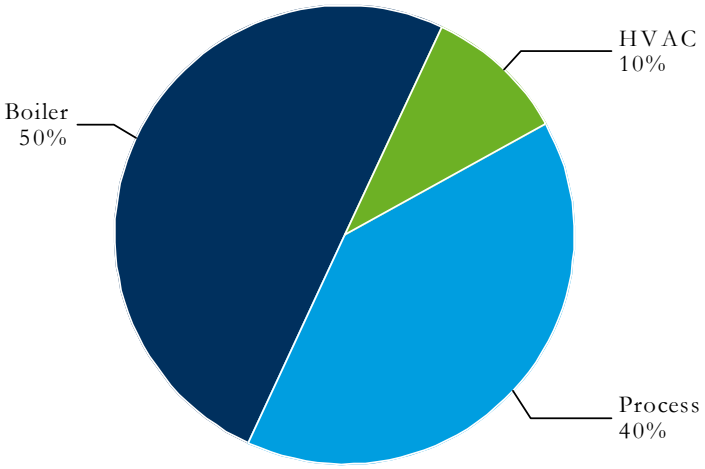
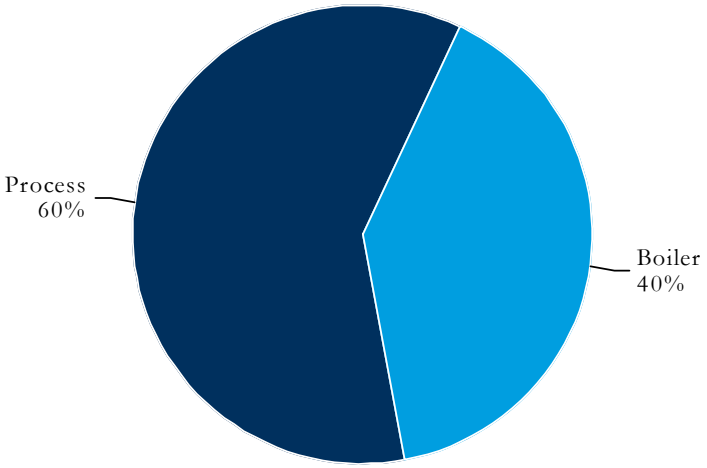


