

Illinois State Building Energy Expenditure Study FY2014
And Projected FY2015-2017

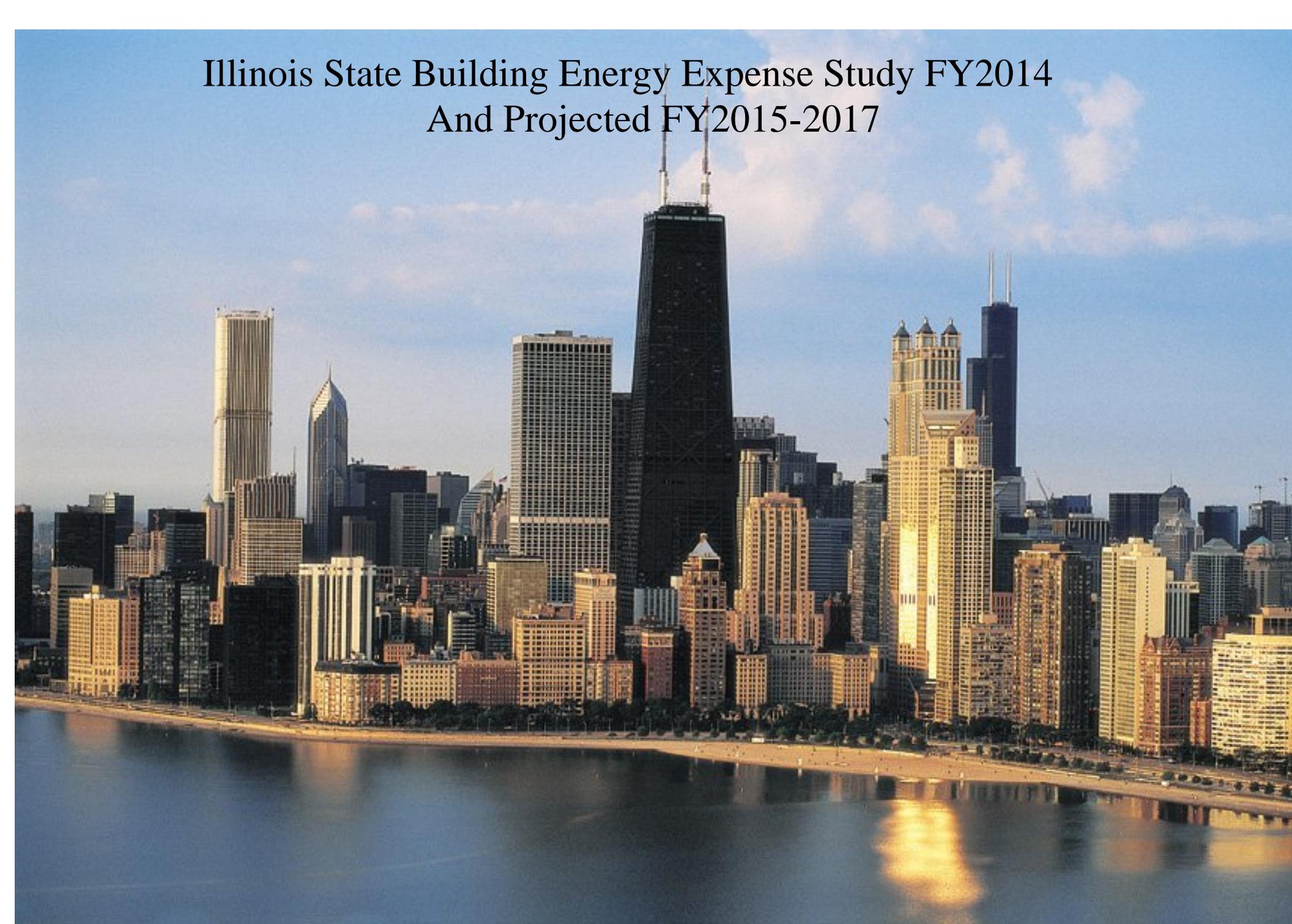




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State Building Energy Program
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Executive Summary

In this report, DCEO summarizes energy costs for Illinois state buildings, by fuel type and agency, for FY10 through FY14. It also projects energy costs for FY15 through FY17, based on previous expenditures of representative state agencies.

During FY14, the State of Illinois spent \$182,650,718 in energy costs (for natural gas, electricity, coal, oil, propane, and steam) to operate state-owned and leased buildings. This is an 8% increase from FY13. Energy consumption for FY14 was 17,217,426 MMBtu (Million Btus), which is a 12.3% increase from FY13. These increases may be surprising to some, given the aggressive steps the State has taken to reduce energy consumption, as well as agency and building consolidations. Over the last year, the State, through its agencies, has enacted many measures to lower energy consumption, including: lowering building temperatures in winter and raising them in summer, pursuing performance contracts, performing retrocommissioning and energy audits of state buildings, and completing energy efficiency projects with the support of grants and rebates. Nevertheless, unfortunately, energy consumption overall did increase, and this can in part be contributed to the significant increase in heating and cooling degree days. There was 84.07% increase in cooling degree days in FY14 from FY13, and a 12.88% increase in heating degree days. The cooling degree days for FY14 were 31.77% above the normal, and heating degree days were 7.06% above normal.

In turn, the increase in energy consumption explains the increase in energy costs. Across State agencies, there was a 17.09% increase in electricity costs in FY14 from FY13, a 26.15% increase in natural gas costs, and a 160.83% increase in fuel oil costs. There was one decrease on the coal costs side by 2.5%. Energy costs were mitigated however, by two main factors. The State has continued to consolidate large purchases of natural gas, and, in the last four years, aggregated purchasing of electricity has continued for all large users in the Commonwealth Edison and Ameren service territories. This has had a dramatic impact on stabilizing energy costs for the State well below the private sector. Another less significant factor is that the State also decreased its contribution to public universities for energy costs by 0.7% (66.8% in FY13 to 66.1% in FY14).

In reviewing agency level data for both consumption and costs, it should be noted that the Department of Central Management Services (CMS) assumed control of smaller agencies' facility operations beginning in FY05, as directed under the Facilities Management, Internal Auditing and Staff Legal Functions Executive Order. This included payment of utility bills. The result is a large increase in the utility expenditures reported to the Comptroller's Office, for CMS. The ability to separate these expenditures by agency under CMS is not available at this time.

Looking forward, energy costs are projected to increase to as much as \$238 million by FY17, due to increasing fuel prices. However, due to the recent volatility in commodity prices, this projection is highly uncertain. Natural gas prices are expected to remain volatile for the next few years, and electric deregulation, which took effect January 1, 2007, will also continue to have a significant impact on electric rates throughout the State. It should also be noted that these projections assume normal weather patterns; deviations from those patterns can also have significant impacts on consumption and costs. The Department of Commerce and Economic Opportunity (DCEO) and its partners will continue to actively work with state building managers to decrease energy consumption and mitigate these costs. For example, DCEO has been collaborating with the Department of Corrections to complete major energy upgrades with the support of its grants and rebates. DCEO will also continue to provide outreach and technical assistance to facility managers, to promote the use of energy savings performance contracts and other energy programs, which over the past ten years have resulted in cost savings of over \$76 million.

Figure 1 illustrates the energy cost history for Illinois state buildings from FY80 through FY14 with cost projections for FY15-17. State buildings' energy expenditures steadily increased from FY80 through FY84. From FY84 through FY86 the costs were essentially level due to falling fossil fuel prices. FY87 and FY88 building costs decreased because of some lower utility rates and energy conservation.

