SCHOOL DISTRICT CASE STUDY:

Best Practices in Strategic Energy Management (SEM) for Local Texas School Districts

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SPEER
The South-central Partnership for Energy Efficiency as a Resource

Clyde ISD Case Study

Rural schools represent about one-third (32,000) of the public schools in the United States. Rural schools are collaborative and intentional problem-solvers despite the remote locations and under-resourced facilities. Energy management planning is a collaborative opportunity to assess and prioritize energy-saving measures, identify funding sources, and prepare staff to operate building systems efficiently. These rural school districts accommodate nearly 14 million students in facilities located in remote areas where it is often difficult to deliver information and services to maximize school building energy performance.

Clyde Consolidated Independent School District (ISD) in Clyde, Texas, is just 15 minutes from Abilene, located in northwestern Callahan County. Clyde CISD contains four schools and 1,397 students. The district's minority enrollment is 20%. Also, 34.6% of students are economically disadvantaged. The mission of Clyde CISD is to provide effective education, develop the potential of each student, build skills necessary for lifelong learning, and instill self-worth and confidence that allows students to achieve success in an ever-changing world.

Figure 1. Clyde ISD is located outside of Abilene with a population of 3,805

Motivation and Stakeholders for Clyde ISD

Due to their geographic locations and typically smaller sizes, rural schools face several energy efficiencies and renewable energy challenges related to implementation, financing, and operations. Nationally K-12 school districts spend nearly $8 billion annually on energy costs, the second-largest expense after teacher salaries. Aging facilities combined with limited school budgets result in deferred maintenance, with an estimated $270 billion needed for infrastructure repairs. Clyde CISD's school board demonstrated its commitment to investing in its infrastructure to save money in the future.

CLYDE CISD SPENT IN THE FISCAL YEAR 2019-2020:

- $11,253 per student
- $8M on instruction
- $2M on support services
- $3M on district operations

For example:

- Many rural schools fall into a “service black hole,” with equipment too large to be serviced by local technicians that work with residential-scale equipment but too small a budget to afford a commercial-scale technical service.
- Smaller populations in rural areas often result in regionalized school systems, placing facilities far from urban centers and specialized systems maintenance personnel.
- Many state-level and utility financial incentives are not developed with the rural school or facility manager in mind. In some situations, for example, retrofit financial assistance is only available to LEED2 -accredited personnel, and many rural school facilities are managed by local personnel who are not LEED accredited.

Financing Energy Initiatives

Thanks to a capital recovery and reinvestment program with Schneider Electric, Clyde CISD can now implement primary lighting, mechanical, building automation, and water efficiency renovations throughout the district without being a financial burden to the community. Clyde CISD will save on energy and maintenance expenses annually over the project's life while simultaneously streamlining district operations and enhancing the student experience and classroom learning environment.

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Description of Best Practice

School districts are unique in their support system. They have some outstanding energy managers and energy planners. Implementing an energy savings performance contracting project with Schneider Electric provided the rural school district access to technical expertise, contractors, and purchasing accessibility to high-performance equipment.

The low-hanging fruit for a school district is examining the energy end-use profile, technical opportunities for energy efficiency improvement, and monitoring of the building automation system. An energy end-use profile is a load profile that quantifies how and when energy is used.