Figure E.97. Industrial Gas Technical Potential in 2016 by End Use, Petroleum



Industrial Sector Gas Economic Potential

Figure E.98. Industrial Gas Economic Potential in 2016 by Segment

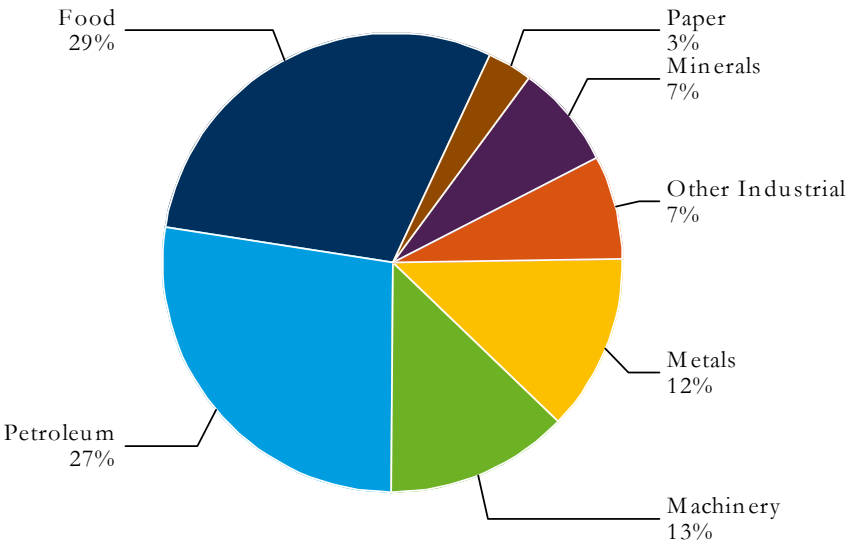


Figure E.99. Industrial Gas Economic Potential in 2016 by End Use

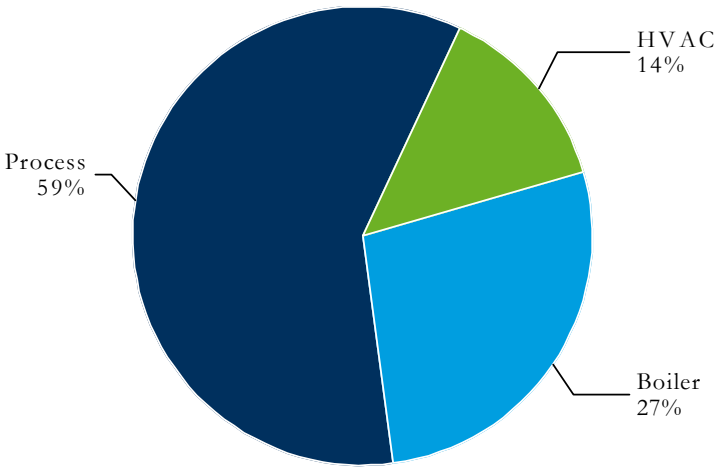


Figure E.100. Industrial Gas Economic Potential in 2016 by End Use, Food

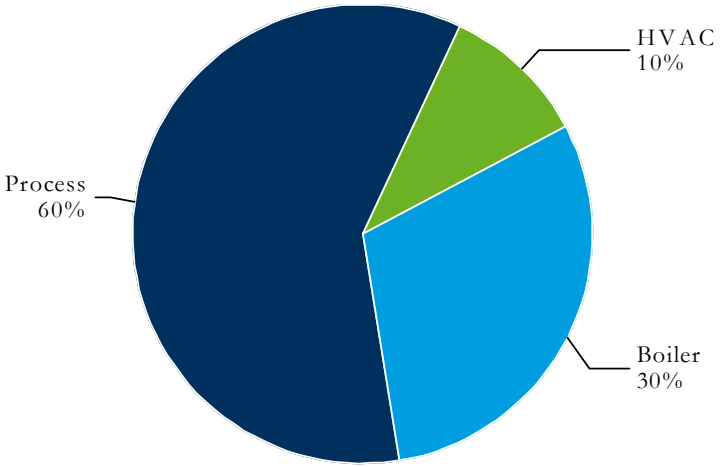


Figure E.101. Industrial Gas Economic Potential in 2016 by End Use, Machinery

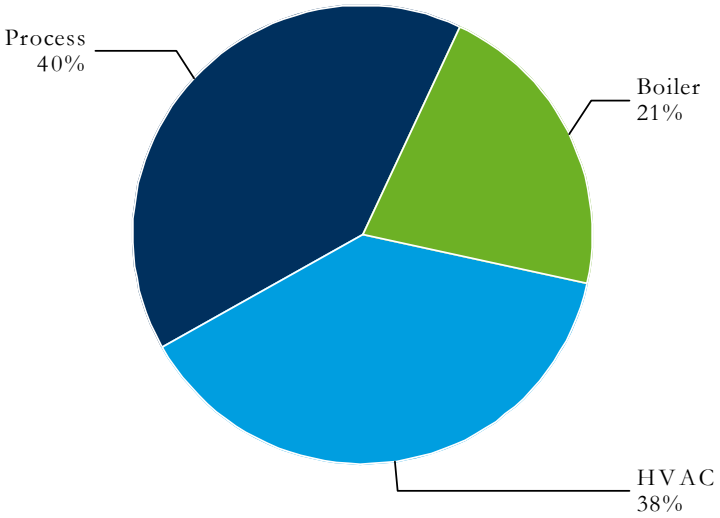


Figure E.102. Industrial Gas Economic Potential in 2016 by End Use, Metals

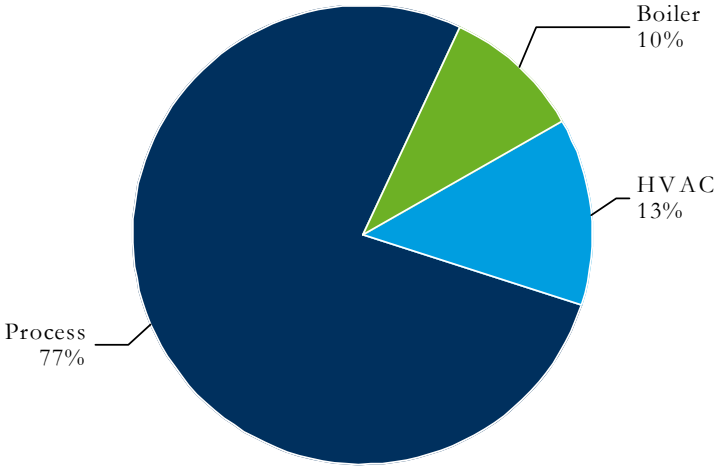
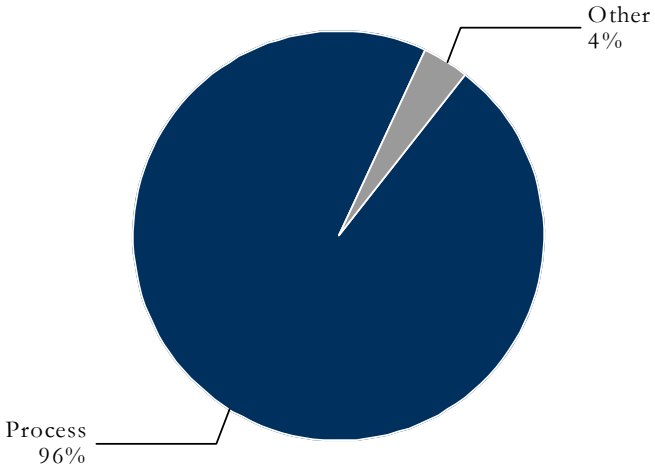


