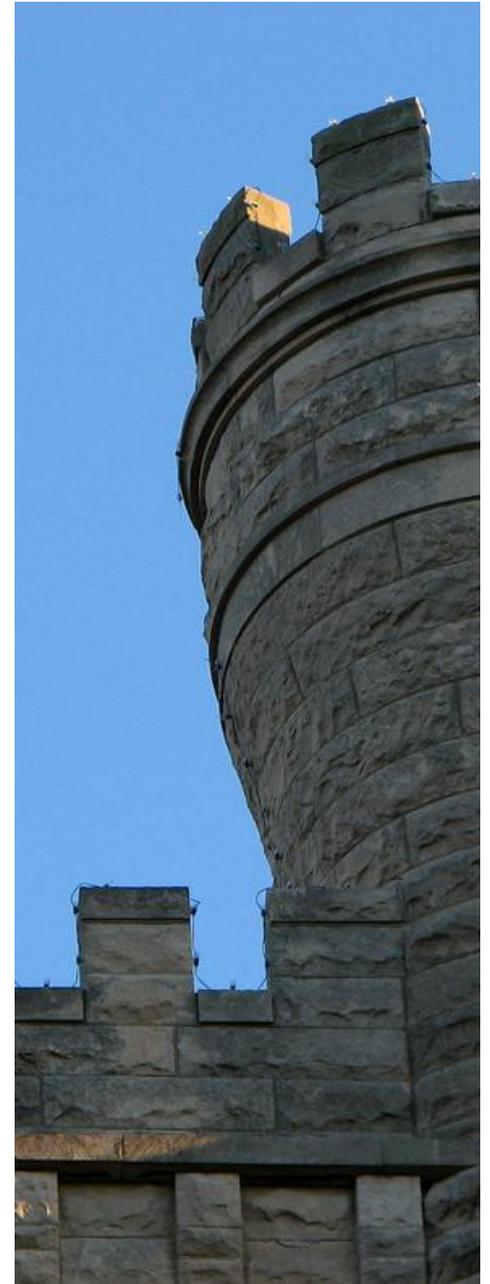


green **eiu** 

## environmental responsibility, sustainability and green energy measures are possible through performance contracting

- ▶ performance contracting enables Eastern to use savings from Energy Conservation Measures toward installation and payment of new energy facilities
- ▶ does not increase tuition or tax dollars
- ▶ each new Energy Conservation Measure installed results in a greener and more efficient campus operation
  - ▶ upgrades to water systems and conservation measures
  - ▶ upgrades for energy-efficient lighting and transformers
  - ▶ upgrades for energy-efficient buildings, including insulation, windows and air conditioning

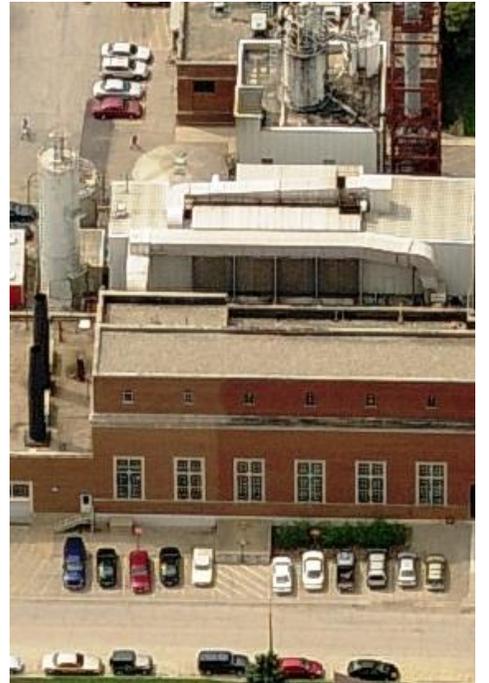


# annual savings from performance contracts

Phase I (1995)	Phase II (2001)	Phase II E (2003)
<ul style="list-style-type: none"><li>• Electrical: 6,562,000kwh</li><li>• Steam: 86 billion BTU</li></ul>	<ul style="list-style-type: none"><li>• Electrical: 7,824,000kwh</li><li>• Steam: 226 billion BTU</li><li>• Water 72,000,000 gallons</li></ul>	<ul style="list-style-type: none"><li>• Electrical: 2,496,000kwh</li><li>• Steam: 32 billion BTU</li><li>• Water 5,300,000 gallons</li></ul>
<ul style="list-style-type: none"><li>• Guaranteed Savings \$533,000/yr</li></ul>	<ul style="list-style-type: none"><li>• Guaranteed Savings \$1,200,000/yr</li></ul>	<ul style="list-style-type: none"><li>• Guaranteed Savings \$295,000/yr</li></ul>

eastern is committed to the philosophy of creating a greener, pedestrian-friendly campus.

