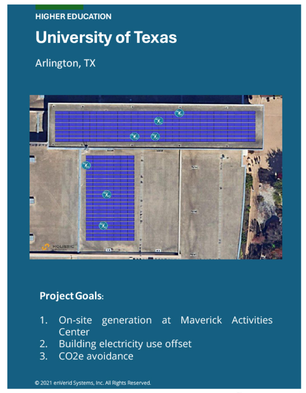
Office of Facilities Management

Campus Energy Conservation Strategies/Outlook



Thermal Energy Plant

UTA's thermal energy production is a combination of two separate plants. The main Thermal Energy Plant (TEP) is located between the Health Center and Arlington Hall and this plant provides chilled water and steam various campus buildings. There is a second plant located behind the Maverick Activities Building (NWTEP) and provides chilled water only to the west part of campus. Chilled water is used to cool spaces and to cool some research equipment in the building and steam is used to heat the buildings and for various research related loads.

The main TEP consists of five large chillers totaling 13,700 tons. This system has large pumps that distribute the chilled water leaving the plant at 42 F to an underground piping network to each building. Each building uses the chilled water to cool the spaces and returns the chilled water back to the TEP at around 56 F to be cooled again by the chillers. The NWTEP has a total of 4050 tons of cooling and is connected to the same piping network as the main TEP. The TEP provides steam at 83 psig to campus through the same underground piping network.

The overall plant chilled water efficiency is measured as kW/ton. Killowatts used to produce the chilled water divided by the tons o chilled water produced. Our system is between 0.65 to 0.90 kW/ton depending on the time of year and campus and weather conditions. Our boiler plant efficiency is calculated as BTU's of steam produced in the boilers divided by the BTU's of natural gas used in the boilers and is represented as a percentage. Our boiler plant ranges from 75-80 % depending on the time of year and weather conditions.
To help keep our plants running efficiently we contract with an energy analysis company called utilivisor. This company monitors our plants 24/7 and gives us real time feedback on where we could use less energy. We use this feedback to investigate areas we are wasting energy and configure our system for optimal energy efficiency. We save about $170,000 per year in energy and over 1000 tons of CO2 each year with this system.
The thermal systems efficiency is kept at maximum efficiency by preventative maintenance programs, analyzing hourly data, reactive maintenance and the utilivisor energy monitoring contracts. The most recent maintenance items we have completed are replacing cooling tower parts and systems, replacing one boiler with a new more efficient boiler, new steam trap maintenance program and repairing steam leaks and insulation. We are always exploring new energy efficient systems such as thermal storage and microgrids.

Solar Array

UTA designed and installed a 385 kW Photovoltaic system that became operational in 2011. This system is installed at the North Parking Garage Sections A and B. This location was selected for the large area and existing structure could support the added weight. The system consists of 1652 Schott 235 photovoltaic panels and two Satcon S-Type 210 kW inverters. Each panel is rated for 235 W max output. The array is grouped into 15 sub arrays of about 110 panels each. This system was paid for with capital expenditure by UTA, Oncor rebates and federal funding for energy efficiency projects.
UTA has researched different options for adding more solar systems to campus with mixed results. The biggest obstacle UTA has is space to put them due to our urban campus. We have investigated roof mounted systems, but they are more costly to install and have limited space so relatively small systems is all we can install and the financial payback is not supportive of the roof mounted arrays and this time. We are currently investigating solar systems at the new UTA West Campus
This system is connected to the college park electrical system and supplements the college park's electricity use. At max output it can provide up to 500,000 kwh of electrical energy per year that saves UTA about $30k to $40k per year.

Energy Conservation Measures (ECM) Projects in Development

- Replace TEP 2,000 Ton Chiller #5 with 2,500 Ton Chiller
- Pickard Hall HVAC Ductwork - Seal Duct Leakage
- Maverick Activities Center (MAC) 210KW Solar PV System
- Replace Remaining Non-LED Lighting:
  - Central Library 1,273 fixtures
  - Business Building 516 fixtures
  - Pickard Hall 620 Fixtures

Financials:

Estimated Costs: $10 Millions
Pending budget availability

Benefits:

Total Proposed ECM Energy Saved: 7,290,844 kWh
Total Campus Energy Saved: 7%
Avoided CO2e: 5,167 metric Tons

Energy Conservation Outlook

UTA Campus Carbon Neutral Vision by 2040 is possible with the following strategies:

- Retrofit and design high-performance buildings across campus
- High-performance buildings are an essential building block to a low-carbon future for UTA
- A key component of the energy transition pathway is development of high-performance targets for each building type on campus

- BUILDING LEVEL ECM:

Daylighting

Maximizing natural light with windows and skylights reduces artificial lighting needs and improves occupant well-being.

Direct Digital Control (DDC) Upgrades

DDC advanced monitoring and diagnostics capabilities improve efficiency, reduce

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Direct Digital Control (DDC) Upgrades
DDC advanced monitoring and diagnostics capabilities improve efficiency, reduce maintenance costs, and improve reliability.

Demand Controlled Ventilation (DCV)
Adjusting ventilation based on occupancy and air quality with real-time sensors optimize energy use while maintaining comfort.

LED Lighting Transition
LEDs use up to 90% less energy than traditional lighting while offering longer lifespans and smart control compatibility.

High-Efficiency Mechanical Equipment
Converting traditional high-temperature equipment to modern solutions like heat pumps significantly improves performance. maintenence costs and improve reliablity.

- ENERGY INFRSTRUCTURE
  - Shift to resilient, low-carbon energy infrastructure
  - Integration of high-performance buildings and hybrid solutions
  - Shift towards Electrification
  - eliminate centralized natural gas fired steam
  - develop de-centralized heat sources in each new building
  - Geothermal Heat Pumps
  - Procure Electricity from 100% renewable energy source