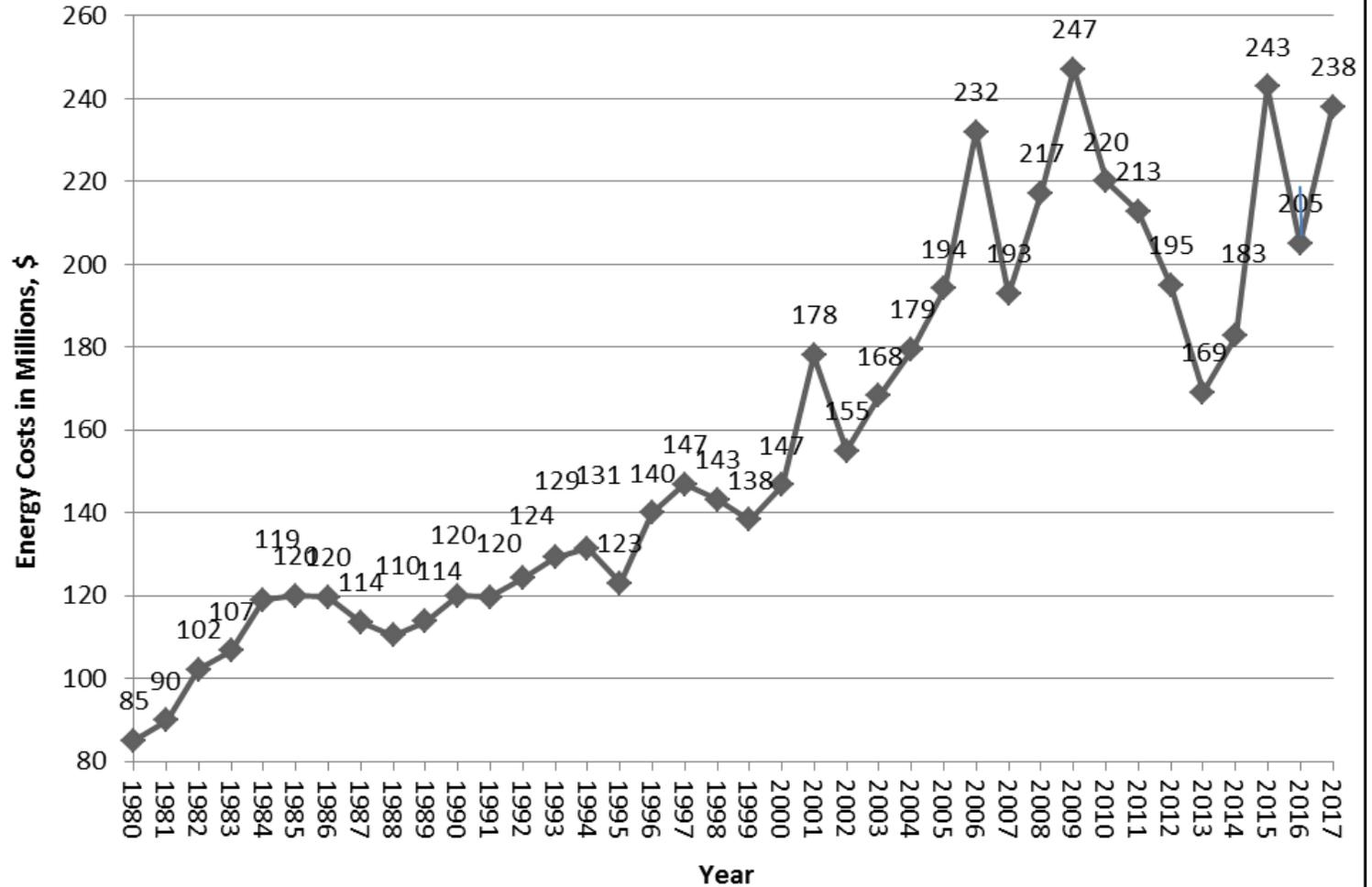
Except for FY95, when there was a dip in natural gas prices, expenditures for fuels increased from FY91 through FY97 due to steadily increasing fuel prices and the addition of new buildings. Electricity and natural gas prices declined at state facilities in FY98 and FY99. The spikes in energy costs in FY01 and FY03 through FY06 are a result of natural gas and electrical price fluctuations. FY09 has seen a huge spike in all energy prices. FY10 through FY13 has seen a decrease in energy costs due to the State's efforts to reduce energy consumption. The increase in FY 14 can be attributed to the increase in heating & cooling costs due to higher than normal weather conditions.

➤ **Figure 1**

The graph presented in Figure 1 is based on data from Table A-3 (State Building Energy Costs and Projections), which details costs for various fuel sources.

For simplicity in calculation it was assumed that the amount of energy consumed, in terms of Btus, would remain constant from FY15 to FY17 (assuming normal weather conditions). Energy usage and weather data since FY81 were used to determine how much energy the State would have used if the weather during FY14 had been normal (7,876 heating and cooling degree days). This value was then used in the projections. The description of Table A-3 explains the methodology.

Figure 1
State of Illinois Building Energy Cost and Predictions FY80 through FY14,
vertical axis "energy Costs in Millions \$", 2015-2017 are Projected Values.



Tables 1 and 2 lists the building energy cost, and consumption figures for the 10 Illinois agencies that incurred the highest energy costs during FY14. Universities, the Department of Corrections (DOC), and the Department of Central Management Services (CMS) were the three largest users of energy, expending 41.8 percent, 15.3 percent and 11.0 percent of the total state building energy costs, respectively.

Electricity accounted for nearly 65.6 percent of the total energy cost, but only 31.2 percent of the total energy consumed (see Figures 3 and 4). At the same time, natural gas accounted for 32.2 percent of the total energy cost and 61.0 percent of the total energy consumed. This illustrates that electricity costs are considerably more per unit of energy than natural gas.

Figure 2, 3, and 4 display the same information graphically.

➤ **Table 1**

The energy expenditures in this study are taken from the Comptroller’s Data Warehouse for FY14. The energy consumption of 83 state agencies, which utilize over 117 million square feet of buildings, is included. The state agencies that are listed individually in this report were chosen because each one accounts for approximately 1 percent or more of the total state buildings energy costs in each year. The remainder is listed under “All Others.” Those energy expenditures made by leased facilities that pay a constant rental charge, but do not pay for utilities directly, are not included in this report.

Table 1 shows the amount of money (excluding gasoline expenditures) that was spent on energy by the State. The energy costs incurred by Universities are taken directly from Board of Higher Education report. The remainder is taken from the FY14 Comptroller’s Data Warehouse. The specific accounts, from which expenditures are included, are listed below.

Account 1251 – Natural Gas

The account includes charges for natural gas furnished by public utilities. This excludes repair, maintenance, rental or equipment sales.

Table 1

State of Illinois FY14 Building Energy Cost (\$)¹

Agency²	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Energy Cost³	% of Total Building Energy Cost
Universities⁴	34,899,015	41,458,251	***	53,078	***	76,410,344	41.8
Corrections	8,655,723	18,484,806	623,378	100,814	***	27,864,721	15.3
Human Services	3,855,157	6,377,705	1,051,968	1,119	***	11,285,949	6.2
Central Management Services⁵	3,210,407	16,882,002	***	14,465	***	20,106,875	11.0
Transportation	1,375,053	10,207,914	***	266,083	***	11,849,050	6.5
Secretary of State	1,536,551	9,687,372	280,907	6,938	***	11,511,768	6.3
Illinois Tollway	724,937	3,585,629	***	***	***	4,310,566	2.4
Natural Resources	233,375	2,581,753	***	681,403	***	3,496,531	1.9
Military Affairs	1,435,862	2,559,931	***	320,394	***	4,316,187	2.4
State Police	301,139	1,185,199	***	35,903	***	1,522,242	0.8
All Others⁶	2,571,097	6,849,598	507,070	48,721	***	9,976,486	5.5
Total	\$58,798,316	\$119,860,160	\$2,463,323	\$1,528,918	\$0	\$182,650,718	100.0

¹ Based on FY14 Comptroller's Data Warehouse records. Natural Gas numbers based on account 1251; Electricity - 1252; Coal - 1341; and Fuel Oil - 1342.

² The agencies in this category expended approximately 1 percent or more of the State's total building energy costs.

³ Gasoline not included.

⁴ Based on FY14 data from Board of Higher Education.

⁵ CMS expenditures and energy use contain data from multiple agencies.

⁶ All remaining state agencies.

Account 1252 – Electricity

The account includes charges for electric power furnished by public utilities. This excludes repair, maintenance, rental or equipment sales.

Account 1254 – University Central Plant Services

Payments by a university to a central service organization for purchased steam, including maintenance of these buildings. Using information from the Board of Higher Education, other fuel types have been separated from this account and added to their respective columns. Other agencies may purchase steam; however, it is impossible to distinguish steam costs with accounting data alone.

