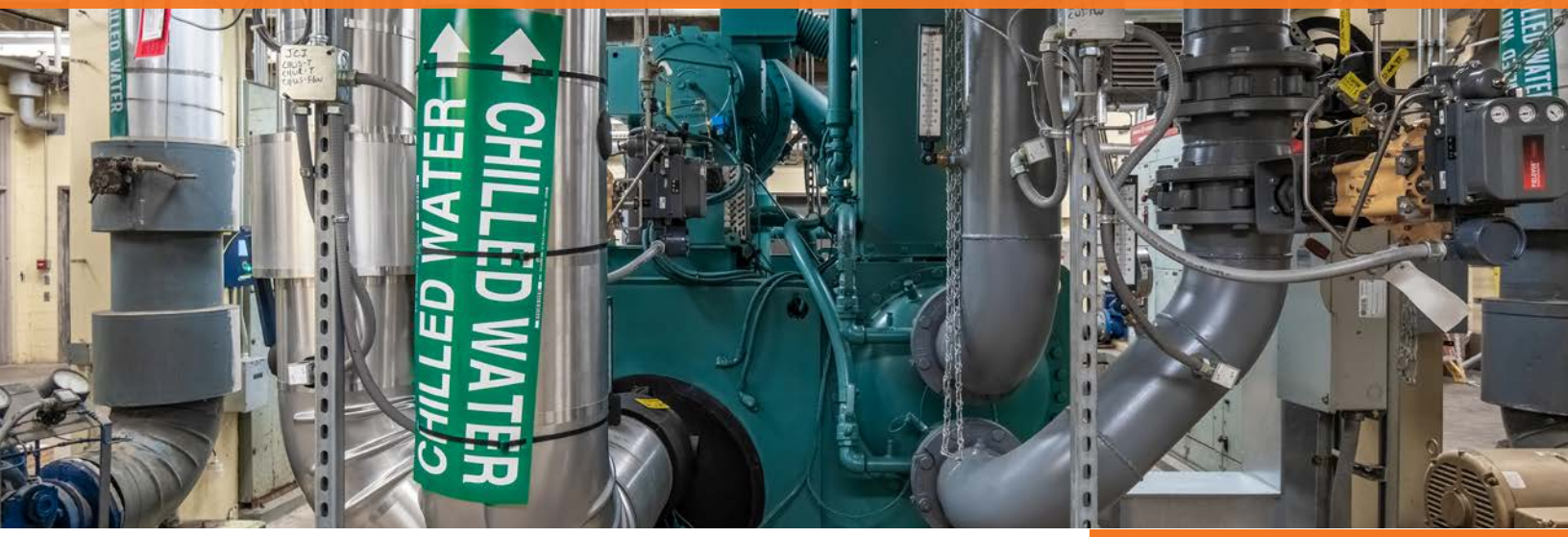
University of Texas at Austin

Austin, Texas

CASE STUDY



The University of Texas at Austin Has a Rich History of Sustainability

The University of Texas at Austin (UT Austin) first opened its doors in 1883 with eight professors, 221 students and a goal of creating quality higher education in the state of Texas. Throughout the last 135 plus years, UT Austin has grown to over 3,000 professors, 51,000 students and has garnered an impressive global reputation. Regardless of growth, the university takes pride in its active attention to pursuing sustainable energy solutions.

In the interest of reducing the impact the university has on the local grid and environment, the Carl J. Eckhardt Combined Heating and Power Complex was built to provide energy for the campus. This power plant has achieved an efficiency of more than 85%, meaning very little energy is lost in the form of heat. This is more than twice the efficiency of a typical power plant. With all of the advancements in efficiency, the system uses the same amount of fuel today as in 1976 with double the amount of served space.