End-Use Load Profile Project Overview

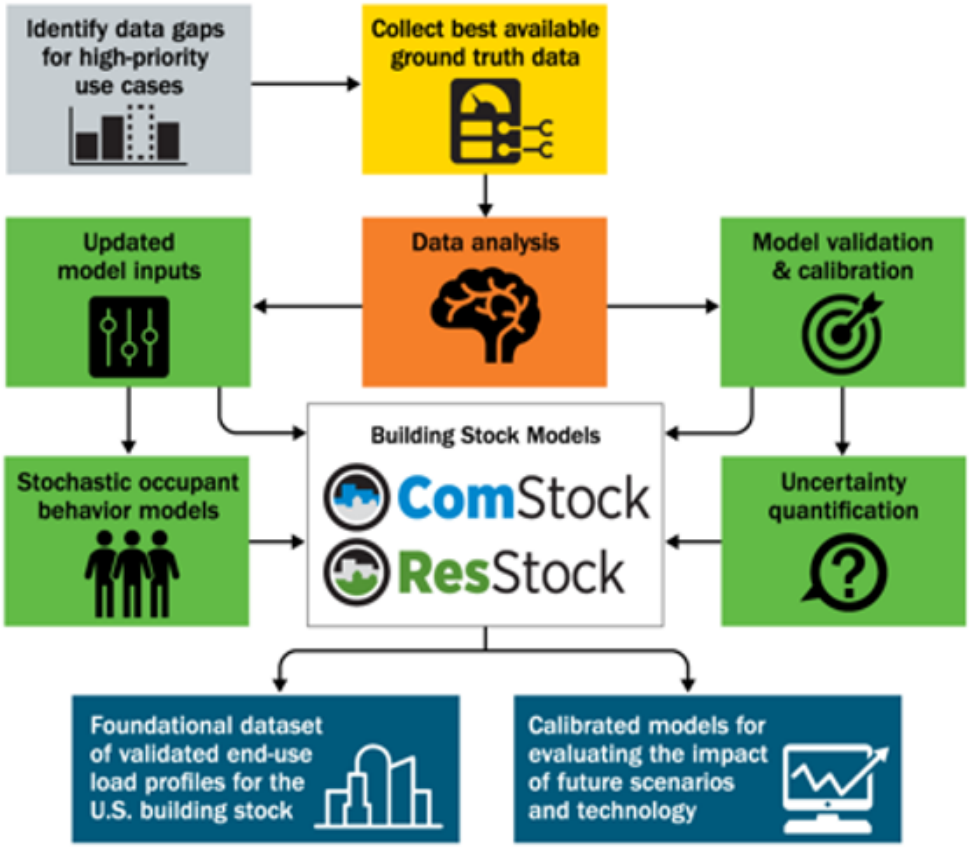
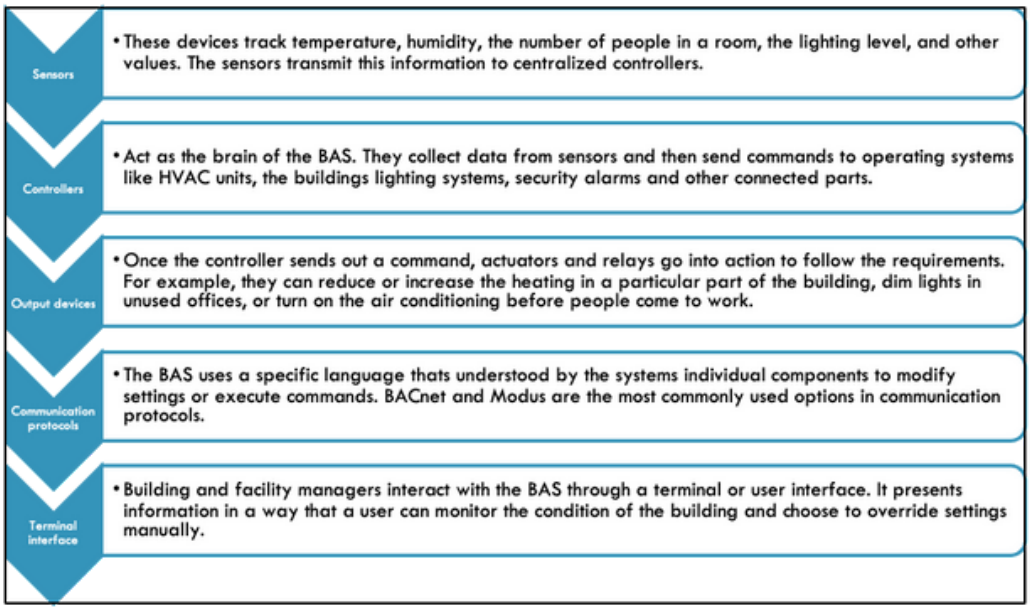


Figure 2. Berkley Lab End-Use Load Profile Project Overview. https://emp.lbl.gov/news/end-use-load-profiles-how-and-when-are#:~:text=End%2Duse%20load%20profiles%20quantify,energy%20researchers%20and%20other%20stakeholders.

Technical opportunities for energy efficiency improvement occur through regular monitoring and incorporation of building automation systems. The building operator performs monthly monitoring utilizing a checklist with items such as verifying power and correct IPO addresses for the system.

A building automation system (BAS) **is a network designed to connect and automate certain functions inside a building.** All building control systems, from lighting and HVAC (Heating, Ventilation & Air Conditioning) to fire and security systems, are wired through one set of controls. The BAS should be monitored daily to verify what is online and offline. At times the BAS may not function as intended due to changes within the building, such as changes in building use, removing/adding walls, or connectivity issues. A building automation system will lower operating and maintenance costs and deliver improved energy efficiency, indoor air quality, occupant comfort, and productivity. Maintaining control of large buildings can be a considerable challenge.

