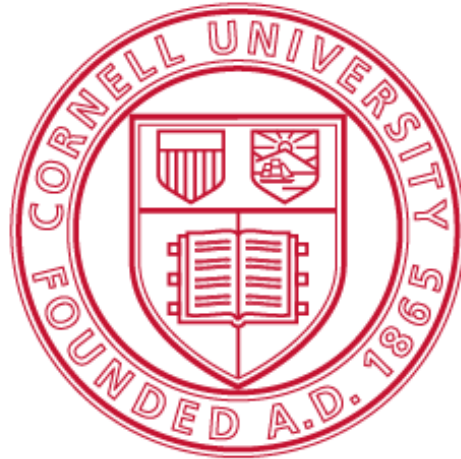


The Cornell University Energy Story: Seeking Efficiency, Sustainability and Low Cost

***2011 Annual Meeting
Multiple Intervenors***

***Jim Adams, Director of Utilities
Department of Energy and Sustainability***





Cornell Vision : "I would found an institution where any person can find instruction in any study." Ezra Cornell

- ***Teaching***
- ***Research***
- ***Engagement***



***Total
students:***
21,325

***Total
faculty:***
2,908

Total staff:
12,842

Ithaca, New York, USA main campus:

- Land: 745 acres (3 km²)
- 584 buildings and 14 million sq. feet (1.3 M sq. meters)
- Also, medical campuses in: New York City & Doha, Qatar



