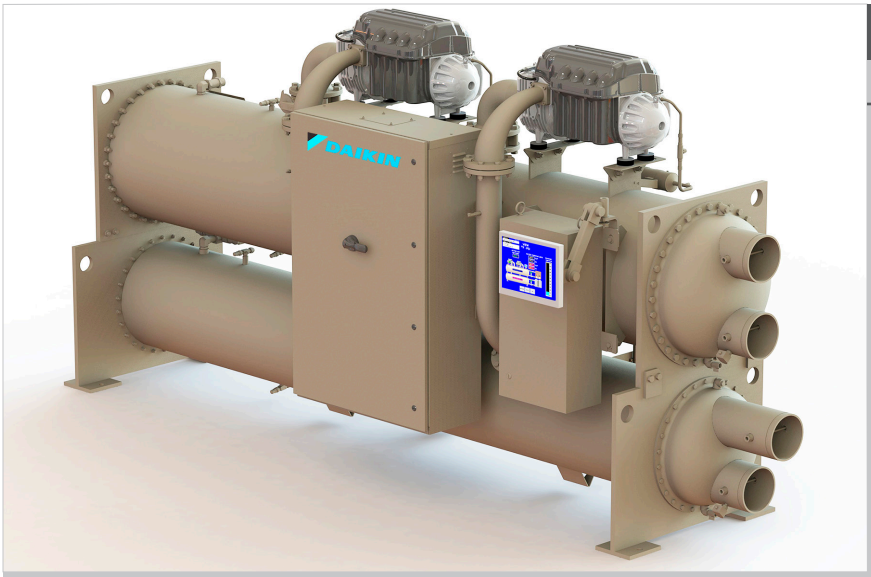


The college turned to a Daikin Magnitude chiller with Siemens Demand Flow technology to optimize the existing plant's central chilled-water system and to reduce energy consumption.

CASE STUDY

Higher Education

Facility
College campus

Location
Florida, USA

Facility size
22 buildings

Issue
Find energy-saving solutions that avoid investing in an additional mechanical plant

Solution
(1) 275-ton Daikin Magnitude® frictionless magnetic bearing chiller with Siemens Demand Flow® technology

Daikin Magnitude Chiller and Siemens Demand Flow Technologies Combine for LEED Gold Energy Savings at a Florida College

Issue

Staff at a state college in Florida searched for a solution that would conserve energy as well as deliver significant savings in utility and infrastructure costs.

The college planned to build a 100,000 sq. ft. state-of-the-art classroom building with a green roof, wind turbines, and photovoltaic solar panels. Engineers initially proposed the building be served by an adjacent, dedicated mechanical plant with air-cooled chillers.

When construction costs mounted for the new building, the design and engineering principals looked for ways to better manage resources, especially with the campus' HVAC system. Siemens Building Technologies, the college's controls contractor for more than 20 years, met with the consulting engineer and college officials to devise a cost-saving solution. Rather than build a second central plant, the team examined how to upgrade the building's original central plant and accommodate the new facility.

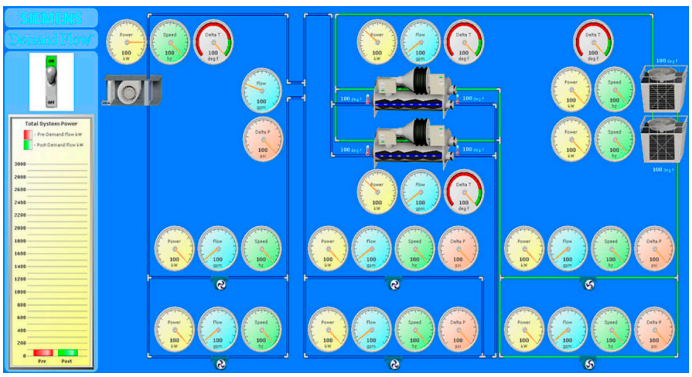
Solution

Tony Rodriguez, project engineer with Siemens Building Technologies, and the Siemens team presented a performance-contract scenario that met the new building's HVAC needs with the original central plant. The design team was convinced by the solution that called for replacing one of four water-cooled chillers with a Daikin Magnitude magnetic bearing chiller and using Siemens Demand Flow proprietary technology. With the new technology, the central plant would now optimize central chilled-water systems to reduce total energy consumption and serve the expanded campus footprint.

Campus-wide Central Plant

"We replaced the smallest and oldest of the four chillers, all from the same manufacturer, with a 275-ton Daikin Magnitude magnetic bearing chiller," says Rodriguez, noting three 525-ton capacity chillers, at about 20 years old, remain in place. The upgraded central plant uses the three original chillers plus the new Daikin Magnitude chiller to serve the entire campus—a total of 22 facilities—including the new classroom building.

"Energy savings were a key driver for this project. The secondary driver was reduced maintenance and low sound levels," says Mark Dengate, district sales manager with Daikin Applied.



Credit: ©Siemens

Siemens Demand Flow technology optimizes central chilled-water systems to reduce energy consumption by 20-50 percent annually.

"We work with many different vendors. Among chiller manufacturers, Daikin is one of the best," Rodriguez says. "We needed someone at the factory level who understood what we were trying to do. To run our Design Flow scenarios, we asked Mark Dengate of Daikin Applied to provide us with software-designed condition runs, not just the typical ARI condition runs. We couldn't have accomplished this project so efficiently without Mark's assistance."

The new chiller was installed at the college in late summer of 2012 and was online serving the campus for the fall term, while the new building was under construction. Next, new piping was installed from the central plant to the new building and it opened on time before the fall 2013 term started. The building achieved LEED Gold certification for New Construction by the U.S. Green Building Council.