Figure E.103. Industrial Gas Economic Potential in 2016 by End Use, Minerals



Note: "Other" includes:
HVAC: 2%, Boiler: 2%

Figure E.104. Industrial Gas Economic Potential in 2016 by End Use, Other Industrial

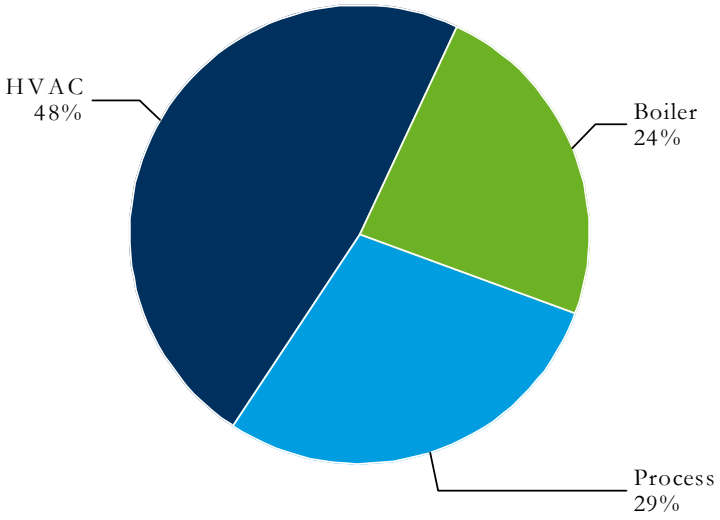


Figure E.105. Industrial Gas Economic Potential in 2016 by End Use, Paper

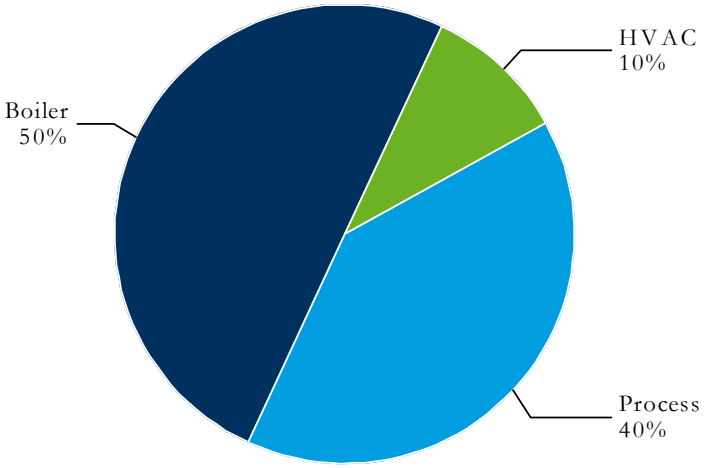
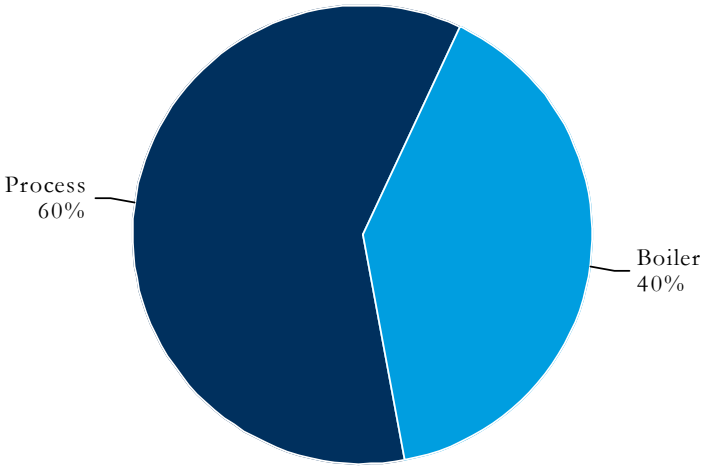


Figure E.106. Industrial Gas Economic Potential in 2016 by End Use, Petroleum



Appendix F: List of Energy-Efficiency Potential Studies Used in Achievable Benchmarking

This appendix contains a table of energy-efficiency potential studies used in assessing achievable potential.