Account 1341 – Coal and Coke

These are charges for purchasing coal and coke including related freight or switching charges.

Account 1342 – Fuel Oil and Bottled Gas

These are charges for acquisition of oil or bottled gas for use as fuel in power or heating plants or oil stoves, including related freight or switching charges. The column in Table 1 titled “Fuel Oil” includes the relatively small amount of bottled gas purchased by state agencies.

➤ **Table 2**

Table 2 shows the amount of energy (in millions of Btus) consumed by state agencies. Those figures were developed by converting the cost per year data from Table 1 to consumption. When possible, actual agency energy consumption and cost data were used (e.g. Universities, Human Services and Corrections). If not, The Department of Human Services price averages were used since these were assumed to be representative of prices paid by other state facilities.

The price of oil was based only on the University price, because reliable Human Services data were not available.

The fuel prices and conversion factors are listed in the Table 2 footnotes. Table A-2 lists unit energy cost by fuel type.

Table 2

State of Illinois FY14 Building Energy Consumption (10⁶ Btu)

Agency ¹	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Consumption	% of Total Building Consumption
Universities ²	6,477,817	2,098,637	***	4,351	***	8,580,805	49.8
Corrections ³	1,525,876	772,269	309,106	8,264	***	2,615,515	15.2
Human Services	630,436	266,451	521,626	92	***	1,418,605	8.2
Central Management Services ⁴	525,000	705,306	***	1,186	***	1,231,492	7.2
Transportation	224,863	426,472	***	21,811	***	673,146	3.9
Secretary of State	251,273	404,725	139,290	569	***	795,857	4.6
Illinois Tollway	118,549	149,802	***	***	***	268,351	1.6
Natural Resources	38,164	107,862	***	55,856	***	201,882	1.2
Military Affairs	234,807	106,950	***	26,263	***	368,020	2.1
State Police	49,246	49,516	***	2,943	***	101,705	0.6
All Others	420,453	286,167	251,434	3,994	***	962,048	5.6
Total	10,496,484	5,374,157	1,221,456	125,329	0	17,217,426	100.0

¹ Energy consumption for all agencies, except Universities and Corrections, is based on adjusted average Human Services

FY14 unit energy costs as follows:

Human Services unit costs

Natural Gas \$0.612/therm or \$6.115/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0817/kwh or \$23.936/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$44.44/ton or \$2.017/10⁶ Btu (1 lb. = 11,018 Btu)
 Oil (#2) \$1.63/gal or \$12.20/10⁶ Btu (1 gal = 138,974 Btu)

³ Corrections Natural Gas \$0.567/therm or \$5.673/10⁶ Btu (1 therm = 100,000 Btu)

⁴ CMS expenditures and energy use contain data from multiple agencies.

² University unit costs:

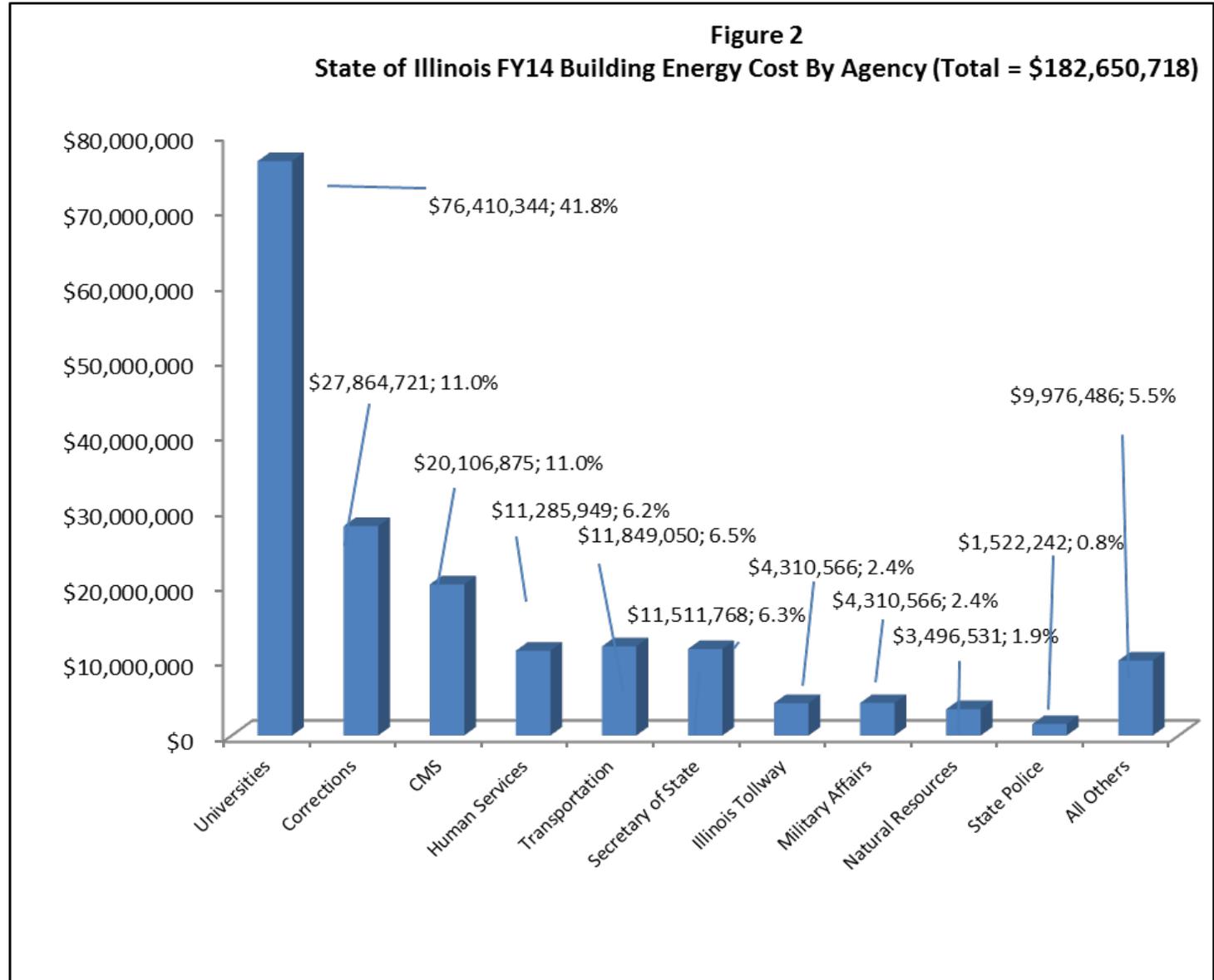
Universities Unit costs

Natural Gas \$0.539/therm or \$5.4/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0674/kwh or \$19.76/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$44.44/ton or \$2.02/10⁶ Btu (1 lb. = 11,190 Btu)
 Oil & Propane \$1.63/gal or \$12.20/10⁶ Btu (1 gal = 136,049 Btu)
 Steam No steam purchase was reported (1 lb. steam = 1,000 Btu)

Figure 2 illustrates building energy cost for the ten (10) Illinois agencies that incurred the highest energy costs for FY14. Universities, the Department of Corrections, and the Department of Central Management Services were the three largest single users of energy, expending 41.8 percent, 15.3 percent, and 11.0 percent of the total state building energy costs, respectively.

