Major Medical Research & Health Care Facility

Work Scope

EMAT completed an ASHRAE Level 2 energy audit of a major medical research and health care facility in Houston, Texas.

Facility Description

The building was constructed in 2011 and totaled 1.4 million square feet. The building was separated into three sections: Phase 1, Phase 2, and the meeting center. Phase 1 was constructed mainly of double pane glass and had 19 stories. Phase 2 was also constructed mainly of double pane glass and had 25 stories, and the meeting center was constructed of brick and had only three stories. Phase 1 and 2 consisted mainly of office space.

There was one large data center on-site that was responsible for servicing the building as well as other buildings on the same campus. Lighting was observed to be mainly compact and linear fluorescent. Most restroom and kitchen faucet aerators had been replaced with 1.0 GPM low-flow aerators.

The building was supplied conditioned air from variable air volume air handler units (AHUs) and energy recovery units (ERUs). The ERUs were equipped with rotating desiccant wheels to transfer sensible and latent heat energy from the exhaust stream to the supply stream. Each AHU and ERU was also equipped with UV lights for disinfecting the supply air. Outdoor air dampers were controlled by CO2 sensors, while also utilizing airside economizing. Each unit was supplied chilled water from the central plant.

The building utilized district chilled water for cooling. District chilled water entered the central plant and exchanged heat with the buildings circulating water loop through several plate and frame heat exchangers. Water flow was delivered out of the central plant to the rest of the building by variable speed pumps. Each AHU and ERU was equipped with 2-way valves. Heat was supplied to the building through electric duct heaters and electric VAV reheat. The building was controlled locally by both a Siemens Apogee building automation system (BAS) and a Lutron lighting control system.

Summary of Recommendations

Energy efficiency was a primary focus when the building was constructed. Preliminary utility analysis showed that the energy intensity of the building was very low. The building received an ENERGY STAR® Score of 88, well above the threshold for certification. Particular attention had to be paid to this building during the walkthrough and post-site visit analysis to find potential for energy savings.

There were a few simple recommendations, such as retrofitting all light fixtures with LEDs and lowering the faucet aerators from 1.0 GPM to 0.5 GPM. Lighting on the south side of the building was observed to be on despite sunlight being sufficient for space illumination. EMAT recommended installing photocells and utilizing the Lutron system to raise lighting levels in the space when sunlight was insufficient.

EMAT analyzed trend data on each piece of equipment at the site and noticed that several units were running longer than necessary. It was recommended to reprogram these units to be on the proper building schedule. Finally, EMAT observed large amounts of open roof area with no surrounding obstructions. Therefore, a rooftop PV system was recommended.

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Potential Savings Identified

- Eleven (11) Energy Conservation Measures (ECMs)
- Total annual savings of over 3.7 million kWh, 470 MCF of natural gas, 1.3 million ton-hours, 4,000 gallons of water, and $550,000 in cost savings
- Overall payback of less than 4 years