- ▶ current boiler system was installed in 1925 and has outlived its useful economic life
- ▶ current location conflicts with Eastern's core mission to be pedestrian friendly, academic oriented, with lots of green space
- ▶ with system failure and deferred maintenance, it has become mission critical to replace the system



# current steam plant

multiple views



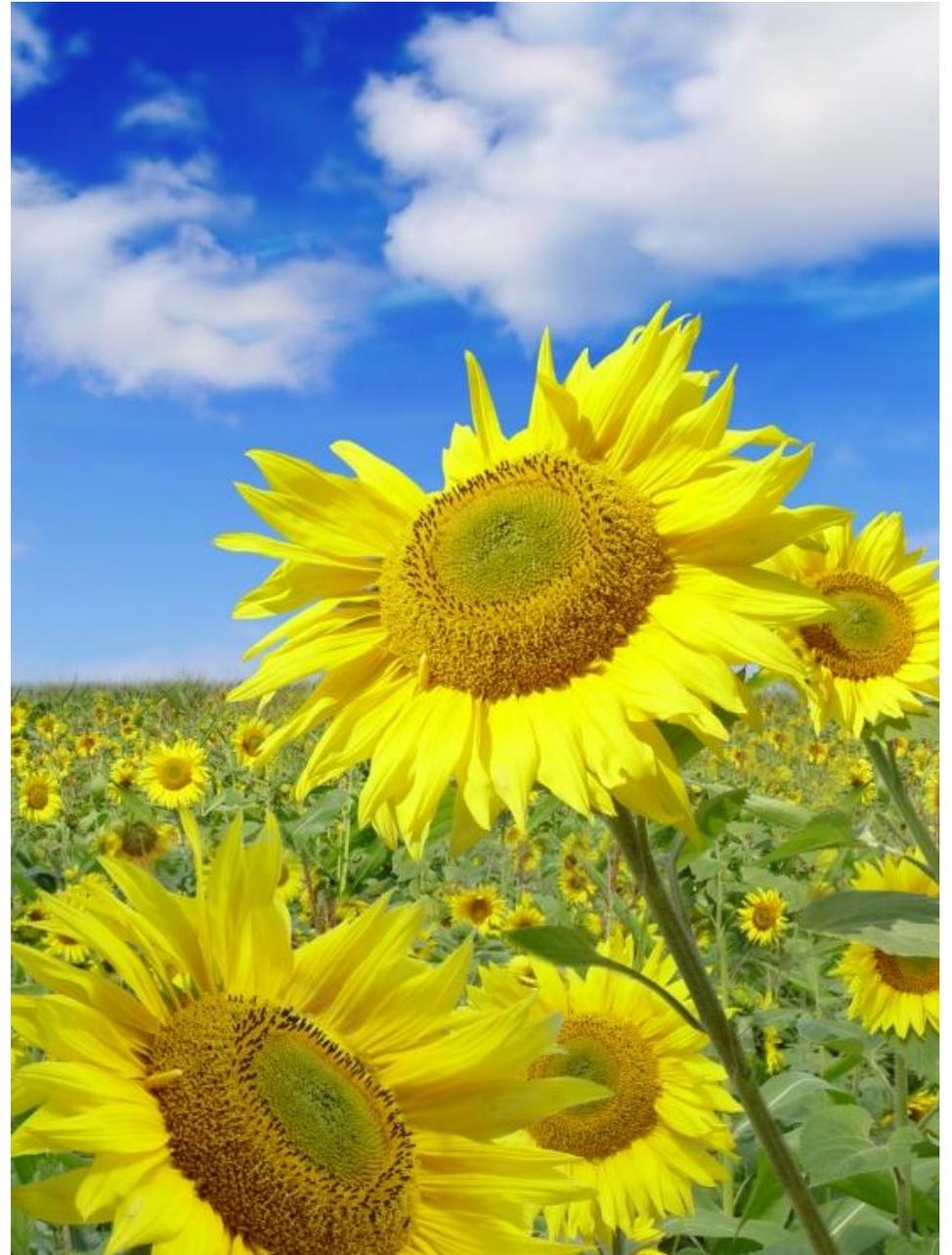
## deferred maintenance

\$16 million :: from corrosion to  
outdated technology to equipment  
failure



# renewable energy center

moving from coal to  
clean-burning  
biomass gasification  
to heat and cool campus



