PROJECT PROFILE

University of Texas at Austin

137-MW CHP & District Energy System

UT Austin has achieved significant fuel and emission savings through its District Energy & CHP plant.

Quick Facts

LOCATION: Austin, Texas
MARKET SECTOR: College/University
FACILITY SIZE: 17 million sq. ft.
CAPACITY: CHP –137 MW; Steam – 1,282,000 lbs/hr; Chilled Water – 48,000 Tons; Thermal Energy Storage (TES) – 39,000 Ton-hours
EQUIPMENT: General Electric LM2500+ G4 DLE Combustion Turbine; Vogt HRSG; Three Vogt Boilers; Babcock & Wilcox Boiler; Two Westinghouse Steam Turbines; One General Electric Steam Turbine and One Siemens Delaval Steam Turbine
FUEL: Primary – N. Gas, Secondary – Waste Heat
USE OF THERMAL ENERGY: Space Heating and Cooling, Process Steam, Boiler feedwater and condensate Preheat, Domestic Hot Water, turbine inlet air cooling, chilled water thermal storage tank
CHP PLANT EFFICIENCY: 88%
ENVIRONMENTAL BENEFITS: 91,267 tons of CO_2 per year
NOTE: UT Austin has achieved carbon-neutral growth through major energy efficiency improvements.

Site Description

The University of Texas at Austin's (UT Austin) Carl J. Eckhardt Heating and Power Complex provides a campus of 50,000 students and 20,000 faculty and staff with efficient heating, cooling and electricity. UT Austin, one of the largest public universities in the U.S., has added 5 million square feet of building space over the past 15 years and has grown from 9 million square feet of building space to 17 million square feet since 1977. The university's highly efficient District Energy & CHP plant has doubled the amount of power it produces to keep up with this campus growth yet the plant uses the same amount of fuel today as it did in 1977. The campus achieved carbon-neutral growth through efficiency gains as a result of $150 million of energy efficiency and capacity upgrades. UT Austin earned the Environmental Protection Agency's Energy Star award in 2005 in recognition of these achievements & Global Climate Award from the International Energy Agency in 2009.

Reasons for District Energy & CHP

With a total budget of over $2 billion, UT Austin's mission-critical campus research operations require highly reliable energy. The campus District Energy & CHP plant supplies enough energy to meet 100 percent of the heating, cooling and power demands of 160 campus buildings and 17 million square feet of space and has achieved 99.9998% reliability over the past 40 years.

District Energy & CHP Equipment & Operation

UT Austin's highly efficient campus District Energy & CHP plant uses a combustion turbine, steam turbines and boilers burning natural gas to produce steam and electricity. The plant also runs a Heat Recovery Steam Generator to optimize total efficiency. 70% of the electricity produced is consumed by the campus while the other 30% is used to make chilled water. Four chilled water plants distribute 140 million ton-hours of water chilled to 39 degrees F through 6 miles of piping to provide cooling to the campus. A 4 million gallon TES tank provides an additional 39,000 ton-hours of chilled water capacity. Overall, the system operates at 88% efficiency.

Environmental Benefits

UT Austin's Utilities and Energy Management department continuously works to conserve energy and increase overall efficiency. Ten years of utility improvement projects and investments in efficiency improvements have saved $170 million worth of energy and allowed the university to achieve carbon-neutral campus growth. Overall, utility projects to address campus growth and fuel needs have reduced campus CO_2 emissions by 91,627 tons per year.

These major plant improvements, along with the use of proven technology such as digital controls, plant optimization software and plant and distribution system "real time" modeling, have resulted in significant fuel savings and emissions reductions. UT Austin's energy plant has the same fuel consumption and emissions levels as it did in 1977.

Recent notable projects include modifications and upgrades to the plant's steam boilers that reduced NOx emissions by more than 80%, improved efficiency by 5-10% and reduced horsepower consumption by more than 75%. Additionally, a comprehensive university Demand Side Energy Management and Conservation (DSEMC) project included $1.2 million to replace or repair 420 steam traps and radiator valves and install removable pipe blanket insulation in over 700 places on campus. These improvements will save the university $235,000 annually (a simple payback of 5.1 years) and prevent 5.8 million pounds of CO_2 emissions from the 25 million pounds per year of steam energy saved.

UT Austin's District Energy & CHP Plant.

For More Information

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