Best Practices Tools and Process



Case Study

By implementing an energy savings performance contracting project with Schneider Electric, the rural school district was provided access to technical expertise, contractors, and purchasing accessibility to high-performance equipment. By partnering with Schneider Electric to develop and install comprehensive energy savings evaluated at the school's facilities, the district produced a report with a conceptual understanding of the Energy Conservation Measures (ECMs).

Those measures included the following improvement opportunities in district facilities:

Lighting

- Retrofit existing fluorescent fixtures with energy-efficient/long-life LED lighting (3,901 fixtures)
- The comprehensive project includes both indoor and outdoor lighting
- High efficiency, better quality, and substantially longer life

Building Automation System

- Update existing HVAC controls throughout the district
- Web-based and viewable from any computer connected to the network
- Access to temperatures, set points, and schedules of all related HVAC equipment

Mechanical

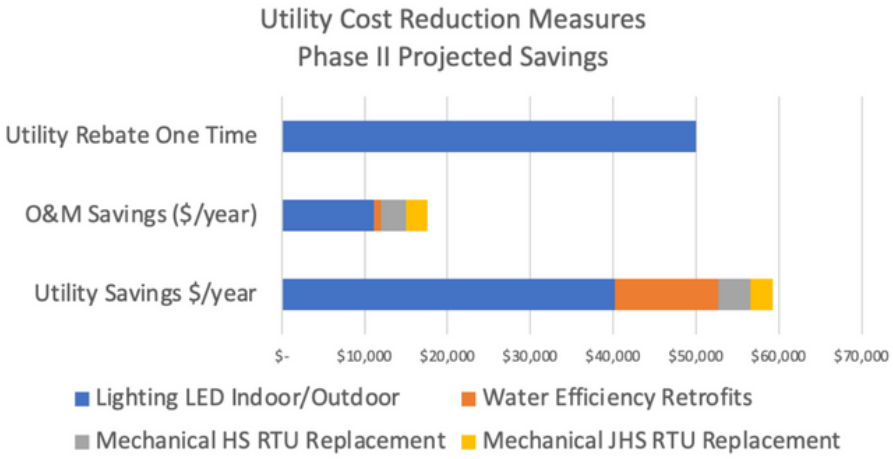
- Replacement of the oldest HVAC units (60 in High School and 53 in Junior High)
- Higher efficiency equipment that also eliminates R22 refrigerant use
- Improve comfort and air quality

Water

- Reduce water usage
- A comprehensive solution to maximize performance
- Standardization of flush valve technology and material

Data Sources

Schneider Electric performed a benchmarking analysis of energy and water consumption to create projected savings. The overall savings in Phase II of the project totaled $76,856.00 per year with a one-time utility rebate of $50,000.



School Strategic Energy Management and the law

In 2009, the 81st Legislature passed **Senate Bill (SB) 300**, amending **Education Code §44.902** to require public schools to develop long-range energy plans.

The plan must include strategies for achieving energy efficiency that result in net savings for the district, or that can be achieved without financial cost to the district, along with initial, short-term capital costs and lifetime costs and savings that may result from the implementation of the strategies.

Responding to Challenges

- High energy costs are not "fixed" and can be reduced by 5% to 20% by effectively managing, maintaining, and operating school physical plants, regardless of age.

- School district facilities can readily utilize techniques to systematically assess O&M practices in their physical plant, as well as the magnitude of potential energy-saving opportunities resulting from changed O&M practices.

- The most significant challenges to obtaining school district cost savings are not technical. Critical to the success of energy-efficient O&M management efforts is an active support by senior administrators and staff training.

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Resources for Schools

The Texas State Energy Conservation Office provides integrated services to public school districts and community colleges; the Schools Energy Program assists education officials in creating and maintaining effective energy efficiency programs. The approach is through energy efficiency partnerships and energy management training workshops.

The program also offers technical support addressing energy-efficient facility operation and maintenance, indoor air quality, water conservation, comprehensive energy planning, and education through the following:

- **Watt Watchers** is an online STEM program designed to help boost energy literacy for K-12 students and help schools save money by saving energy.
- **Preliminary Energy Assessments** details recommendations for cost-effective resource efficiency measures that could be implemented to reduce utility consumption or utility costs.
- **Technical Assistance for Schools** is a program where SECO contracts with leading engineering firms having a high degree of technical knowledge. They provide customized, on-site, energy-related services across a broad spectrum, ranging from basic consultation to feasibility studies

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SECO State Energy Conservation Office

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