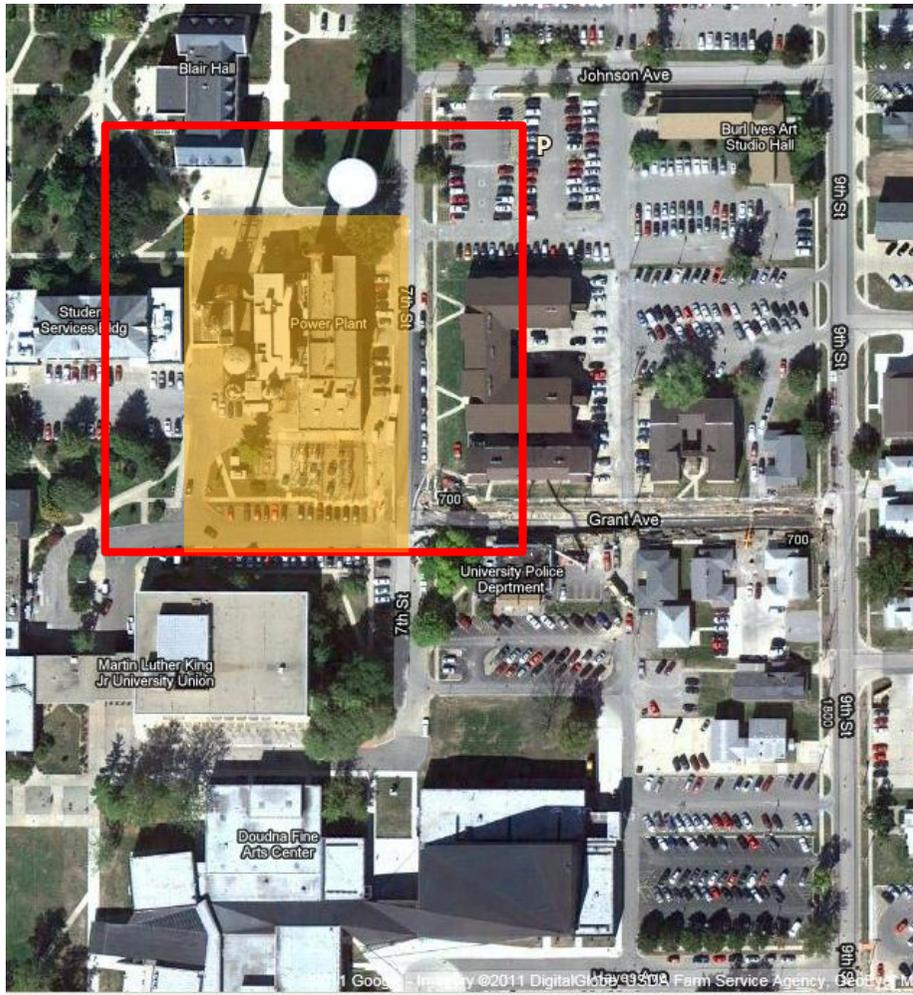


current steam plant location



# new EIU renewable energy center

location indicated on ariel view of campus



# new EIU renewable energy center

plant site and area comparison



# new EIU renewable energy center

current photos

# new EIU renewable energy center

what a typical plant  