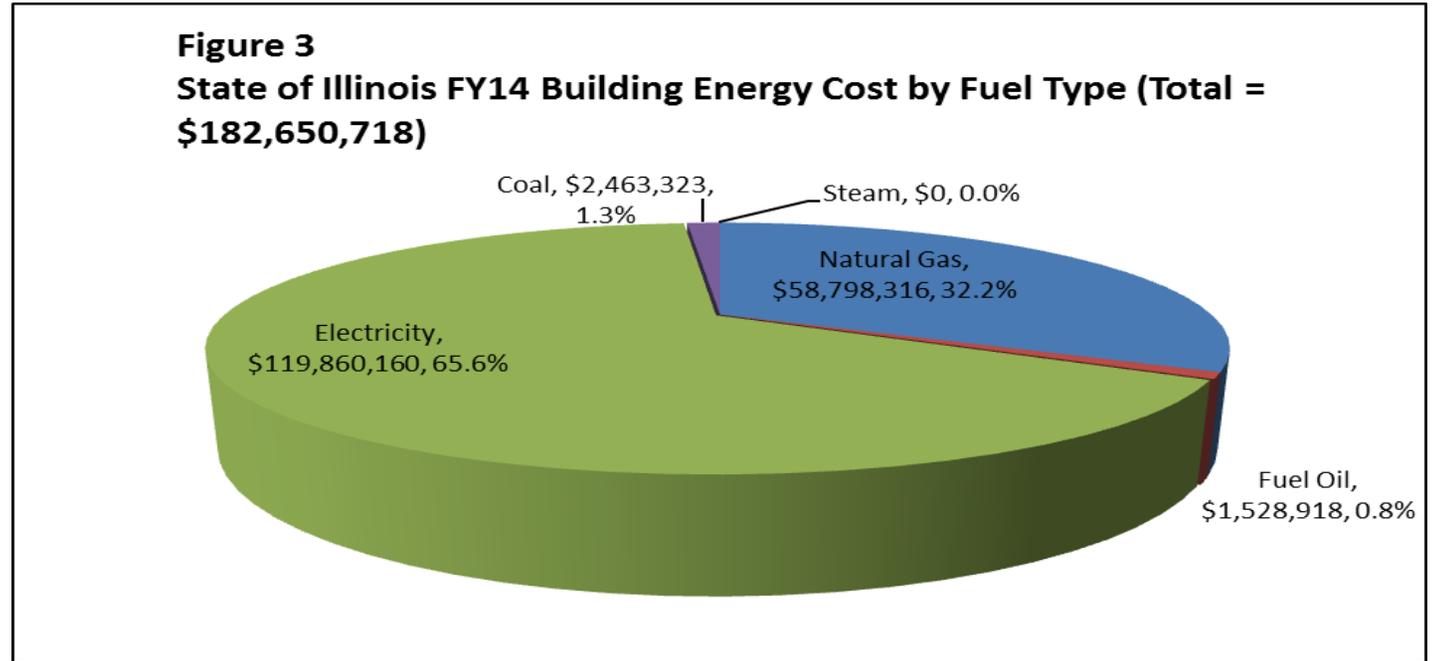
➤ **Figure 2**
 The energy expenditures in this study are taken from the Comptroller's Data Warehouse for FY14. The state agencies that are listed individually in this report were chosen because each one accounts for approximately 1 percent or more of the total state buildings energy costs in each year. The remainder is listed under "All Others." Those energy expenditures made by leased facilities that pay a constant rental charge, but do not pay for utilities directly, are not included in this report.

Expenditures by CMS contain data from multiple agencies.



➤ **Figure 3**

Figure 3 illustrates the state buildings energy cost for FY14 presented graphically by fuel type. Data from Table 1 was used to show that electricity accounts for the greatest energy cost: 65.6 percent of the total of all buildings energy costs. Natural gas cost accounts for 32.2 percent of the total energy costs followed by coal, fuel oil and steam which account for 1.3 percent, 0.8 percent, and 0 percent, respectively.



➤ **Figure 4**

Figure 4 illustrates the state buildings energy consumption for FY14 presented graphically by fuel type. Data from Table 2 was used to show that natural gas accounts for the highest fuel consumption: 61.0 percent of the total of all buildings' energy consumption. Electricity consumption accounts for 31.2 percent of the total buildings' energy consumption followed by coal, fuel oil and steam which account for 7.1 percent, 0.7 percent, and 0 percent, respectively.

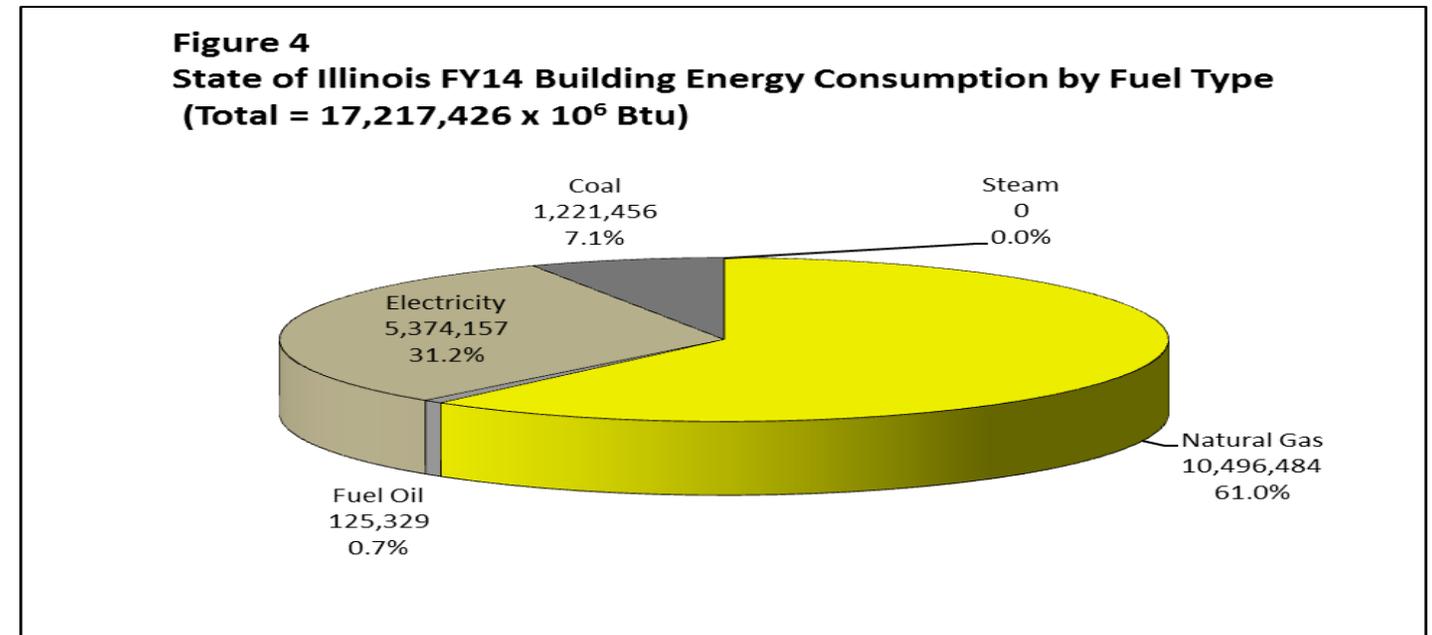


Table 3 lists the 10 agencies' energy and cost index numbers, which can be used for monitoring the progress of an energy conservation program. The building area figures used to generate these index numbers are only estimates because accurate agency totals are not readily available. The wide range of energy index numbers is due to the various types and uses of buildings by the different agencies.

➤ **Table 3**

In Table 3, cost index numbers and energy index numbers are generated by using information from Tables 1 and 2 and gross building area data from each state agency. The gross building area figures are obtained directly from the agencies and compared to Capital Development Board records. The energy and cost index numbers that appear in Table 3 include some energy charges for leased buildings for which the State pays the utility costs.

Many of the building area table figures are updated from previous reports as new and more accurate information becomes available. Agency-to-agency facility transfers and closings and new building openings all contribute to overall building inventory changes. Changes in agency gross area can mean similar differences in both cost and energy index numbers when compared from year to year. Such changes can yield discontinuity from year to year and can alter significantly the current energy cost and use position of those affected.

Table 3

State of Illinois FY14 Building Energy Index Number Data

Agency	Fuel Cost Total	Energy Use Total (x 10⁶ Btu)	Building Area⁴ (x 10⁶ Sq. Ft)	Energy Index² Btu/Sq. Ft /Yr.	Cost Index³ \$/Sq. Ft /yr.
Universities	76,410,344	8,580,805	76.55	112,094	1.00
Corrections	27,864,721	2,615,515	15.46	169,179	1.80
Human Services	11,285,949	1,418,605	9.10	155,891	1.24
Central Management Services⁵	20,106,875	1,231,492	***1	***1	***1
Transportation	11,849,050	673,146	2.23	301,859	5.31
Secretary of State	11,511,768	795,857	3.79	209,989	3.04
Illinois Tollway	4,310,566	268,351	3.82	70,249	1.13
Natural Resources	3,496,531	201,882	0.90	224,313	3.89
Military Affairs	4,316,187	368,020	4.02	91,602	1.07
State Police	1,522,242	101,705	0.78	129,673	1.94
All Others	9,976,486	962,048	***1	***1	***1
Total	\$182,650,718	17,217,426	***	***	***

¹ Accurate building area figure not available.