Running Optimally

During the winter season, the new Daikin Magnitude chiller is the primary chiller in operation for the campus. In the summer, the chiller operates as an intermediary-stage chiller supported by two of the existing 525-ton chillers. To more closely match the demands placed on the new chiller, especially during the winter, the piping configuration was modified from a 2-pass to a 3-pass chiller system allowing for lower minimum evaporative flows.

"Coupled with Demand Flow technology, the Daikin Magnitude chiller and the other chillers are working side by side, online at the same time," Rodriguez says.

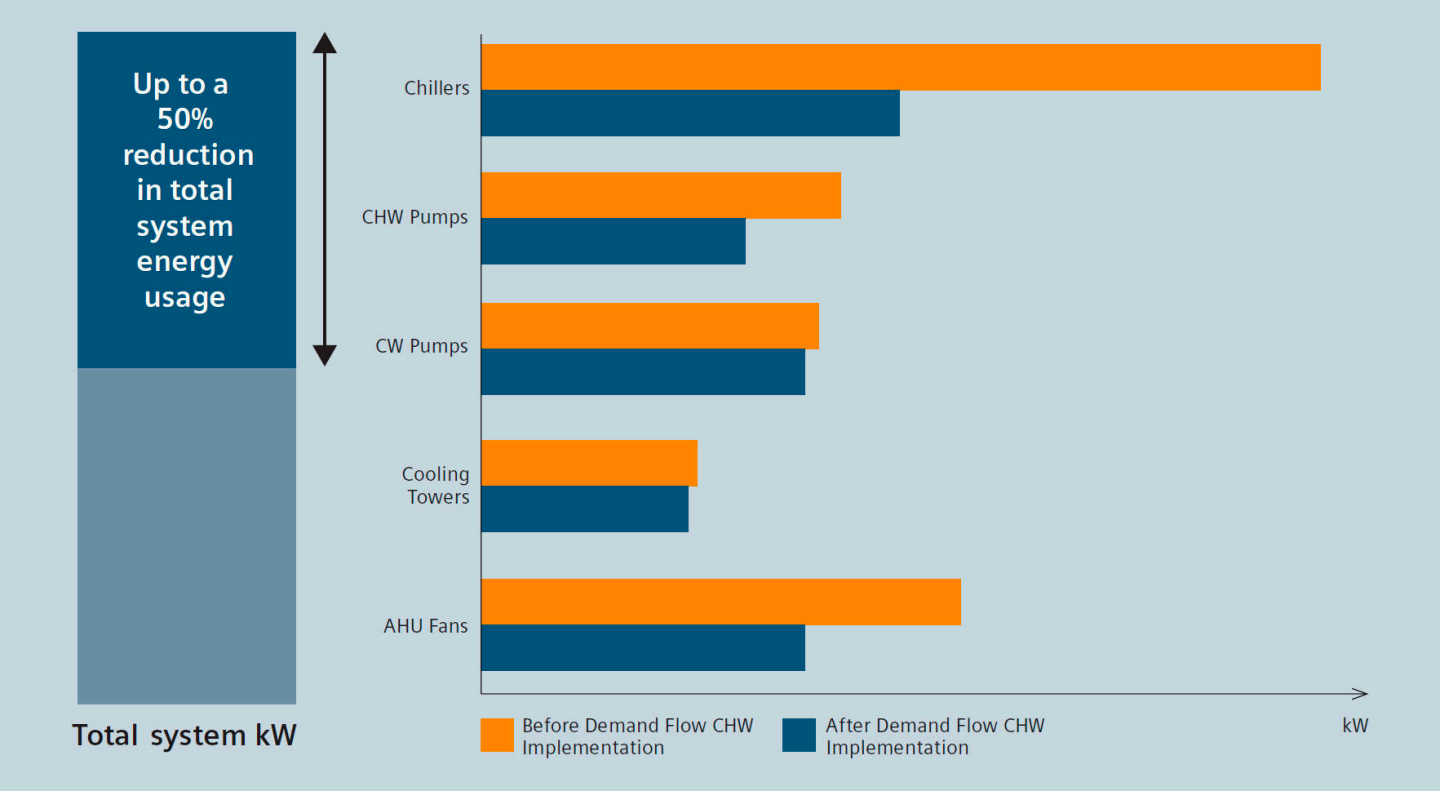
Outcome

The college has realized significant savings by investing in Daikin's latest chiller technology paired with Siemens Demand Flow at the original central plant. Rodriguez estimates the college has saved more than 50 percent in capital equipment costs, versus building a new plant, powered by air-cooled chillers, to serve the new facility.

Plus, the upgraded central plant supports ongoing operational savings for the college. The electrical utility savings are estimated at more than $100,000 annually with the enhanced central plant versus the former chiller system without Demand Flow. "The Daikin Magnitude chiller runs optimally on one compressor versus two to match the campus' building load needs. In the winter and shoulder months, we are achieving efficiencies of .4 kW per ton. In the summer months, we are achieving .6 to .7 kW per ton," Rodriguez says.

In addition to Daikin Applied's Mark Dengate, Rodriguez credits the Siemens Building Technologies team: Johnny Colvin, Demand Flow project engineer; Jason Adcock, project manager; and Carter Somerset, senior project engineer, who made the project such a long-term success. "We now take other Siemens customers to see first-hand the technology in action," Rodriguez concludes.

HVAC Systems With Demand Flow Yield Lower Energy Use



Credit: ©Siemens

The Daikin Magnitude magnetic bearing chiller with Siemens Demand Flow technology provides more than $100,000 in electrical utility savings annually, compared to the former chiller system without Demand Flow.