looks like

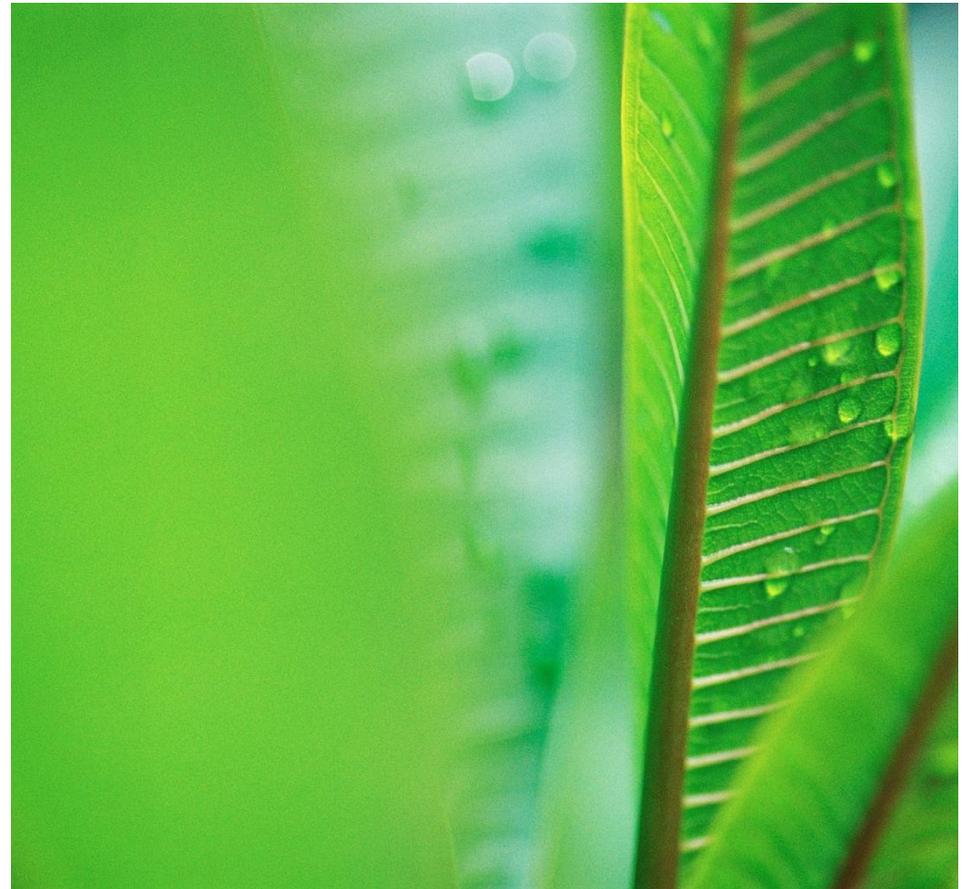


# overview of the EIU renewable energy center

- ▶ Wood gasification process (synthetic natural gas)
- ▶ Renewable fuel
- ▶ Carbon neutral
- ▶ Fuel Oil backup fuel
- ▶ Byproduct is soluble potash (fertilizer)
- ▶ Environmentally friendly
- ▶ Existing steam plant decommissioned