² Energy Index = Amount of energy used per square foot per year.

³ Cost Index = cost of energy used per square foot per year.

⁴ These figures are estimates based on best available data and may change from year to year as current data becomes available. See Table 3 description for further clarification.

Tables 4 and 5 show State of Illinois buildings energy cost and consumption comparisons for FY10 through FY14. The data show a total cost increase of 8.0 percent from FY13 to FY14 and a consumption increase of 21.2 percent for the same period.

➤ **Table 4**

Table 4 gives a five-year energy cost history for the different agencies reported and then compares each year's cost to the previous year's to give a percentage cost change. The data in the five columns are taken from the various cost tables from this report.

Cost variations from year to year can be attributed to several factors that are listed below.

1. *Fuel Prices*

Fuel prices for the last seven years have had drastic increases as compared to the relatively stable prices in the 80's and 90's. These increases have been mitigated by purchasing programs instigated by CMS. Changing fuel prices significantly affect the total yearly energy costs.

2. *Weather Conditions*

As noted in the footnote to Table 4, no attempt has been made to adjust the results to reflect climatic variations from year to year and climatic differences from north to south.

3. *Facility Changes*

In recent years factors such as economics have caused the closing or opening of facilities in some agencies. This would have an effect on energy cost from year to year that is not taken into account in this report.

4. *Conservation*

The drastically increasing fuel prices in the past seven years, has again prompted a nationwide awareness of the need for energy conservation. This renewed public awareness has encouraged the state to adopt measures to conserve energy. While the conservation factor is disregarded for cost projections, it has affected the energy cost totals of Table 4.

Table 4

State of Illinois FY10 through FY14 Building Energy Cost Comparison¹

Agency	FY10 Energy Cost (x \$1000)		FY11 Energy Cost (x \$1000)		FY12 Energy Cost (x \$1000)		FY13 Energy Cost (x \$1000)		FY14 Energy Cost (x \$1000)	
Universities	97,530.2	(-14.8) ² ✓	95,113.2	(-2.5) ✓	89,464.8	(-5.9) ✓	77,219.5	(-13.7) ✓	76,410.3	(-1.0)
Corrections	33,583.8	(-11.2) ✓	31,168.7	(-7.2) ✓	28,015.3	(-10.1) ✓	24,637.4	(-12.1) ✓	27,864.7	(13.1)
Human Services	16,944.6	(-10.1) ✓	15,318.0	(-9.6) ✓	13,030.8	(-14.9) ✓	9,999.2	(-23.3) ✓	11,285.9	(12.9)
Central Management Services³	25,321.9	(-3.4)	23,709.2	(-6.4)	21,701.7	(-8.5)	17,224.9	(-20.6)	20,106.9	(16.7)
Transportation	11,650.0	(-1.9) ✓	11,221.7	(-3.7) ✓	9,882.1	(-11.9) ✓	9,641.8	(-2.4) ✓	11,849.1	(22.9)
Secretary of State	10,832.8	(2.7) ✓	11,255.6	(3.9) ✓	11,119.9	(-1.2) ✓	10,643.9	(-4.3) ✓	11,511.8	(8.2)
Illinois Tollway	4,732.8	(-7.1) ✓	4,858.6	(2.7) ✓	4,130.7	(-15.0) ✓	3,663.2	(-11.3) ✓	4,310.6	(17.7)
Natural Resources	3,567.1	(4.7) ✓	3,419.4	(-4.1) ✓	3,038.3	(-11.1) ✓	2,707.8	(-10.9) ✓	3,496.5	(29.1)
Military Affairs	4,022.8	(-9.3) ✓	4,189.9	(4.2) ✓	3,688.8	(-12.0) ✓	3,501.6	(-5.1) ✓	4,316.2	(23.3)
State Police	1,582.7	(-11.5) ✓	1,654.8	(4.6) ✓	1,422.0	(-14.1) ✓	1,217.5	(-14.4) ✓	1,522.2	(25.0)
Children & Family Services³	***	***	***	***	***	***	***	***	***	***
All Others³	10,243.3	(-18.7) ✓	10,867.9	(6.1) ✓	9,417.7	(-13.3) ✓	8,602.2	(-8.7) ✓	9,976.5	(16.0)
Total	220,012.0	(-11.0)	212,776.9	(-3.3)	194,912.0	(-8.4)	169,059.0	(-13.3)	182,650.7	(8.0)

¹ Due to diverse weather conditions in Illinois, no attempt has been made to adjust the results to reflect climate severity from year to year and climatic differences from north to south. Representative weather data are shown on Table 5.

² Brackets denote percentage change from previous year.

³ CMS expenditures and energy use contain data from multiple agencies. Starting in FY05, Children & Family Services and some smaller agencies in the All Others group are included in the CMS data.

➤ **Table 5**

Table 5 presents a five-year energy consumption history for the agencies listed, and then compares each year's use to the previous year's to give percentage consumption change. The data in the five columns are taken from the various consumption tables in this report.

Consumption variations from year to year can be attributed to the same factors that affected the cost variations in Table 4 (except fuel prices.)

An indication of weather variation over the last five years is given by the Heating Degree Day and Cooling Degree Day lines at the bottom of the table. A Heating or Cooling Degree Day is a unit, based on temperature difference and time, used in estimating fuel consumption and specifying the nominal heating/cooling load of a building.

The degree day data shown are based on Peoria weather, which is considered to be representative of the state. These data should be used only for identifying weather trends. No attempt should be made to normalize the consumption data given in order to compensate for weather differences.

Table 5

State of Illinois FY10 through FY14 Building Energy Consumption Comparison ¹

Agency	FY10 Energy Consumption (10⁹ BTU)		FY11 Energy Consumption (10⁹ BTU)		FY12 Energy Consumption (10⁹ BTU)		FY13 Energy Consumption (10⁹ BTU)		FY14 Energy Consumption (10⁹ BTU)	
Universities	10,065.6	(-2.3) ²	9,964.4	(-1.0)	8,852.6	(-11.2)	8,017.7	(-9.4)	8,580.8	(7.0)
Corrections	2,945.5	(-0.9)	2,727.8	(-7.4)	2,317.1	(-15.1)	2,128.9	(-8.1)	2,615.5	(22.9)
Human Services	2,381.6	(-3.2)	2,079.7	(-12.7)	1,639.4	(-21.2)	1,146.6	(-30.1)	1,418.6	(23.7)
Central Management Services ³	1,180.3	(-17.4)	1,093.6	(-7.3)	951.9	(-12.9)	798.5	(-16.1)	1,231.5	(54.2)
Transportation	511.9	(-15.6)	485.8	(-5.1)	414.5	(-14.7)	414.1	(-0.1)	673.1	(62.6)
Secretary of State	686.0	(-22.6)	706.2	(2.9)	661.1	(-6.4)	630.4	(-4.6)	795.9	(26.2)
Illinois Tollway	266.9	(-4.2)	242.4	(-9.2)	188.2	(-22.3)	169.3	(-10.1)	268.4	(58.5)
Natural Resources	166.2	(-6.2)	156.3	(-6.0)	133.1	(-14.8)	118.3	(-11.1)	201.9	(70.7)
Military Affairs	263.2	(-21.7)	268.0	(1.8)	219.1	(-18.2)	68.3	(-68.8)	368.0	(438.9)
State Police	79.0	(-21.6)	84.0	(6.3)	64.3	(-23.5)	63.9	(-0.6)	101.7	(59.2)
Children & Family Services ³	***	***	***	***	***	***	***	***	***	***
All Others ³	999.1	(-6.6)	872.6	(-12.7)	700.6	(-19.7)	653.1	(-6.8)	962.0	(47.3)
Total	19,545.3	(-5.2)	18,680.7	(-4.4)	16,141.9	(-13.6)	14,209.1	(-12.0)	17,217.4	(21.2)
HDD ⁴	6,017.0	(3.7)	5,954.0	(-1.0)	4,593.0	(-22.9)	5,831.0	(27.0)	6,582.0	(12.9)
CDD	753.0	(20.1)	1,241.0	(64.8)	1,382.0	(11.4)	703.0	(-49.1)	1,294.0	(84.1)

¹ Due to diverse weather conditions in Illinois, there has been no attempt made to adjust the results to reflect climatic variations from year to year and the climatic differences from north to south. Representative weather data are shown on Table 5

² Brackets denote percentage change from previous year.

