Steam Plant Conversion

Eliminating Campus Coal Use at the Steam Plant
University of Tennessee, Knoxville

- Flagship campus of the University of Tennessee
- TN’s land grant university
- 24,400 FTE students and 6,600 FTE staff as of fall 2011
- 560 acres and 14.9 million GSF building space
- Signed ACUPCC in 2007
Knoxville and the TN Valley

- UT is located in Knoxville, TN – pop. 180,000 and site of TVA headquarters
- States in TVA region produce 14% of US coal (TN only 0.2%)
UT’s Steam Plant

- UT is one of about 70 U.S. colleges and universities w/ steam plant that burns coal
- Constructed in 1964, provides steam for:
  - Building heating
  - Domestic hot water
  - Lab sterilization
UT’s Steam Plant

- Powered by 5 boilers:
  - 2 coalfired
  - 1 NGfired (installed in late 1990s)
  - 1 fired w/ coal, fuel oil #2, or NG
  - 1 fired w/ NG or fuel oil #2 (installed in 2011)
- Historically, UT’s choice of fuel has been driven by coal and NG prices
- Peak coal use: 35,000 tons; dropped to 6,700 tons in 2011-12
- Current emissions ~ 90,000 MTCDE
  - Equivalent to CO2 emissions from annual energy use of 7,792 homes

Sources: Sourcewatch. ‘Existing campus coal plants.’; EPA Greenhouse Gas Equivalencies Calculator.
Challenges of Using Coal

EPA proposed national emissions standard (Boiler MACT):

- For existing boilers w/ heat input capacity of 10 MMBtu/hr or greater:
  - Hg limit would be $3.1 \times 10^{-6}$ lbs/MMBtu
  - Filterable PM limit would be 0.028 lbs/MMBtu
- Would have to be in compliance w/in 3 years of final rule
- Costly to meet w/ existing Steam Plant

Possible additional regulations:
- Carbon emissions
- Coal ash disposal
Challenges of Using Coal

Aesthetics:
- Steam Plant located at one of UT’s major access points
- Eliminating coal would enable removing several prominent features:
  - Smoke stack
  - Electrostatic precipitator
  - Coal pile

Economics:
- Retrofitting w/tighter coal emission controls (e.g. bag houses) would cost about same as converting to NG
Other concerns

- Students want UT to get off coal
- Difficult to fulfill ACUPCC while burning coal
  - 20-25% of UT’s carbon emissions due to steam production
Steam Plant Conversion

• UT has decided to eliminate coal use at Steam Plant
• Self-funded $25 million project, target completion: 2016
• Eliminate 3 coal-fired boilers
• Install 3 high-efficiency NG/fuel oil boilers
• Slight reduction in steam production capacity
• Requires upgrading NG service from KUB
• Water treatment system and air compressors to be replaced and relocated
• Fuel oil storage to be increased from 40,000 to 240,000 gallons
• Will decrease emissions by 39,000 MTCDE (43%)
  ➢ Environmental benefit would be like taking 3,300 homes ‘off-grid’ for a year!
Additional Comments

• Coordinating boiler replacements will take years not months

• Steam Plant conversion will not result in layoffs
  ➢ Employees to be retrained on new equipment

• Facilities Services took care to inform small coal suppliers about the conversion prior to this info going public

For More Info: Gordie Bennett, environment@utk.edu or (865) 974-7780