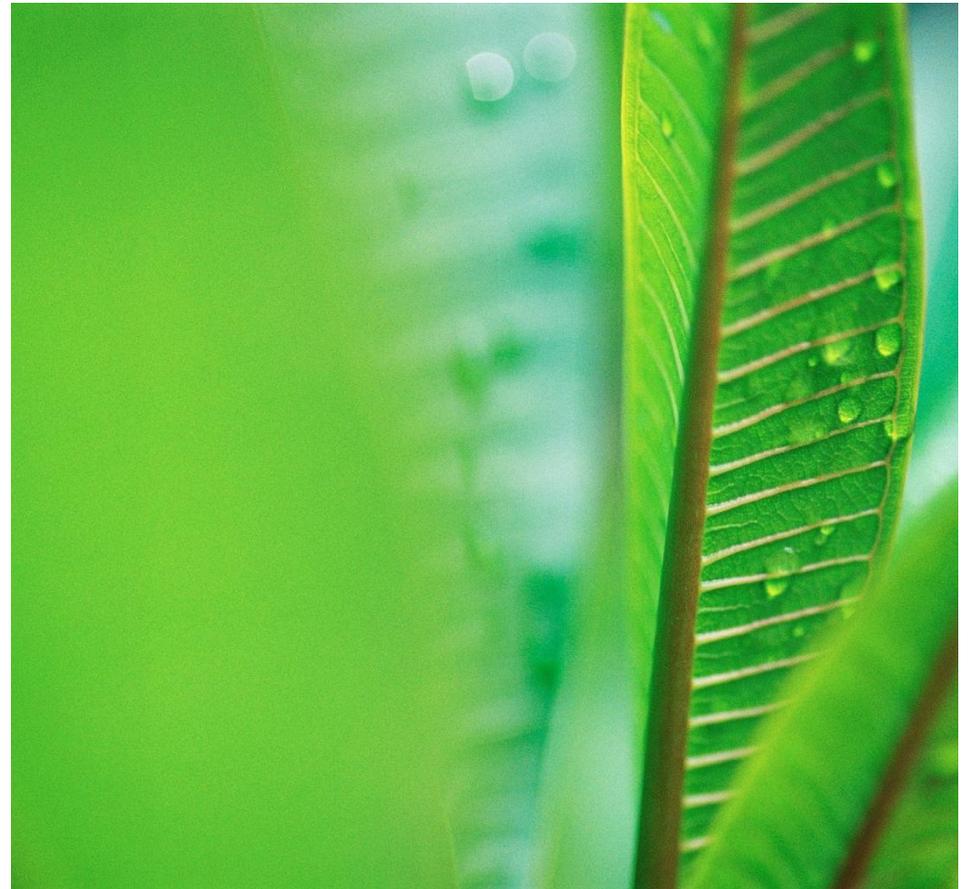
# allowable fuel specifications

- ▶ Size must be 2 ½"-
- ▶ Fuel must be virgin material (no glues, paints, construction debris, etc.)
- ▶ <50% moisture content
- ▶ <10% bark
- ▶ de minimus dirt/metal



# new fuel process

- ▶ lab gassifier test
- ▶ material handling test
- ▶ commercial scale test
- ▶ stack test for permitting
- ▶ fuel bid



# features

- ▶ Truck tipper
- ▶ 100,000 cu ft storage
- ▶ Two fuel flexible gassifiers
- ▶ Laboratory scale gassifier
- ▶ 650 KW back pressure turbine (Co-generation)
- ▶ Two 10KW solar arrays
- ▶ Two 1KW solar arrays
- ▶ Rain water capture system to feed water feature

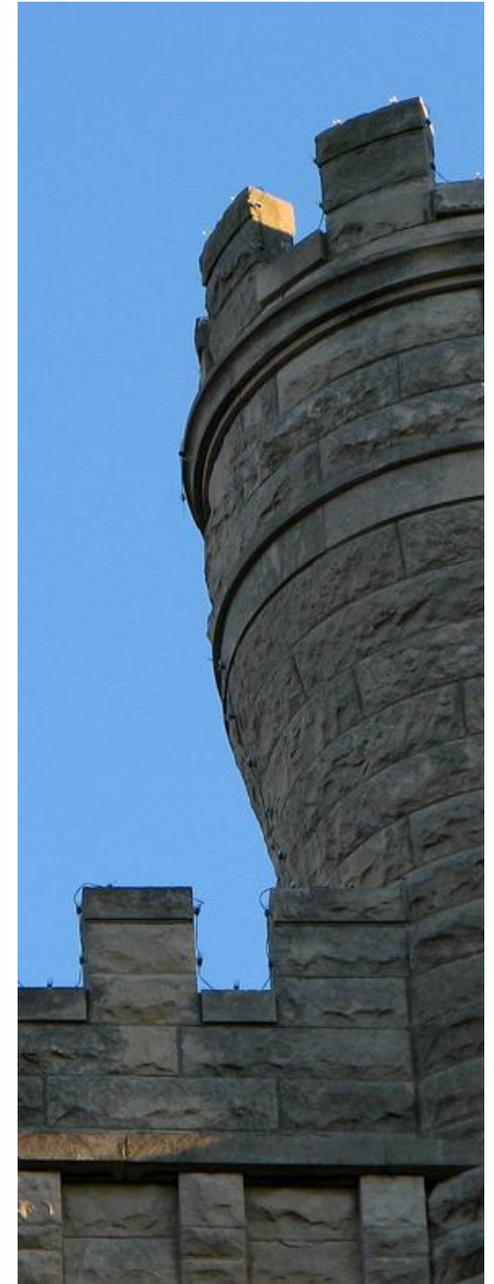


# construction timeline for the EIU renewable energy center

- ▶ October 17, 2009 :: construction contract approved by EIU BOT
- ▶ October 20, 2009 :: construction groundbreaking
- ▶ November 20, 2009 :: ceremonial groundbreaking
- ▶ September 2010 :: building shell completion
- ▶ December 14, 2010 :: last coal burned at EIU
- ▶ May 4, 2011 :: first load of woodchips received
- ▶ Summer/fall 2011 :: plant commissioning
- ▶ October 7, 2011 :: ribbon cutting
- ▶ Spring 2012 :: last of old plant decommissioned