³ CMS expenditures and energy use contain data from multiple agencies. Starting in FY05, Children & Family Services and some smaller agencies in the All Others group are included in the CMS data.

⁴ HDD/CDD refers to the Heating Degree Days and Cooling Degree Days for Peoria (Normal HDD = 5,846 and Normal CDD = 982). These numbers should be used for comparing weather trends only. Further discussion on their interpretation is given in the appendix, under Table 5 description.



Photo credit - Alper Cakir/50m

Appendix

➤ **Table A-1**

This table is prepared using data from Global Insight, Inc., U.S. Economic Outlook January, 2007. The numbers are average fuel price multipliers for the years identified.

TABLE A-1

Unit Energy Cost Projection Multipliers¹

Energy Source	2015/2014	2016/2014	2017/2014
Natural Gas 	1.4716	1.0130	1.1382
Electricity 	1.3624	1.2595	1.4855
Coal 	1.0050	1.0098	1.0157
Oil (#2) 	1.1470	1.0359	1.0126
Oil (#6) 	1.2259	1.0053	1.0295
Steam 	1.0050	1.0098	1.0157

¹ Projection multipliers are found by averaging the quarterly Global Insight indices to obtain fiscal year indices and determining the percent change from the base year.

➤ **Table A-2**

Table A-2 shows the unit energy prices for FY10 through FY17. FY10 through FY14 are actual fuel costs and FY15 through FY17 are projected costs. The projection method used was to multiply the FY14 fuel price by its respective price multiplier from Table A-1, to obtain the specific fuel price for FY15 through FY17. That is current price X projection multiplier = projected price.

This table is prepared using data from the Illinois Board of Higher Education, Distributional Analysis of Energy Usage and Cost FY14 report and the Illinois State Water Survey, Power Plant Efficiency FY14 report.

Table A-2

Unit Energy Costs by Fuel Type

Energy Source	Actual					Projected ¹		
	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Natural Gas (¢/therm)								
Human Services	83.01	85.07	84.83	84.83	61.15	89.99	61.95	69.60
Universities	75.86	71.82	78.45	60.01	53.87	79.28	54.58	61.32
Electricity (¢/kwh)								
Human Services	9.61	9.79	9.77	9.77	8.17	11.13	10.29	12.14
Universities	7.55	7.72	7.08	6.69	6.74	9.19	8.49	10.02
Coal (\$/ton)								
Human Services	38.76	39.26	39.28	47.02	44.44	44.66	44.88	45.14
Universities	77.11	78.97	72.59	72.59	44.44	44.66	44.88	45.14
Oil (\$/gal)								
Human Services	1.85	1.80	1.80	2.21	1.63	1.87	1.69	1.66
Universities	1.31	1.31	1.31	2.21	1.63	2.00	1.64	1.68
Steam (\$/1000 lb.)								
Universities	14.60	14.60	14.60	14.60	14.60	14.67	14.74	14.83

¹ Projected prices obtained by multiplying FY14 price by its respective projection multiplier (Table A-1).

➤ **Table A-3**

Table A-3 lists energy costs and projections from FY10 to FY17, by fuel types, FY10 through FY14 figures are actual figures and FY15 through FY17 figures are projected. In past reports (pre-FY85), projected costs were obtained by simply multiplying the current utility cost by its respective price multiplier (Table A-1). However, these projections were made assuming that the same amount of energy would be used each year, regardless of weather differences. If the weather during the current year happened to be mild (below normal, as it was in 1985), this led to conservative projections. The weather during the current year was extreme (above normal, as it was in 1984), and then the projections would be over-estimated. To avoid these problems a projection method, which attempts to de-emphasize the weather effect, has been implemented.

The method used to obtain weather-normalized base year cost, for projections, is as follows:

1. Perform a linear regression on consumption totals against total degree days (heating plus cooling) for FY81 through FY14 to obtain the equation for the best fitting line through the data.
2. Substitute the current-year (6,534 DD) degree day number into the equation for the line obtained in step 1.
3. Substitute the normal-year (6,820 DD) degree day number into the equation for the line obtained in step 2.
4. The weather-adjusted normal consumption is the current-year usage plus the usage found in step 3 minus the usage found in step 2. (17,249,733 MMBtu + 18,085,644 MMBtu – 18,874,606 MMBtu = 16,460,810 MMus.)
5. Break the weather-adjusted normal consumption (16,460,810 MMBtu) down by fuel types using the percentages from Figure 4.
6. Multiply each of these by its respective fuel cost in Table 1 divided by the respective fuel consumption in Table 2 to get current normalized dollar totals. (Natural Gas = \$56,214,437; Electricity = \$114,592,931; Coal = \$2,355,073; Oil = \$1,461,730; and Steam - \$0).
7. Project from these totals, using the multipliers from Table A-1.

Table A-3

State Building Energy Costs and Projections (x \$1000)

Energy Source	Actual					Projected ¹		
	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17
Natural Gas	72,590	69,980	61,085	52,498	58,798	82,723	56,946	63,982
Electricity	135,087	131,416	125,217	113,146	119,860	156,126	144,327	170,231
Coal	11,138	10,275	7,725	2,668	2,463	2,367	2,378	2,392
Oil	1,198	1,107	885	747	1,529	1,680	1,513	1,481
Steam	0	0	0	0	0	0	0	0
Total	220,012	212,777	194,912	169,059	182,651	242,895	205,164	238,085

¹ Projected costs obtained by multiplying FY14 weather-adjusted utility cost by its respective projection multiplier (Table A-1)

Current weather-adjusted utility costs are: Natural Gas- \$56,214,437; Electricity \$114,592,931; Coal - \$2,355,073; Oil - \$1,461,730; Steam - \$0; Total = \$174,624,171. A complete discussion of the procedure used is given in the following text.

➤ **Table A-4**

This table presents the expenditures on energy by the State for the Fiscal Year as reported in the respective Comptroller's Data Warehouse records. The same description and preparation methods as were used in Table 1 apply.

Table A-4

State of Illinois FY13 Building Energy Cost (\$) ¹

Agency ²	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Energy Cost ³	% of Total Building Energy Cost
Universities ⁴	35,268,596	41,897,294	***	53,640	***	77,219,531	45.7
Corrections	6,375,240	17,732,116	488,611	41,394	***	24,637,360	14.6
Human Services	2,504,252	6,112,612	1,357,998	24,326	***	9,999,188	5.9
Central Management Services ⁵	2,368,943	14,837,686	***	18,224	***	17,224,853	10.2
Transportation	892,993	8,620,184	***	128,652	***	9,641,829	5.7
Secretary of State	1,173,665	9,089,715	371,482	9,001	***	10,643,862	6.3
Illinois Tollway	498,729	3,164,504	***	***	***	3,663,232	2.2
Natural Resources	188,037	2,204,910	***	314,827	***	2,707,774	1.6
Military Affairs	1,138,572	2,239,452	***	123,578	***	3,501,602	2.1
State Police	194,263	1,008,305	***	14,918	***	1,217,487	0.7
All Others ⁶	1,895,048	6,238,935	449,628	18,638	***	8,602,249	5.1
Total	\$52,498,337	\$113,145,714	\$2,667,719	\$747,198	\$0	\$169,058,968	100.0

¹ Based on FY13 Comptroller's Data Warehouse records. Natural Gas numbers based on account 1251; Electricity - 1252; Coal - 1341; and Fuel Oil - 1342.

² The agencies in this category expended approximately 1 percent or more of the State's total building energy costs.

³ Gasoline not included.

⁴ Based on FY13 data from Board of Higher Education.

