Medical Center saves $1.3 million in annual energy costs while improving patient comfort

Overview

This Medical Center (MC)* is a 500 bed academic medical center providing pediatrics, primary and advanced medical care. MC is a large provider of trauma care and is affiliated with a local university. The medical center has almost 1 million outpatient visits per year and the medical center campus includes over 2.5 million square feet.

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

The Challenge

According to the EPA: "Health care organizations spend over $6.5 billion on energy each year to meet patient needs. Every dollar that a nonprofit health care organization saves on energy is equivalent to generating new revenues of $20 for hospitals or $10 for medical offices."

MC's guiding principles include efficiency and sustainability through a 20% reduction of CO_2 emissions by 2020. To this end, MC was interested in implementing targeted energy conservation measures and technologies, which help achieve the sustainability goals while taking into account MC's specific needs.

MC also committed to the Healthier Hospitals Leaner Energy Challenge. The Healthier Hospitals Initiative (HHI) is "a national campaign to implement a completely new approach to improving environmental health and sustainability in the health care sector."

Results Achieved

- Financial summary
    - Total energy savings: $1.3 million (annual)
    - Simple payback: 0.3 years
    - Net present value: $1,221,237
- Operational benefits
    - Sustainability and environmental stewardship: Achieved 3,400+ metric tons in annual CO_2 emissions reduction, which is the equivalent of taking 715 cars off the road.
    - Utility metering: Provided campus wide metering data by building and sub meters which assisted fault detection and internal billing.
    - Reporting: Assisted in Joint Commission reporting by providing analysis of specific zone conditions, including airflows, relative humidity levels, and temperatures for the operating rooms.
    - Predictive maintenance: This plan included the inspection and reprogramming of equipment prior to failure.
    - Vendor management: Verified optimum sequence of operations programmed into the building automation system (BAS) by outsourced facilities management vendors and maintained 24/7 operations.

Presented by: cimetrics

Cimetrics' Solution

Cimetrics was selected to provide its Analytika Pro solution for 5 buildings comprising over 800,000 square feet including inpatient and outpatient care, medical offices, and the central plant. Cimetrics collaborated with MC, JCI and Siemens, their building automation system providers, to connect to and collect sensor and actuator data from over 9,400 physical points. Data was collected every 15 minutes, 24 hours a day, and 365 days a year, totaling more than 900,000 data samples per day. The following systems were monitored: 41 air handling units, 19 hot water pumps, 11 chillers, 35 chilled water/condenser water pumps, 10 heat exchangers, 125 exhaust fans, 1,000 terminal units, 116 fume hoods, and other miscellaneous equipment. In addition, 2 chilled water meters, 1 condensate return meter, 52 electric meters, 17 steam meters, and 24 water meters were monitored.

Over 1,000 Analytika software algorithms then analyzed the data to identify opportunities to reduce energy consumption, improve environmental conditions and reduce operations and maintenance costs. Analytika also uncovered potential equipment problems, quantified improved patient comfort, improved operating room zone conditions, and provided 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 did not end with providing 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 of fault detection and diagnostics:
Excess hours of operation for air handling units

Four large air handling units (AHUs) serve an outpatient building. All were operating 24/7. However, there was no patient care at night and minimal building usage on weekends. The AHUs were left on 24/7 to serve MRI and other high heat gain loads in the building. This issue was not detected because there were no temperature complaints; however, it was identified with Analytika.

MRI machines and other hospital equipment can create substantial, unwarranted energy consumption if HVAC equipment is not specifically designed to exclusively serve that equipment.

AHU Schedule Display
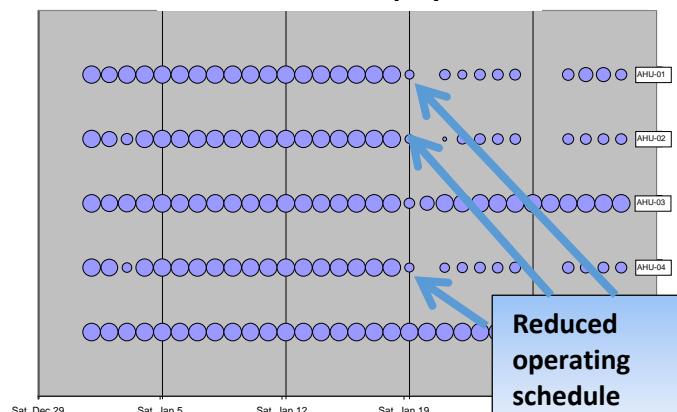
Solution

Cimetrics worked with MC staff and the controls vendor to change the AHU sequence of operation to limit the equipment run times to only occupied hours and allow for override of the AHUs to maintain zones within the required temperature and relative humidity range.

Annual energy savings achieved: $261,278

Annual carbon emissions reduction: 605 metric tons

Learn how Analytika can transform your system data into actionable insight and financial results today!

www.analytika.com

+1 (617) 350-7550

Presented by: cimetrics