How Seaford School District Met the Mark for Energy Efficiency

The Seaford School District (Seaford SD), a rural school system in southwestern Delaware, implemented an energy management plan that has reduced its portfolio-wide energy consumption by 16 percent annually, saving nearly 8.2 million kBtus of energy. As a result, the district is saving an estimated $100,000 in annual energy costs and preventing nearly one million pounds of CO_2 emissions per year. Through its energy efficiency efforts, Seaford SD offsets the CO_2 emissions of approximately 105 vehicles or 53 households.

Commitment

Seaford SD began their efforts with a strong first step—a solid commitment to a highly effective energy management plan. The commitment came from senior management, the school board, taxpayers, school staff, and students. This enabled Seaford SD's Buildings and Grounds Department to assess the performance of all of the facilities, set goals, identify energy savings opportunities, and create and successfully implement action plans. The result has been an impressive cycle of continuous energy savings, positive public relations, national recognition, and substantial cost savings that will ease the school's financial burden for years to come.

Organization and Education

Seaford SD's energy improvements stem from the efforts of an organized energy team, led by Roy Whitaker, Chief of Buildings and Grounds. Mr. Whitaker has access to the skills of internal and external team members. The energy team on staff includes two technicians who are primarily responsible for maintaining all of the heating, ventilating, and air-conditioning plants. They collaborate with six building chiefs, a night shift supervisor, and 29 janitors who are directly responsible for the six schools. The building chiefs and their janitorial staffs take responsibility for the day-to-day operations of the school buildings, environmental controls and programs, and preventive maintenance. The final, critical component of the energy management plan involved the faculty, staff, and students who spend their days inside the schools. They, too, have learned how to use best energy management practices and follow the energy regulations as outlined in the district's energy policy, documents ECF and ECF-R.

Energy Performance Benchmarking and Tracking

Using data from their monthly utility bills and EPA's online energy performance rating system (available at www.energystar.gov/benchmark), Seaford SD staff has established a baseline for each school and then tracks the performance of all six buildings, representing 520,048 square feet. With technical review and school-to-school comparisons, the energy team is able to identify the least efficient buildings and focus efficiency projects where they are most needed.

> *"…the benchmarking process has been the backbone of our teams' Energy Management Program. We understood from the initiation of our energy performance improvement efforts that all meaningful analysis and improvements stem from this critical first process, which involves establishing baseline energy use and comparing the relative energy performance of our facilities."*
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> ***- Roy Whitaker***

Technical Improvements and Systems Upgrades

Seaford SD's success can be attributed in large part to the ability of the energy team to garner support for funding based on demonstrations of expected energy savings. Working together, the Seaford SD team has achieved energy performance improvements through a series of equipment and operational changes that included:

- Cleaning boilers in all school buildings.
- Upgrading lighting systems to high-efficiency T8 and T5 lights in gyms and classrooms.
- Upgrading windows to high efficiency window overlays, resulting in an instantaneous 20%+ reduction in heating fuel consumption. These commercial grade windows have an extremely long life cycle and have helped reduce energy use intensity in one building by an impressive 15.8 kBtus/sf compared to the baseline.
- Installing and testing new equipment such as on-demand heating of domestic hot water systems designed to eliminate standby losses. Using innovative hot water configurations,

Seaford SD has reduced the size of hot water tanks by as much as 75%. In one case, an $1,800 investment led to a 50% reduction in system use, saving more than $300 per month and paying for itself in about 6 months.

- Installing radiant heating systems that improved comfort while conserving energy and being compatible with solar heating.
- Installing new building equipment, such as a new pump frequency drive, timer controls for the fuel oil booster pumps, a high efficiency chiller, heat timer boiler controls, electric to gas dishwasher boosters, new kitchen hoods, and a high efficiency transformer.
- Installing, reprogramming, and on-going re-tuning of a Web-based control system that has decentralized the mechanical system control and provided the ability to instantly review system parameters within each school.
- Installing high efficiency dehumidification equipment in every classroom to improve indoor air quality while simultaneously reducing the energy load and electrical consumption from central plant chillers.

Operational Improvements

In addition to technical upgrades, Seaford SD has achieved its improved energy efficiency through integrated operations management. As part of this effort, the Seaford SD teacher's union worked with the administration to develop agreements on conservation measures for the classrooms. Staff accepted the energy conservation measures, including reduced temperatures (68-70 degrees) in the heating season, keeping superfluous lights off, eliminating unused plug loads, and more. When challenged by unbudgeted electricity cost increases, they implemented even more conservation measures such as turning lights off in the sun-lit hallways and restrooms. This prevented the cost increases from affecting Seaford SD's educational mission. Any concerns the educators have about systems operations are addressed to their respective building chiefs who can perform spot temperature surveys or they can temporarily place data loggers in the space to confirm proper system operation or need for repairs.

"…while being environmentally and fiscally responsible is a reward within itself, Seaford SD's success with ENERGY STAR has created the opportunity to share our successes with others during outreach events, press events, and training activities. One example… local Senator Tom Carper found out about Seaford SD's energy efficiency efforts and requested a tour of our facility. The Senator's tour prompted television coverage of Seaford SD's efficiency efforts."

- Roy Whitaker

Recognition

Seaford SD earned the ENERGY STAR for each of its six buildings and was the third school district in the nation to achieve the ENERGY STAR Leaders recognition for improvements in energy efficiency portfolio wide. The local newspaper carried a photograph and story on the six ENERGY STAR awards received by the six building managers. The story about Leaders recognition was also carried by local papers and appeared in an EPA press release. Public awareness has been generated by information posted on the front page of the Seaford SD Web site. And the Superintendent and school board recognized the special efforts made by Seaford SD staff at a well attended public school board meeting. By following the example of Seaford SD, every school district has opportunities to improve energy performance through ENERGY STAR and achieve similar success. For more information, visit: www.energystar.gov or contact Mr. Whitaker at rwhitaker@seaford.k12.de.us