Because the energy production efficiency is more than 85%, annual savings opportunities are now on the demand side. In 2010, the Energy Management & Optimization (EMO) team at University of Texas at Austin began a 20-year plan to reduce the average energy use intensity (EUI) on the main campus by 20%. The goal was met early in 2018, so a new goal was set for at least 2% annually. This reduction in energy consumption has been taking place even while the university continues to grow. Through initiatives, such as replacing halogen lamps with LEDs in the Texas Memorial Museum and behavioral programs encouraging students to turn off lights, UT Austin has been consistently meeting their goal of optimizing energy consumption. This allows UT Austin to reduce operating costs and achieve higher levels of sustainability.

Pickle Research Center Chiller Plant

AT A GLANCE:

Location:
University of Texas at Austin
Austin, Texas

Product Feature:
300 Ton (1,055 kW)
YORK® YZ Centrifugal Chiller

Annual Energy Savings:
330,000 kWh

Annual Cost Savings:
$23,000

Johnson Controls

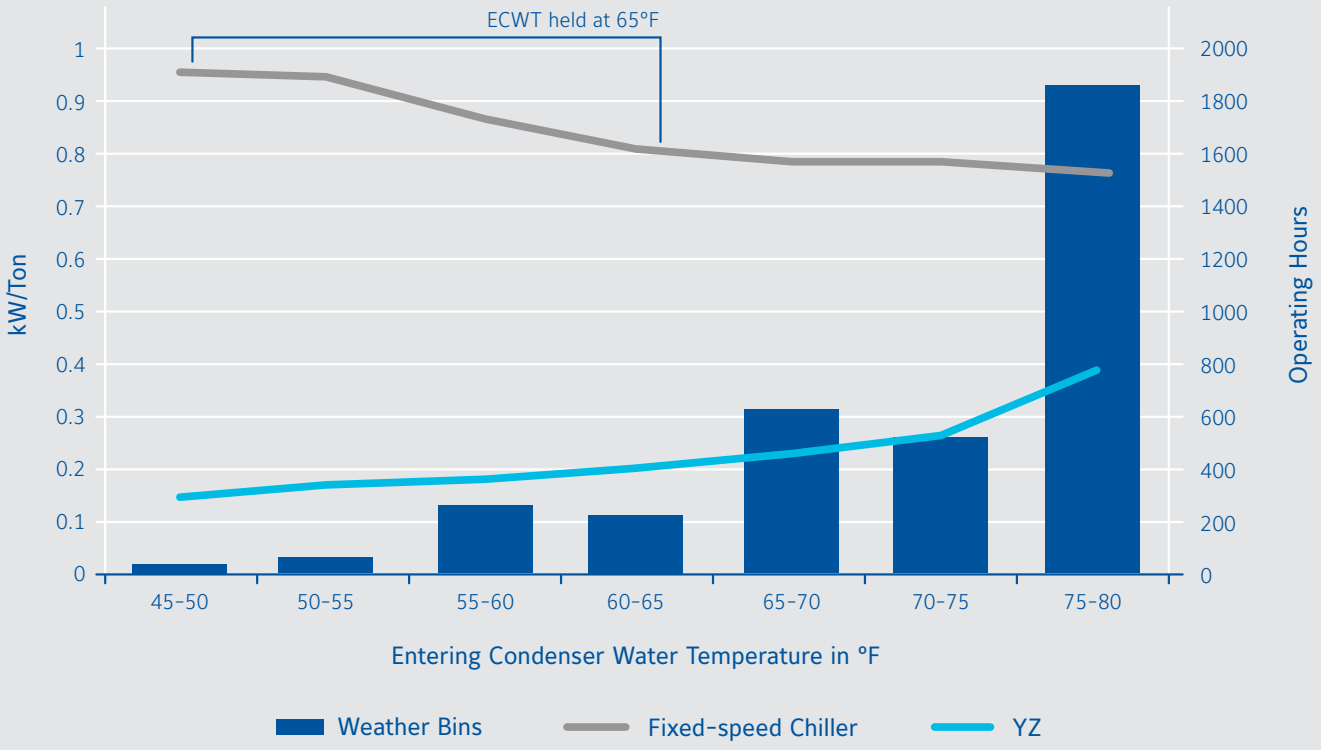
With UT Austin's continuous growth comes an ever-evolving need for facilities. Recently, UT Austin converted an old technology incubator facility with dense equipment cooling loads, known as the West Pickle Research Center, into new office spaces for faculty. Because the offices do not require as much cooling as the lab, the two constant-speed, oil-lubricated, centrifugal chillers that had previously supported the building were no longer appropriate. There was a 650 ton (2,285 kW) chiller that provided too much cooling, and a 200 ton (703 kW) unit that did not provide enough. The chillers were installed in 1983 and ran on R-11, an ozone depleting refrigerant that is now banned for use in new equipment via Montreal Protocol. The chillers were past due for an upgrade and operating them wasted a lot of energy.