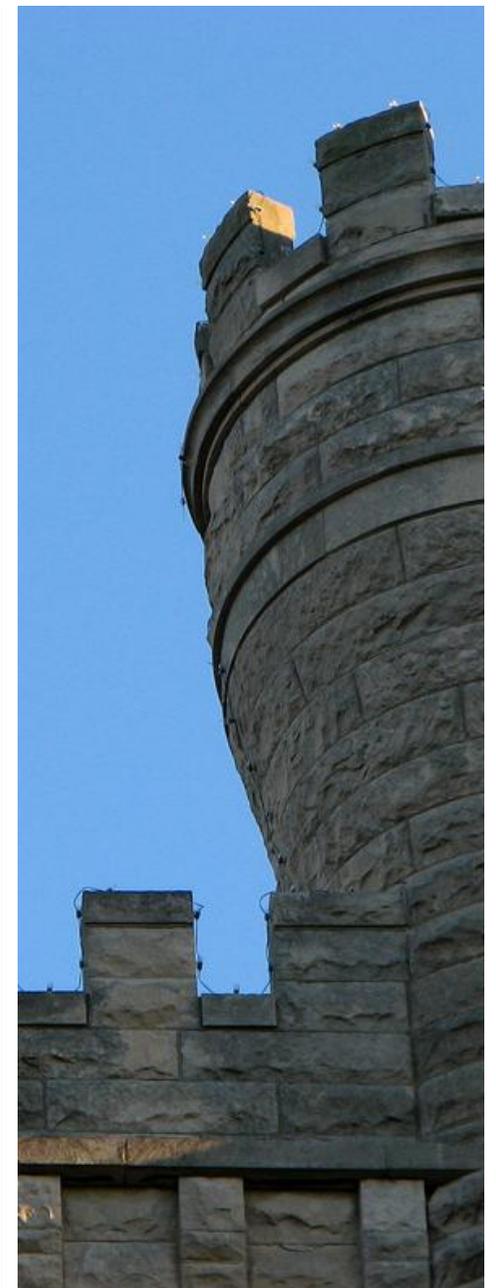
# eastern illinois university energy projects

- ▶ Base biomass-fired steam plant plus co-generation and solar array for internal electrical production: **\$55M**
- ▶ Energy measures installed under the Public University Energy Conservation Act as originally written (<20-year payback): **\$25M**
- ▶ Total Project Cost **\$80M**



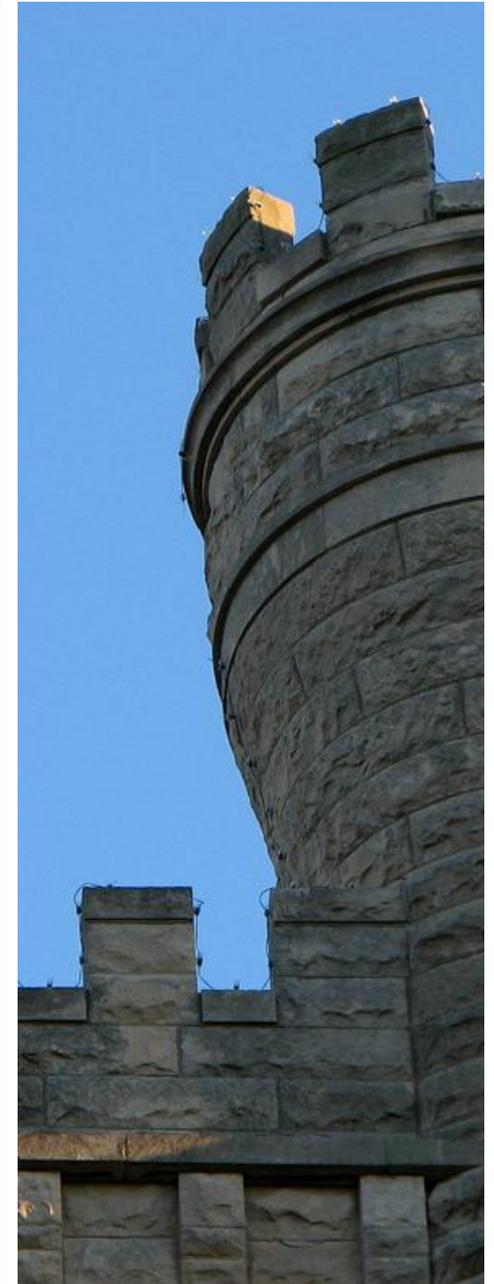
# Eastern Illinois University energy conservation measures