Cornell University District Energy

Systems and Metrics

Electric

35 MW peak
240 GWh/yr

Steam

400 kpph peak
1,100,000,000 lbs/yr

Chilled Water

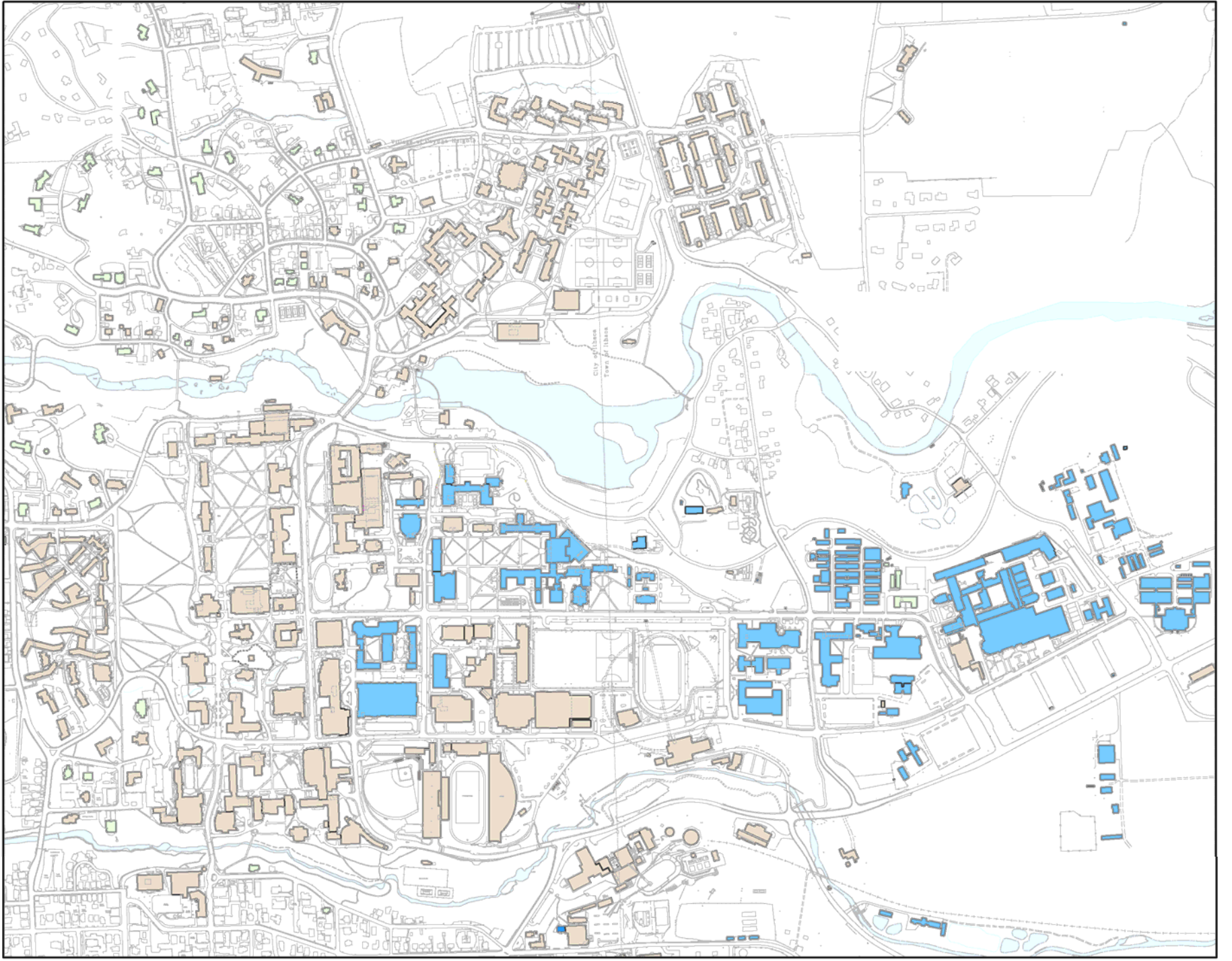
20,000 tons peak
40,000,000 ton-hrs/yr

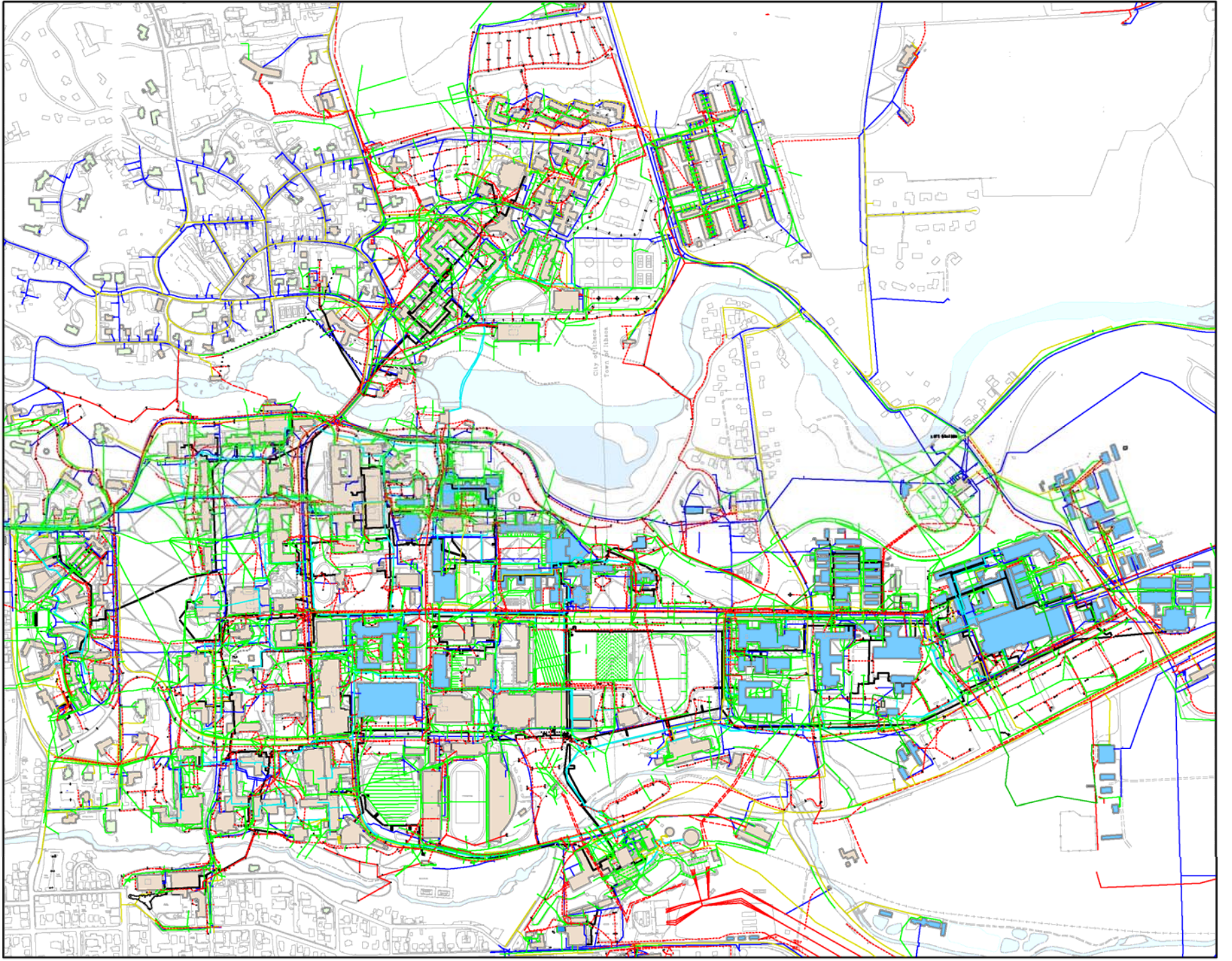
Water and Sewer

1.6 MGD



Annual Budget: ~ \$60 million







Cornell Combined Heat & Power Plant

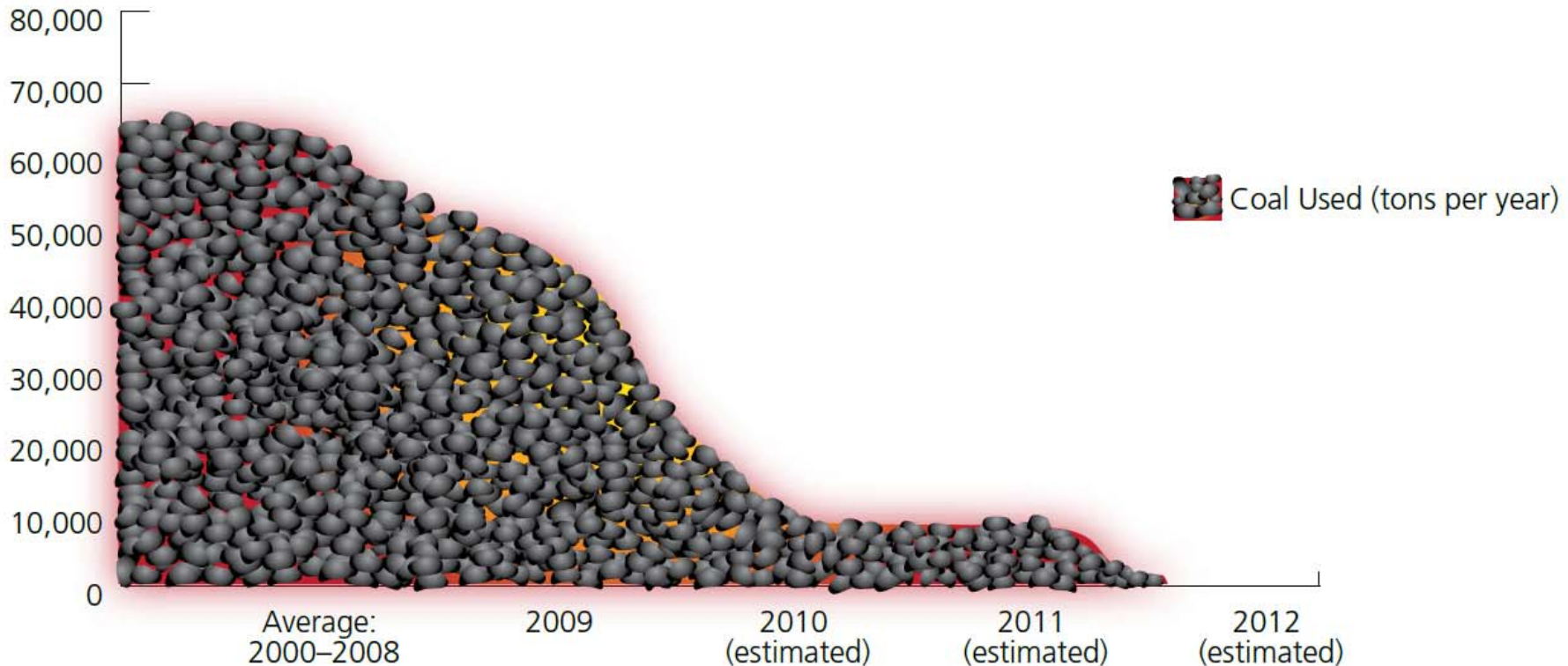


- 30 MW natural gas / oil combustion turbines
- 300 klb/hr heat recovery steam generators
