

Large Research University in the Midwest saves \$683,932 in annual energy costs while improving comfort, sustainability, and competing with other large universities in reducing energy intensity.

Overview



This University (LRU)* is composed of more than a hundred buildings. The campus includes labs, libraries, museums, hotels, arenas, and administrative offices. More than twenty thousand students are currently enrolled. In an effort to improve sustainability, focus is placed on innovation to improve operational efficiency. LRU plans to continually advance its environmentally friendly mission while expanding their campus.

** Due to confidentiality agreements, we are not able to provide the client name. We will refer to the firm as LRU throughout this case study.*

The Challenge

LRU environmental sustainability goals include minimizing environmental impacts and maximizing resource conservation by reducing greenhouse gas emissions, and pursuing building and utility systems that encourage the use of renewable resources, employ energy conservation and optimization, as a participant in the U.S. Department of Energy's Better Buildings Challenge.

To this end, LRU was interested in implementing energy conservation measures and technologies, which help achieve these goals while taking into account LRU specific needs.

Results achieved

- Energy savings financial summary
 - Energy savings: \$683,932 (annual)
 - Simple payback: 0.22 years
 - Net present value: \$1,475,779
- Other operational benefits
 - Energy intensity reduction
 - Each closed fume hood saves 50,000 lbs of CO2 in a year or 60% on energy.
 - Resource management. Utilized impact analysis to prioritize workload for internal maintenance staff and contracted controls personnel, and maximize progress towards corporate goals.
 - Environmental stewardship.
 - Social responsibility in the community.
 - Coordination with EH&S staff to reduce air changes per hour and maintain safe working environment.
 - Improved central plant load capacity across campus building loops.

Cimetrics' Solution

Cimetrics was selected to provide its Analytika Pro solution for 9 buildings comprising over 2 million square feet serving labs, classrooms, and administrative buildings. Cimetrics collaborated with LRU and their building automation system provider Siemens to connect to and collect sensor and actuator data from over 6,000 physical points. Data was collected every 15 minutes, 24 hours a day, 365 days a year, for a total of approximately 580,000 data samples per day. The following systems were monitored: Air Handling Units, Hot Water Pumps, Chilled Water Pumps, Fan Coil Units, Fume Hoods, Terminal Units, and other miscellaneous equipment.

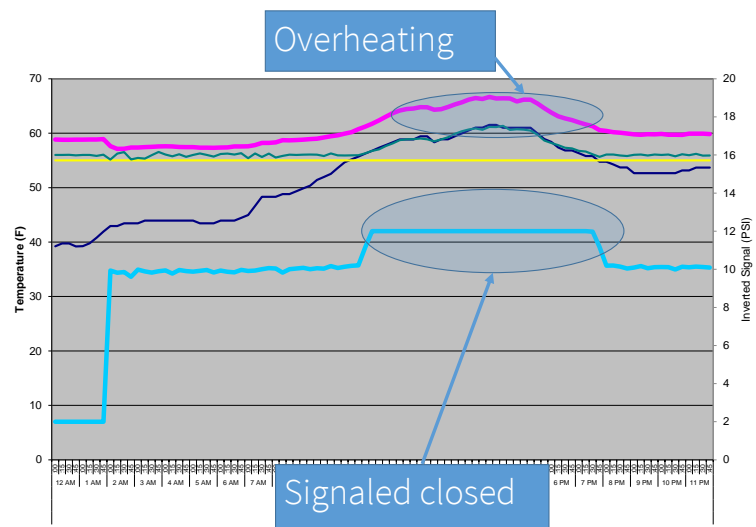
Over 1,000 Analytika software algorithms then analyzed the data to identify opportunities to reduce energy, improve environmental conditions and reduce maintenance, operations and regulatory costs. Analytika also uncovered potential equipment problems, occupant comfort improvement, operational uptime improvements and opportunities for profitable retrofit projects.

Experienced Cimetrics engineers leveraged Analytika software to identify opportunities, determine root cause, and calculate annual savings impact. Actionable recommendations were documented and provided to the client both through online and offline channels. Cimetrics' role didn't end at recommendations. Cimetrics engineers engaged with the client team on a regular basis to help answer questions, coordinate implementation, and provide regular feedback on progress.

Example fault detection and diagnostics: Overheating in large once through AHU

The large air handler (AHU) discharge air temperature (DAT) was overheating due to a leaking valve and damper. This issue was not detected because it was not a large enough increase in temperature at the zones to be noticeable, however, it was identified with Analytika.

Due to the size of the air handler a small fault can equal significant savings. Several air handlers across the nine buildings had leaking pre-heat valves.



Solution

Cimetrics worked with LRU staff and the controls vendor to inspect and fix this AHU and other AHUs where the dampers/valves were not operating correctly, causing simultaneous heating and cooling.

Additionally, this reduced building's heating and cooling demand and allowed for additional heating and cooling capacity to other buildings fed by the steam and chilled water loops.

Energy savings for solution: **\$9,776 (annual)**

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