- ▶ Air conditioning delivery upgrades
- ▶ New windows for Residence Halls
- ▶ New 69KV Switchyard
- ▶ Lighting Upgrades
- ▶ Building Envelope Sealing
- ▶ Retro-comissioning
- ▶ Water Retrofits
- ▶ Occupancy Sensors
- ▶ Low Voltage Transformer Replacement
- ▶ Insulate Condensate Lines

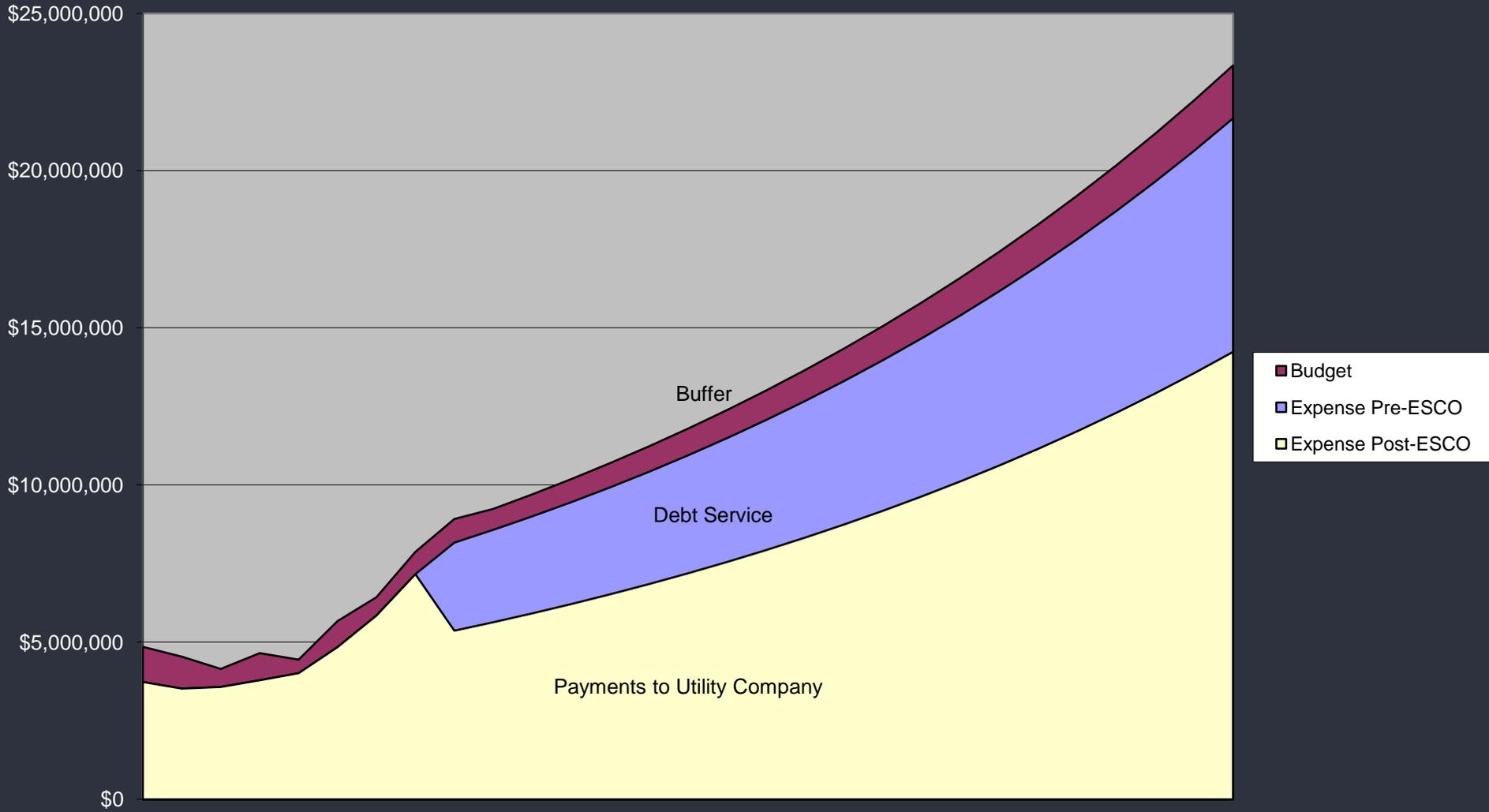


# savings

- ▶ 6,174,794 kwh
- ▶ 13,845,553 gallons of water
- ▶ 54 millions lbs of steam

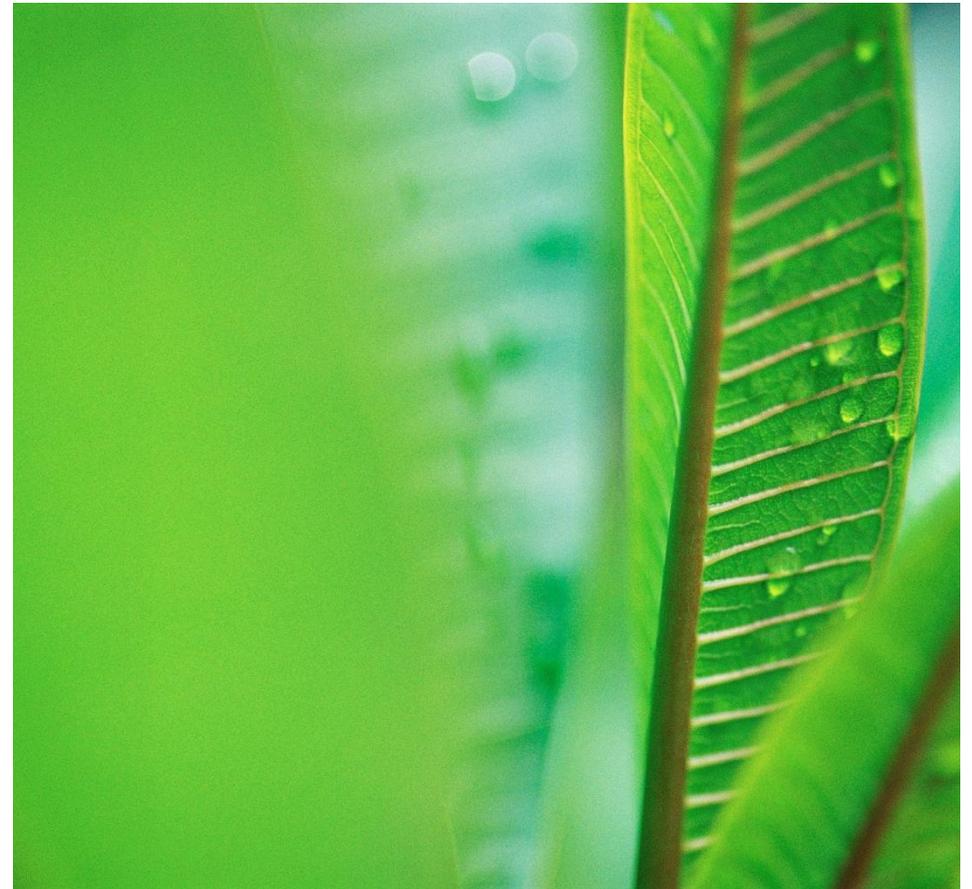


# Eastern Illinois University Utilities Budget Compared to Expenses by Fiscal Year



# lessons learned

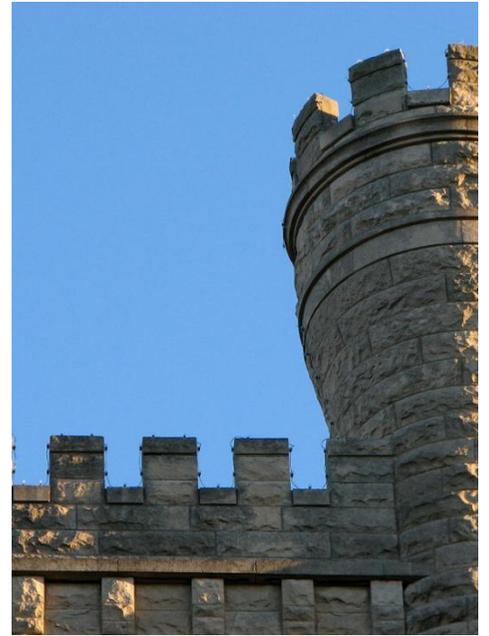
- ▶ chemical balance is difficult
- ▶ system challenges are exponential when cogenerating
- ▶ ash disposal issue
- ▶ academics are extremely valuable



# phase II - Center for Clean Energy Research & Education (CENCERE)

- ▶ new building envisioned
  - ▶ 1/3 laboratory space
  - ▶ 1/3 classroom/training
  - ▶ 1/3 business incubator
- ▶ minor in environmental sustainability
- ▶ masters of science in sustainable energy (Fall 2012)





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