- 5 mile HP gas pipeline
- Produces 180 GWhrs
- Export 50 GWH
- 750,000 klbs/yr steam unfired
- Duct burners
- Operational December 2009
- 3 Package steam boilers



Cornell's Coal Zero Timeline

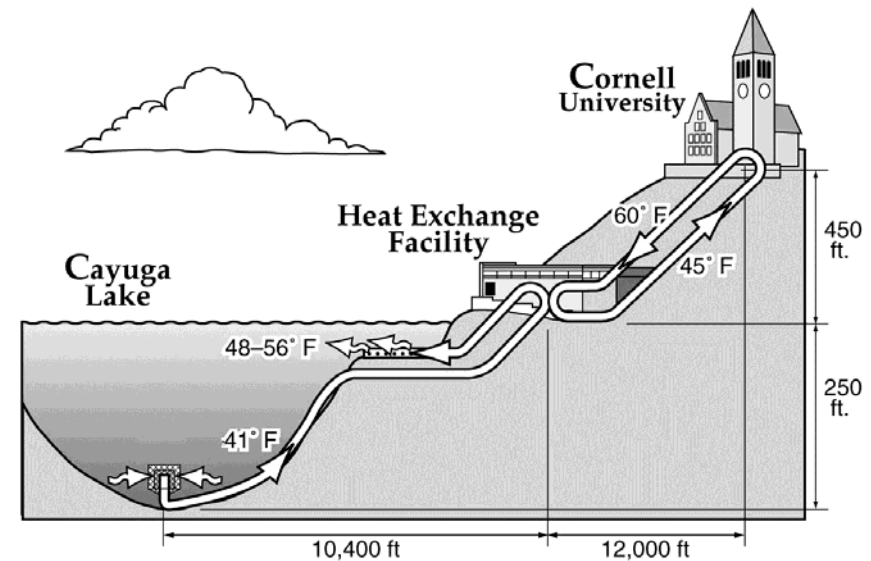
The Cornell Combined Heat and Power Plant will reduce coal usage at the university by 50 percent in its first year of full operation, and by 100 percent within 18 months from the plant's December 2009 start-up date.





Lake Source Cooling (LSC)

- Started service in 2000
- Annual production at 0.1 kw/ton (86% savings)
- Truly “renewable” cooling



- Full automation (un-peopled)
- Saves over 25 million kwh/yr, 10% of campus use
- District cooling system is CFC free



Hydroelectric Plant



- In 1981 Cornell restored the hydroelectric plant built in 1904
- Capacity 1.1 MW
- The facility generates an average 5,000 MWh, enough for 600 homes



115,000 volt Substation



- Commissioned in 2009
- Dual 115kv Feeds
- 3 - 20MVA Wye-Delta Transformers
- Schweitzer Relays
- Self Healing
- Load Management