⁵ CMS expenditures and energy use contain data from multiple agencies.

⁶ All remaining state agencies.

➤ **Table A-5**

This table shows the amounts of energy consumed, in millions of Btus, by the State, for the Fiscal Year, respectively. The same description and preparation methods as were used in generating Table 2 apply.

Table A-5

State of Illinois FY13 Building Energy Consumption (10⁶ Btu)

Agency ¹	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Consumption	% of Total Building Consumption
Universities ²	5,877,606	2,136,859	***	3,258	***	8,017,723	56.4
Corrections ³	1,278,133	619,237	228,995	2,514	***	2,128,879	15.0
Human Services	295,194	213,463	636,446	1,477	***	1,146,580	8.1
Central Management Services ⁴	279,244	518,158	***	1,107	***	798,509	5.6
Transportation	105,264	301,032	***	7,813	***	414,109	2.9
Secretary of State	138,348	317,429	174,101	547	***	630,425	4.4
Illinois Tollway	58,789	110,510	***	***	***	169,299	1.2
Natural Resources	22,165	76,999	***	19,120	***	118,284	0.8
Military Affairs	22,899	35,212	***	10,176	***	68,287	0.5
State Police	19,790	43,182	***	906	***	63,878	0.4
All Others	223,383	217,875	210,725	1,132	***	653,115	4.6
Total	8,320,815	4,589,956	1,250,267	48,050	0	14,209,088	100.0

¹ Energy consumption for all agencies, except Universities and Corrections, is based on adjusted average Human Services

FY13 unit energy costs as follows:

Human Services unit costs

Natural Gas \$0.8483/therm or \$8.483/10⁶ Btu (1 therm = 100,000 Btu)

Electricity \$0.0977/kwh or \$28.635/10⁶ Btu (1 kwh = 3,413 Btu)

Coal \$47.019/ton or \$2.134/10⁶ Btu (1 lb. = 11,018 Btu)

Oil (#2) \$2.29/gal or \$16.47/10⁶ Btu (1 gal = 138,974 Btu)

³ Corrections Natural Gas \$0.499/therm or \$4.988/10⁶ Btu (1 therm = 100,000 Btu)

⁴ CMS expenditures and energy use contain data from multiple agencies.

² University unit costs:

Universities Unit costs

Natural Gas \$0.600/therm or \$6.0/10⁶ Btu (1 therm = 100,000 Btu)

Electricity \$0.0669/kwh or \$19.61/10⁶ Btu (1 kwh = 3,413 Btu)

Coal \$72.59/ton or \$3.29/10⁶ Btu (1 lb. = 11,190 Btu)

Oil & Propane \$2.29/gal or \$16.47/10⁶ Btu (1 gal = 136,049 Btu)

Steam No steam purchase was reported (1 lb. steam = 1,000 Btu)

➤ **Table A-6**

This table presents the expenditures on energy by the State for the Fiscal Year as reported in the respective Comptroller's Data Warehouse records. The same description and preparation methods as were used in Table 1 apply.

Table A-6

State of Illinois FY12 Building Energy Cost (\$)¹

Agency²	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Energy Cost³	% of Total Building Energy Cost
Universities⁴	42,279,308	42,446,748	4,660,821	77,924	***	89,464,802	45.9
Corrections	7,498,572	19,853,188	591,286	72,262	***	28,015,309	14.4
Human Services	3,532,045	7,787,983	1,692,904	17,876	***	13,030,809	6.7
Central Management Services⁵	2,334,455	19,356,388	***	10,817	***	21,701,660	11.1
Transportation	769,425	8,971,670	***	141,032	***	9,882,127	5.1
Secretary of State	1,180,844	9,598,347	331,526	9,148	***	11,119,865	5.7
Illinois Tollway	530,156	3,600,580	***	0	***	4,130,736	2.1
Natural Resources	158,766	2,530,375	***	349,134	***	3,038,275	1.6
Military Affairs	1,008,685	2,512,564	***	167,556	***	3,688,805	1.9
State Police	167,883	1,236,524	***	17,550	***	1,421,957	0.7
All Others⁶	1,624,410	7,323,060	448,733	21,464	***	9,417,666	4.8
Total	\$61,084,549	\$125,217,427	\$7,725,270	\$884,763	\$0	\$194,912,010	100.0

¹ Based on FY12 Comptroller's Data Warehouse records. Natural Gas numbers based on account 1251; Electricity - 1252; Coal - 1341; and Fuel Oil - 1342.

² The agencies in this category expended approximately 1 percent or more of the State's total building energy costs.

³ Gasoline not included.

⁴ Based on FY12 data from Board of Higher Education.

⁵ CMS expenditures and energy use contain data from multiple agencies.

⁶ All remaining state agencies.

➤ **Table A-7**

This table shows the amounts of energy consumed, in millions of Btus, by the State, for the Fiscal Year, respectively. The same description and preparation methods as were used in generating Table 2 apply.

Table A-7

State of Illinois FY12 Building Energy Consumption (10⁶ Btu)

Agency ¹	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Consumption	% of Total Building Consumption
Universities ²	5,389,232	2,044,947	1,414,803	3,579	***	8,852,561	54.8
Corrections ³	1,286,673	693,308	331,734	5,383	***	2,317,098	14.4
Human Services	416,348	271,970	949,782	1,332	***	1,639,432	10.2
Central Management Services ⁴	275,179	675,959	***	806	***	951,944	5.9
Transportation	90,698	313,307	***	10,506	***	414,511	2.6
Secretary of State	139,195	335,191	185,999	681	***	661,066	4.1
Illinois Tollway	62,493	125,739	***	0	***	188,232	1.2
Natural Resources	18,715	88,365	***	26,008	***	133,088	0.8
Military Affairs	118,901	87,743	***	12,482	***	219,126	1.4
State Police	19,790	43,182	***	1,307	***	64,279	0.4
All Others	191,481	255,734	251,756	1,599	***	700,570	4.3
Total	8,008,705	4,935,445	3,134,074	63,683	0	16,141,907	100.0

¹ Energy consumption for all agencies, except Universities and Corrections, is based on adjusted average Human Services

FY12 unit energy costs as follows:

Human Services unit costs

Natural Gas	\$0.8483/therm	or	\$8.483/10 ⁶ Btu (1 therm = 100,000 Btu)
Electricity	\$0.0977/kwh	or	\$28.635/10 ⁶ Btu (1 kwh = 3,413 Btu)
Coal	\$39.277/ton	or	\$1.782/10 ⁶ Btu (1 lb. = 11,018 Btu)
Oil (#2)	\$96.59/gal	or	\$13.42/10 ⁶ Btu (1 gal = 138,974 Btu)

³ Corrections Natural Gas \$0.5703/therm or \$5.703/10⁶ Btu (1 therm = 100,000 Btu)

⁴ CMS expenditures and energy use contain data from multiple agencies.

² University unit costs:

Universities Unit costs

Natural Gas	\$0.785/therm	or	\$7.8/10 ⁶ Btu (1 therm = 100,000 Btu)
Electricity	\$0.0708/kwh	or	\$20.75/10 ⁶ Btu (1 kwh = 3,413 Btu)
Coal	\$72.59/ton	or	\$3.29/10 ⁶ Btu (1 lb. = 11,190 Btu)
Oil & Propane	\$21.78/mmBtu	or	\$160.05/10 ⁶ Btu (1 gal = 136,049 Btu)
Steam	No steam purchase was reported (1 lb. steam = 1,000 Btu)		

➤ **Table A-8**

This table presents the expenditures on energy by the State for the Fiscal Year as reported in the respective Comptroller's Data Warehouse records. The same description and preparation methods as were used in Table 1 apply.

