



SHOWCASE PROJECT: COMMUNITY COLLEGE OF ALLEGHENY COUNTY (CCAC): SOUTH CAMPUS ENERGY PROJECT

SOLUTION OVERVIEW

The South Campus of the Community College of Allegheny County (CCAC) is one of four campuses located throughout Allegheny County. Opened in 1973 with later additions, the one-building campus houses traditional college classrooms and laboratories, as well as a theater for both student and community productions, radio station, gym and fully equipped fitness center, library, media and computer centers, and state-of-the-art nursing and allied health laboratories. The six-story structure is surrounded by open grounds which include parking areas, a nature trail, and a community garden. This facility was the largest single energy user in the entire CCAC system, and the HVAC system was maintenance-intensive.

The building's HVAC system was served by the original physical plant: two gas-fired steam boilers and two steam absorption chillers. Heated and chilled water was distributed to the entire building through a system of small air-handling units and over 400 unit ventilators. The main physical plant was at the end of its useful life and was extremely inefficient. Steam was used primarily to serve the chillers, and the boilers were sized to match these loads, meaning they were oversized for the heating load. The chillers were incapable of running at full capacity, which led to problems with high humidity throughout the building. Steam was also run through a heat exchanger to make hot water that was used to heat most of the building.

Interior lighting in the building was converted from T12 fluorescent lamps to T8 lamps, but the exterior lighting was a mix of metal halide, mercury vapor, and high pressure sodium lamps. The quality of the exterior lighting was considered to be poor.

SECTOR TYPE

Education

LOCATION

West Mifflin, Pennsylvania

PROJECT SIZE

240,000 Square Feet

FINANCIAL OVERVIEW

Project Cost: \$3.8 Million

SOLUTIONS

CCAC pursued a bond-funded guaranteed savings project specifying the following measures:

- New boilers
- New electric chillers
- Conversion of the exterior lighting system to LED fixtures
- Retrocommissioning of the unit ventilators and other HVAC system components that were remaining in place.

Firms responding to the RFP were welcome to propose additional measures, and the firm chosen to complete the project proposed some additional lighting retrofits, replacement of a smaller rooftop chiller, and plumbing retrofits to low-flow fixtures. Water savings were enhanced by the reduction in necessary heat rejection of the electric chillers over the absorbers, thus lessening the amount of water that needed to go to the cooling tower.

This was the first time CCAC had pursued guaranteed savings performance contract, and the project progressed very well. One of the main anticipated problems was keeping the building in operation. Classes are in session year-round, so long-term shutdowns are difficult, if not impossible. The existing chillers and boilers were nearing the end of their useful life, and were not expected to make it through another cooling season. However, the contractor was able to obtain and install one new chiller that kept the campus up and running, and clever operations by the physical plant staff kept the building comfortable through the beginning of the cooling season – cool outside air was brought into the building at night to pre-cool space, thus avoiding the expense of a temporary chiller.

Even though electric chillers were added to replace the absorbers, the electricity consumption at the building decreased because of the lighting retrofits, installation of air eliminator units in the piping systems, and new variable-speed pumping systems. The reduction in gas usage was so large that the gas company checked their meter for errors several times.

The retrocommissioning of the unit ventilators revealed problems in 43 percent of the units, including some malfunctioning freeze stats.

OTHER BENEFITS

The project resulted in reduced water treatment costs, as steam was eliminated from the building, as well as lowered maintenance costs, better humidity control, and fewer occupant complaints on hot/cold rooms for the maintenance staff. In addition, CCAC received rebates from the electric utility for the lighting retrofits and the variable speed pumps. The quality of lighting in the parking lots improved with the new LED fixtures, and students, faculty, and staff feel more secure on the site.

Annual Energy Use

(Source EUI)

Baseline(2014)



Actual(2017)



Energy Savings

37%

Annual Energy Cost

Baseline(2014)



Actual(2017)



Cost Savings

\$184,000



South Campus Building Exterior



Before and After Boiler Replacement



Before and After Chiller Replacement



Before and After Pump Replacement