Energy Conservation Initiative

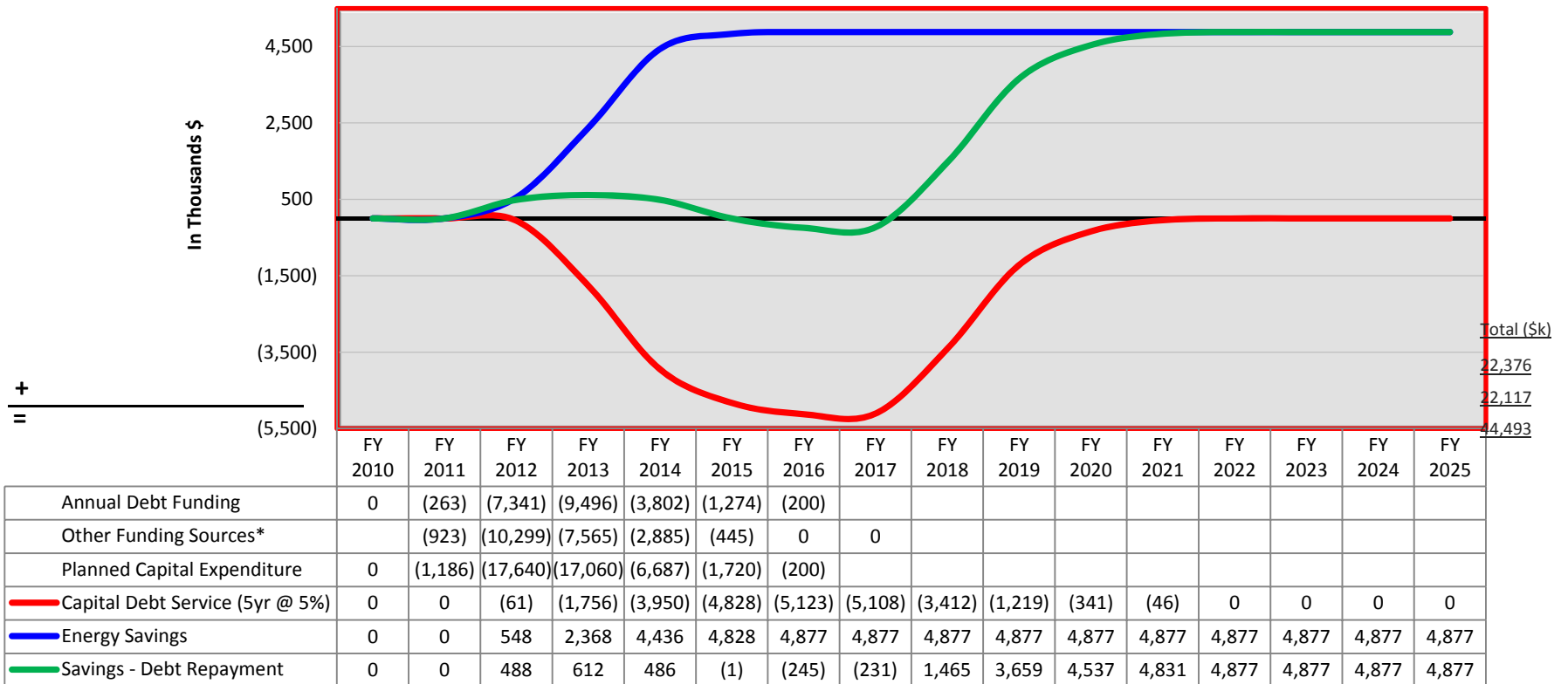
- Total estimated project cost \$40M - \$50M
- Energy savings \$8M - \$11M annually
- Simple payback goal ~ 5 - 7 years on projects
- Participating in NYSERDA's Flex Tech, New Construction, and Existing Facilities programs





