EFFICIENT AND HEALTHY SCHOOLS

The Efficient and Healthy Schools Program aims to motivate and empower K-12 schools to reduce energy costs and improve student and teacher health. The Program connects schools with practical solutions and provides technical assistance and resources to significantly improve school facilities. It is led by the U.S. Department of Energy Building Technologies Office with technical support from Berkeley Lab and New Buildings Institute.

CASE STUDY: Performance Pro Katy Independent School District

Project Details

Location: Katy, TX

Number of Students: 92,000

Number of Schools in District: 74

Locale: Large suburb

Percent Free and Reduced Price Meal: 31%

Percent Title 1 Schools: 45%

Funding Mechanism: 95% Bond, 5% Maintenance & Operations general fund

Project Dates: Summer 2019 (ongoing)

Design/Performance Criteria Used: International Performance Measurement and Verification Protocol (IPMVP)

Key Project Features: Upgraded control systems, including:

- Controllers
- Components
- Sensors
- Actuators
- Enhanced operation and graphic sequences
- Ongoing training

Project Scope & Approach

In 2019, Katy Independent School District, in Katy, Texas, set out on a course to systematically upgrade the aging Building Management Control Systems (BMCS) district wide. BMCS modernizations have been applied to over 6 million square feet of conditioned space and 44 facilities over the past four years, with the goal of all schools receiving improvements. Each BMCS project includes upgraded hardware and application of a standardized, enhanced sequence of operations and graphics that prioritize efficiency while maintaining proper ventilation rates. Thoughtful choices were made to improve the user experience, including visibility into the sequence of operations in real time and a key that matches equipment and systems with operational settings. These enable the operator to identify deviations from expected operation more easily and avoid contractor misinterpretation and rework.

Multiple departments within the district worked together to envision and execute the project. A third-party commissioning agent was involved from the design phase all the way through the warranty period, providing ongoing commissioning activities such as measurement and verification of results and training of operators and HVAC technicians.

Project Outcomes & Lessons Learned

The commissioning agent has employed a unique weekly training approach that engages operators in troubleshooting the "problem of the week." This program has improved operator confidence and empowered more proactive changes and targeted responses to issues. Finally, site energy use intensity (EUI, kBtu/sq ft) has been improved across the district.

The new systems also have provided the district with the ability to participate in utility demand response programs that help keep the power grid stable for the community. The addition of emergency HVAC shutdown provides the ability to quickly shut down outside air ventilation during times of environmental emergency such as chemical spills or other local hazard release.

PROJECT HIGHLIGHTS

- The overall average EUI reduction for the group of 30 upgraded facilities is **22%**, which contributes to a district-wide average site EUI **decrease from 56 to 44 (kBtu/sq ft)**.
- When all facilities are included, the financial impact is currently projected to reduce annual energy operating costs by **2 million dollars** annually at today's rates, and higher if and when rates increase.
- Improved temperature and humidity consistency within and between spaces
- Elimination of simultaneous heating and cooling