The YORK® YZ Chiller Creates a New Definition of Sustainability

Johnson Controls offered a highly efficient and optimized solution with a 300 ton (1,055 kW) YORK® YZ Magnetic Bearing Centrifugal Chiller. Installed in 2018, the chiller provided a perfect middle ground between the two previous chillers and was fondly nicknamed the "Goldilocks Chiller" because it was just the right size for the new building load. With the flexible control options that the variable speed drive offers to meet a shifting building load, unnecessary energy consumption was curbed. Additionally, the magnetic bearing technology in the YORK® YZ dramatically increases reliability, decreases downtime and decreases the need for maintenance. The UT Austin EMO Team appreciates the independence of the YZ chiller, saying, "We never have to worry about changing filters or checking oil levels, which allows us to focus our energy on saving initiatives rather than the upkeep of equipment."

The 300 ton YORK® YZ Magnetic Bearing Centrifugal Chiller replaced two older chillers in the Pickle Research Center

Pickle Research Center Operating Hours and Efficiency Comparison



The bars above indicate the number of operating hours at each temperature bin for the Pickle Research Center. The **gray line** indicates the estimated efficiency of the old chiller that the YZ replaced, and the **blue line** tracks efficiency based on data received after the YZ was installed. As temperature decreases, the YZ can take advantage of reduced condenser temperatures and operate very efficiently.

The YORK® YZ Chiller Offers a Lower Cost of Ownership

While operating the YZ Chiller, UT Austin realized an estimated 330,000 kWh or $23,000 annual savings. The high efficiency of the YZ makes an appreciable difference in energy costs over the year compared to the old chillers previously in the building.

One of the reasons the YZ chiller can save energy throughout the year is its ability to run at exceptionally low tower water temperatures, thanks to its wide operating map. “We used to have to hold the entering condenser water temperature at 65°F (18.3°C) to run our chillers during the winter months, but the YZ Chiller is able to take advantage of our entering condenser water temperatures down to 45°F (7.2°C), greatly reducing the energy consumption.” Utilizing magnetic bearings eliminates minimum speeds and lubrication systems that previously limited chillers from operating at extra low lift conditions. The YZ is designed for real-world efficiency and operates efficiently at off-design conditions, which is where chillers operate 98% of the time. Even in a warmer climate like Austin, Texas, there are still plenty of hours where the temperature is cool enough to take advantage of lower entering condenser water temperature. While the chiller has been operating, exceptional efficiencies as low as 0.15 kW/ton (23 COP) have been observed.

Efficiency Gains in Any Environment

An impressive feature of the YORK® YZ Chiller is its ability to easily integrate into any building setting and run efficiently. In this retrofit to an old lab facility, an immediate efficiency improvement of 15% over UT Austin's other fully optimized plants was noted soon after starting up the YZ Chiller. Juan Ontiveros concludes, "It can support anyone in any system of any age. You don't need the most sophisticated building technology to run the YZ and realize awesome efficiencies!"

The YORK® YZ Chiller was designed to optimize the benefits of R-1233zd(E) to offer low operating costs

Whether new construction with the latest building automation technology or a retrofit for a century-old building, the YORK® YZ operates more efficiently and more reliably than any other chiller on the market.

For additional information about the YORK® YZ Chiller, visit **www.YORK.com/Next**.

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