Energy Budget Impact

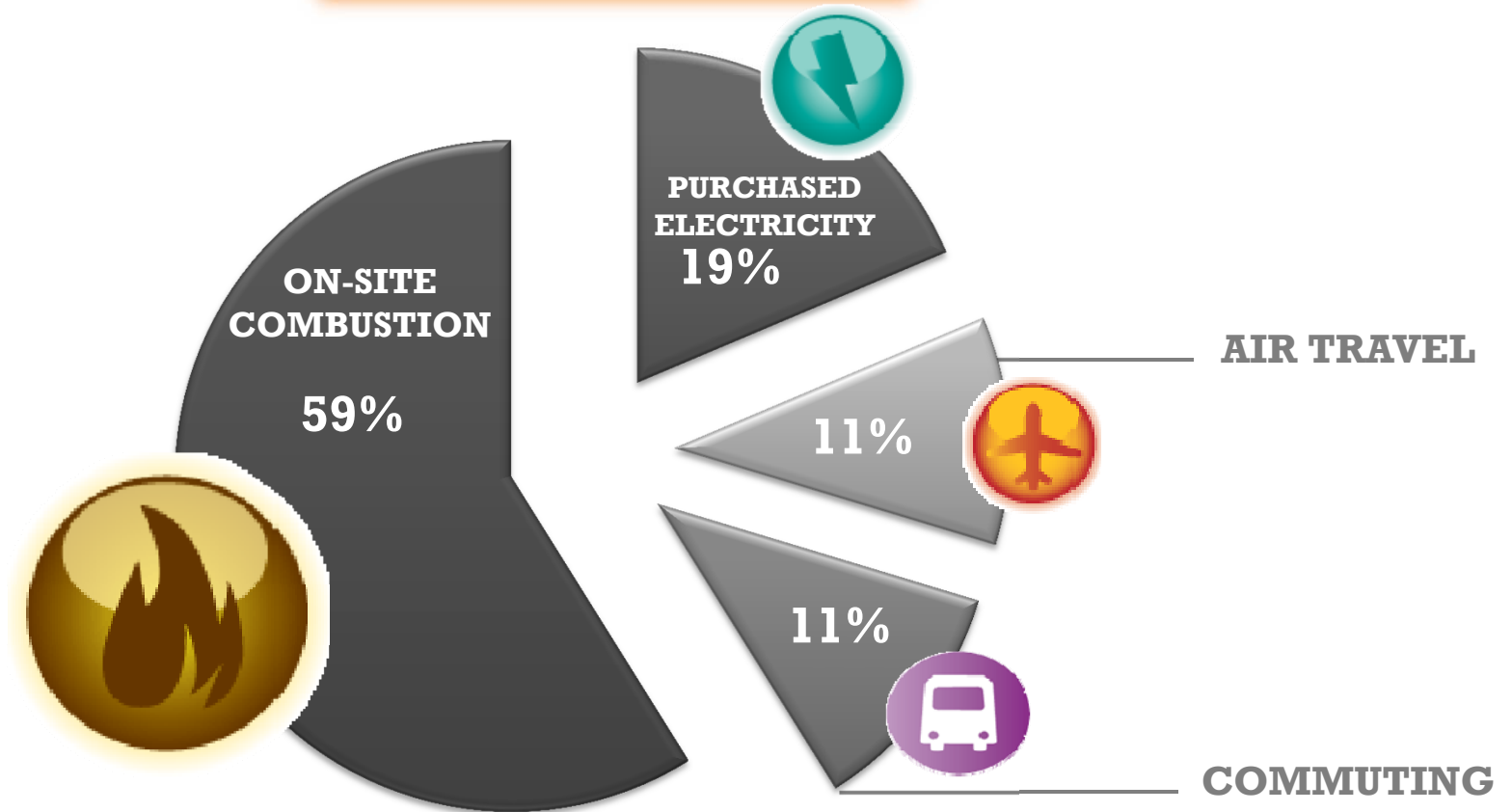
ECI Annual Energy Budget Impact





2010 Carbon Emission - 26% Less

236,000 Metric Tons:
2010 GREENHOUSE GAS EMISSIONS
FROM CORNELL'S ITHACA CAMPUS
(CO² EQUIVALENT EMISSIONS)





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