Table F.1. Energy-Efficiency Potential Studies Used in Achievable Benchmarking

Study Title	Author	Date	Region
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	Arizona
BC Hydro Conservation Potential Review	Marbek	2002	British Columbia
Energy Efficiency Technical Potential Study	GDS	2005	Kentucky - Big Rivers
California Statewide Residential Sector Energy Efficiency Potential Study	Kema	2003	California
California Commercial End-Use Survey	Itron	2006	California
California Statewide Commercial Sector Energy Efficiency Potential Study	Xenergy	2002	California
California Energy Efficiency Potential Study	Itron	2006	California
Colorado DSM Market Potential Study	KEMA, Quantum	2006	Colorado
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	Colorado
Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region	GDS, Quantum	2004	Connecticut
Energy Efficiency & Renewable Energy Economy Study	Kema	2009	Connecticut
Potential for Energy Efficiency and Renewable Energy to Meet Florida's Growing Energy Demand	ACEEE	2008	Florida
Assessment of Energy Efficiency Potential in Georgia	ICF	2005	Georgia
National Transmission Grid Study	ORNL	2001	Iowa
Assessment of Energy and Capacity Savings Potential in Iowa	Cadmus	2008	Iowa - Alliant
Assessment of Energy and Capacity Savings Potential in Iowa	Cadmus	2008	Iowa - MidAmerican
Kansas Energy Council EE Potential Study Draft Results	Summit Blue	2008	Kansas
Electric Energy Efficiency Plan	Exeter/OEI	2003	Maine
Energy Efficiency: First Fuel for a Clean Energy Future	ACEEE	2008	Maryland
Fitchburg Gas and Electric Light Company, Massachusetts Electric Company, NSTAR, and Western Massachusetts Electric Company: The Remaining Electric Energy Efficiency Opportunities in Massachusetts	RLW Analytic, SFMC	2007	Massachusetts
The Remaining Electric Energy Efficiency Opportunities in Massachusetts. Middletown, Conn.and Middleton, Wisc.	RLW Analytics, SFMC	2001	Massachusetts
Colorado DSM Market Potential Assessment	Kema	2006	Midwest
Minnesota's Next Generation Energy Act of 2007	Strom	2005	Minnesota
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	Nevada

Study Title	Author	Date	Region
Economically Achievable Energy Efficiency Potential in New England	OEI	2004	New England
Additional Opportunities for Energy Efficiency in New Hampshire	GDS	2009	New Hampshire
New Jersey Energy Efficiency and Distributed Generation Market Assessment	Kema	2004	New Jersey
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	New Mexico
New York State Energy Research and Development Authority, Energy Efficiency and Renewable Energy Resource Development Potential in New York State - Final Report	Optimal, ACEEE, et al	2003	New York
Study of the Feasibility of Energy Efficiency as an Eligible Resource as Part of a Renewable Portfolio Standard for the State of North Carolina	GDS	2006	North Carolina
Sixth Northwest Power Plans	NWP&CC	2009	Northwest
Energy Efficiency and Conservation Measure Resource Assessment for the Residential, Commercial, Industrial and Agricultural Sectors.	Ecotope, ACEEE, Tellus	2003	Oregon
Assessment of Long-Term, System-Wide Potential for Demand Side and Other Supplemental Resources	Cadmus	2007	PacifiCorp
Potential for Energy Efficiency, Demand Response, and Onsite Solar in Pennsylvania	ACEEE	2009	Pennsylvania
Opportunity Report	Rhode Island Energy Efficiency and Resources Management Council (EERMC):	2008	Rhode Island
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP, ACEEE	2002	Southwest
Power to Save: An Alternative Path to Meet Electric Needs in Texas,	OEI	2007	Texas
Potential for Energy Efficiency, Demand Response, and Onsite Renewable Energy to Meet Texas' Growing Electricity Needs	ACEEE	2007	Texas
Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018	Itron	2008	Texas
Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S.	EPRI	2009	U.S.
Unlocking Energy Efficiency in the U.S. Economy	McKinsey	2009	U.S.
Clean Energy Future study	IWG/ORNL	2000	U.S.
Southwest Energy Efficiency Project	SWEEP	2001	Utah
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	Utah
Vermont Department of Public Service Electric and Economic Impacts Maximum Achievable Statewide Efficiency Savings, 2003–2012: Results and Analysis Summary	Optimal Energy/VEIC	2002	Vermont
Vermont Electric Energy Efficiency Potential Study	GDS	2007	Vermont
Comprehensive Assessment of Demand-Side Resource Potentials (2010-2029)	Cadmus	2009	Washington - PSE

Study Title	Author	Date	Region
Comprehensive Assessment of Demand-Side Resource Potentials (2008-2027)	Quantec	2006	Washington - PSE
Conservation Potential Assessment (2007-2026)	Quantec	2007	Washington - Tacoma
Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for the years 2012 and 2018	Energy Center	2009	Wisconsin
The New Mother Lode: The Potential for More Efficient Electricity Use in the Southwest	SWEEP	2003	Wyoming

THE
CADMUS
GROUP, INC.