Table A-8

State of Illinois FY11 Building Energy Cost (\$)¹

Agency ²	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Energy Cost ³	% of Total Building Energy Cost
Universities ⁴	44,243,539	44,195,491	6,622,358	51,811	0	95,113,200	44.7
Corrections	9,726,834	20,781,386	594,813	65,693	***	31,168,725	14.6
Human Services	5,136,372	8,035,906	2,127,798	17,888	***	15,317,964	7.2
Central Management Services⁵							
Services ⁵	3,214,954	20,469,998	***	24,198	***	23,709,150	11.1
Transportation	1,044,417	9,972,351	***	204,884	***	11,221,652	5.3
Secretary of State	1,310,652	9,546,572	389,333	9,035	***	11,255,592	5.3
Illinois Tollway	880,188	3,974,499	***	3,928	***	4,858,614	2.3
Natural Resources	209,126	2,709,892	***	500,383	***	3,419,401	1.6
Military Affairs	1,392,749	2,625,457	***	171,713	***	4,189,919	2.0
State Police	306,757	1,324,252	***	23,758	***	1,654,767	0.8
All Others ⁶	2,513,975	7,780,411	540,273	33,246	***	10,867,905	5.1
Total	\$69,979,564	\$131,416,213	\$10,274,576	\$1,106,537	\$0	\$212,776,889	100.0

¹ Based on FY11 Comptroller's Data Warehouse records. Natural Gas numbers based on account 1251; Electricity - 1252; Coal - 1341; and Fuel Oil - 1342.

² The agencies in this category expended approximately 1 percent or more of the State's total building energy costs.

³ Gasoline not included.

⁴ Based on FY11 data from Board of Higher Education.

⁵ CMS expenditures and energy use contain data from multiple agencies.

⁶ All remaining state agencies.

Table A-9

State of Illinois FY11 Building Energy Consumption (10⁶ Btu)

➤ **Table A-9**

This table shows the amounts of energy consumed, in millions of Btus, by the State, for the Fiscal Year, respectively. The same description and preparation methods as were used in generating Table 2 apply.

Agency ¹	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Consumption	% of Total Building Consumption
Universities ²	6,160,616	1,953,043	1,847,984	2,780	***	9,964,423	53.3
Corrections ³	1,664,366	724,706	333,883	4,882	***	2,727,837	14.6
Human Services	603,774	280,235	1,194,386	1,329	***	2,079,724	11.1
Central Management Services ⁴	377,914	713,847	***	1,798	***	1,093,559	5.9
Transportation	122,770	347,764	***	15,226	***	485,760	2.6
Secretary of State	154,065	332,916	218,543	671	***	706,195	3.8
Illinois Tollway	103,465	138,602	***	292	***	242,359	1.3
Natural Resources	24,583	94,502	***	37,187	***	156,272	0.8
Military Affairs	163,716	91,557	***	12,761	***	268,034	1.4
State Police	36,059	46,180	***	1,766	***	84,005	0.4
All Others	295,514	271,325	303,269	2,471	***	872,579	4.7
Total	9,706,842	4,994,677	3,898,065	81,163	0	18,680,747	100.0

¹ Energy consumption for all agencies, except Universities and Corrections, is based on adjusted average Human Services

FY11 unit energy costs as follows:

Human Services unit costs

Natural Gas \$0.851/therm or \$8.51/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0979/kwh or \$28.676/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$38.257/ton or \$1.781/10⁶ Btu (1 lb. = 11,018 Btu)
 Oil (#2) \$96.82/gal or \$13.46/10⁶ Btu (1 gal = 138,974 Btu)

² University unit costs:

Universities Unit costs

Natural Gas \$0.718/therm or \$7.1/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0772/kwh or \$22.63/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$78.97/ton or \$3.58/10⁶ Btu (1 lb. = 11,190 Btu)
 Oil & Propane \$18.58/mmBtu or \$93.43/10⁶ Btu (1 gal = 136,049 Btu)
 Steam No steam purchase was reported (1 lb. steam = 1,000 Btu)

³ Corrections Natural Gas \$0.5703/therm or \$5.703/10⁶ Btu (1 therm = 100,000 Btu)

⁴ CMS expenditures and energy use contain data from multiple agencies.

➤ **Table A-10**

This table presents the expenditures on energy by the State for the Fiscal Year as reported in the respective Comptroller's Data Warehouse records. The same description and preparation methods as were used in Table 1 apply.

Table A-10

State of Illinois FY10 Building Energy Cost (\$)¹

Agency²	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Energy Cost³	% of Total Building Energy Cost
Universities⁴	46,421,793	44,245,270	6,784,481	78,641	0	97,530,186	44.3
Corrections	9,875,441	22,887,334	687,814	133,165	***	33,583,755	15.3
Human Services	5,498,466	8,954,774	2,460,991	30,352	***	16,944,582	7.7
Central Management Services⁵	3,303,660	22,007,188	***	11,100	***	25,321,949	11.5
Transportation	1,065,307	10,393,570	***	191,111	***	11,649,988	5.3
Secretary of State	1,238,653	9,216,277	367,073	10,802	***	10,832,805	4.9
Illinois Tollway	1,159,257	3,564,668	***	8,837	***	4,732,762	2.2
Natural Resources	229,875	2,840,526	***	496,701	***	3,567,102	1.6
Military Affairs	1,338,840	2,519,954	***	164,052	***	4,022,847	1.8
State Police	253,411	1,302,923	***	26,402	***	1,582,736	0.7
All Others⁶	2,205,178	7,154,532	837,221	46,395	***	10,243,326	4.7
Total	\$72,589,882	\$135,087,016	\$11,137,581	\$1,197,559	\$0	\$220,012,038	100.0

¹ Based on FY10 Comptroller's Data Warehouse records. Natural Gas numbers based on account 1251; Electricity - 1252; Coal - 1341; and Fuel Oil - 1342.

² The agencies in this category expended approximately 1 percent or more of the State's total building energy costs.

³ Gasoline not included.

⁴ Based on FY10 data from Board of Higher Education.

⁵ CMS expenditures and energy use contain data from multiple agencies.

⁶ All remaining state agencies.

➤ **Table A-11**

This table shows the amounts of energy consumed, in millions of Btus, by the State, for the Fiscal Year, respectively. The same description and preparation methods as were used in generating Table 2 apply.

Table A-11

State of Illinois FY10 Building Energy Consumption (10⁶ Btu)

Agency ¹	Natural Gas	Electricity	Coal	Fuel Oil	Purchased Steam	Total Building Consumption	% of Total Building Consumption
Universities ²	6,119,345	2,001,248	1,938,738	6,304	***	10,065,635	51.5
Corrections ³	1,731,689	812,744	390,990	10,081	***	2,945,504	15.1
Human Services	662,362	317,990	1,398,956	2,298	***	2,381,606	12.2
Central Management Services ⁴	397,969	781,490	***	840	***	1,180,299	6.0
Transportation	128,330	369,082	***	14,467	***	511,879	2.6
Secretary of State	149,212	327,276	208,663	818	***	685,969	3.5
Illinois Tollway	139,648	126,584	***	669	***	266,901	1.4
Natural Resources	27,691	100,869	***	37,600	***	166,160	0.9
Military Affairs	161,281	89,485	***	12,419	***	263,185	1.3
State Police	30,527	46,268	***	2,201	***	78,996	0.4
All Others	265,642	254,062	475,920	3,512	***	999,136	5.1
Total	9,813,696	5,227,098	4,413,267	91,209	0	19,545,270	100.0

¹ Energy consumption for all agencies, except Universities and Corrections, is based on adjusted average Human Services

FY09 unit energy costs as follows:

Human Services unit costs

Natural Gas \$0.830/therm or \$8.30/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0961/kwh or \$28.161/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$38.765/ton or \$1.759/10⁶ Btu (1 lb. = 11,018 Btu)
 Oil (#2) \$1.85/gal or \$13.21/10⁶ Btu (1 gal = 138,974 Btu)

³ Corrections Natural Gas \$0.5703/therm or \$5.703/10⁶ Btu (1 therm = 100,000 Btu)

⁴ CMS expenditures and energy use contain data from multiple agencies.

² University unit costs:

Universities Unit costs

Natural Gas \$0.759/therm or \$7.59/10⁶ Btu (1 therm = 100,000 Btu)
 Electricity \$0.0755/kwh or \$22.11/10⁶ Btu (1 kwh = 3,413 Btu)
 Coal \$66.33/ton or \$2.96/10⁶ Btu (1 lb. = 11,190 Btu)
 Oil & Propane \$12.71/gal or \$93.43/10⁶ Btu (1 gal = 136,049 Btu)
 Steam No steam purchase was reported (1 lb. steam = 1,000 Btu)