



Thirteen buildings that reduced their energy use by 30% or more in a single year

Find some inspiration in the stories of these diverse buildings and their energy teams, each of which managed to cut their energy use dramatically within a single year.

K-12 SCHOOLS

Claiborne Elementary School, Baton Rouge, La.



- Energy Use Reduction: 45.9%
- Cost Savings: \$114,499
- GHGs Prevented: 488 metric tons

At Claiborne Elementary School, the most effective tool in saving energy was managing and scheduling the HVAC and lighting systems, which was achieved by working closely with the school principal and staff throughout the year. Computerized building automation system (BAS) control and scheduling software was used to fine-tune and continually adjust system settings to accommodate the specific comfort needs of the school, while using the least amount of energy to do so. Some examples of steps Claiborne's energy team took include: setting back cooling, heating, and lighting levels when rooms are unoccupied; determining how many chillers and hot water boilers are needed to meet the temperature and humidity needs of the school; and automatically adjusting the amount of fresh air being brought into the building to meet the occupancy and ventilation requirements during any given part of the day.

Lake High School Complex, Uniontown, Ohio



- Energy Use Reduction: 36.2%
- Cost Savings: \$263,428
- GHGs Prevented: 1,514 metric tons

Lake High School completed a full-scale energy conservation project with CCG Energy Solutions that included lighting retrofits, transformer upgrades, mechanical design improvements, and an upgrade to the building automation system (BAS). Of these, the BAS had the biggest impact on energy savings. Lake High School

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is now continuously monitored remotely through the BAS by CCG's performance improvement specialists who focus on identifying energy savings opportunities. The team also focused on upgrades to mechanical systems, a transformer, and lighting fixtures. Previous lighting did not meet the required design standards. Now the lighting not only exceeds these standards, but also provides a better work environment while reducing the electric demand throughout the building. Upgrades were completed on the building's electrical distribution system to reduce electrical transformer losses. This upgrade moved the building into a lower utility rate class, resulting in huge cost savings. Lastly, the mechanical system was redesigned to take advantage of the existing oversized condensing boilers. The packaged rooftop units that were heating much of the building were only rated at 80-percent efficiency, but now new piping helps to utilize them at 98-percent efficiency.

Demarest Elementary School, Bloomfield, N.J.



- Energy Use Reduction: 52%
- Cost Savings: \$75,900
- GHGs Prevented: 267 metric tons

In partnership with Cenergistic, Demarest Elementary School started by engaging its entire staff in saving energy. Once staff members had bought into the Energy Savings Program, they took control of their immediate areas by turning off and unplugging... whether it was equipment, accessories, or anything else that was using up energy needlessly. Before the energy team could program the building to run on a normal schedule, they first had to learn how to operate its antiquated energy management system (EMS) and replace a heat timer. Once that was done, they were able to get the building to run on a normal schedule. The head custodian watches the weather daily for high and low temperatures and will shut down boilers when the building reaches temperature—a practice they refer to as “toast and coast.”

OFFICE

Hillside Center II (6310), Columbia, Md.



- Energy Use Reduction: 37.1%
- Cost Savings: \$30,428
- GHGs Prevented: 185 metric tons

The top efficiency project for Hillside Center was the installation of variable air volume (VAV) boxes for the HVAC system. In many buildings, the heating and cooling system uses more energy than any other system. Installing a VAV system controls the amount of constant-temperature air that is in a room to meet the varying con-

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ditions of the space. This allowed Hillside to substantially reduce energy use by not having to continuously heat or cool the air. Hillside's team also focused on making small changes to save big. In one example, more than 25 400-watt parking lot pole heads were replaced with 96-watt LED lights, while an additional six 250-watt wall-packs were replaced with 20-watt LEDs.



Manatee County Administration Building Bradenton, Fla.

- Energy Use Reduction: 39.7%
- Cost Savings: \$80,200
- GHGs Prevented: 616 metric tons

The Manatee County team employed a variety of energy-saving measures. These ranged from installing solar window shades and lighting motion sensors, to upgrading the HVAC system to integrate internet-controlled thermostats, to upgrading all lighting fixtures to LEDs and efficient lighting models. The county also constructed a new central energy plant that uses alternative energy and now serves a number of county buildings.



TD University, Mount Laurel, N.J.

- Energy Use Reduction: 37%
- Cost Savings: \$89,800
- GHGs Prevented: 449 metric tons

Working in collaboration with Johnson Controls, the team at TD University developed and implemented a number of energy conservation measures, including building automation control strategies, interior and exterior lighting upgrades, and installation of lighting occupancy sensors. Among these, the application of building automation control strategies had the biggest impact. This project included a reduction of the equipment operating hours, unoccupied period temperature setback for both heating and cooling seasons, demand control ventilation, and static pressure reset. Prior to implementing these strategies, the building's HVAC system would operate continuously; this is no longer the case. Additionally, the amount of fresh air brought into the building is now automatically adjusted based on the carbon dioxide levels in the space, reducing the need to heat or cool unnecessary quantities of outside air.

OTHER



Timken Museum of Art, San Diego, Calif.

- Energy Use Reduction: 50%
- Cost Savings: \$29,500
- GHGs Prevented: 80 metric tons

The Timken Museum relamped the existing 50-year-old gallery light fixtures, converting them from flood lights to advanced LED lighting. They also installed new timers, dimmers, and sensors integrated into a new lighting control system. In addition to converting both interior and exterior lighting to LEDs, the museum's HVAC controls were replaced, upgraded, commissioned, and extended to include boiler operation which prevented the boiler from running continuously throughout the day. Additionally, new temperature and humidity sensors were installed throughout the galleries, a supplemental rooftop air-conditioning unit was connected to the new control system, and updated technology was installed to allow for automated demand response from the local utility.



The Garden House at Harry P. Leu Gardens, Orlando, Fla.

- Energy Use Reduction: 45%
- Cost Savings: \$16,700
- GHGs Prevented: 86 metric tons

Most of the energy savings achieved at this facility came from the Leu Gardens' HVAC replacement project. This project involved changing out older, inefficient direct expansion compressor run units with high efficiency scroll chillers and an air handler with variable frequency drive (VFD). Furthermore, a new building energy controls system was installed to monitor occupancy so that when areas were not in use for an extended period of time, the space temperature setpoint was automatically set back. The team also re-insulated the mechanical room roofing, and implemented other architectural enhancements such as new double pane low-emissivity glazing on new doors that open into the mechanical room.



University of Central Florida Parking Garage C, Orlando, Fla.

- Energy Use Reduction: 63.2%
- Cost Savings: \$34,907
- GHGs Prevented: 258 metric tons

The University of Central Florida approached the improvements to Parking Garage C by first tackling the interior and then, in a second phase, focusing on the exterior of the structure. For the interior, 424 high performance T-5 Fluorescent lights were installed in place of the existing 150 watt HPS fixtures. During Phase II, the top deck of the garage was retrofitted with 16 Cooper LED 236 watt lights in place of the existing 400 watt HPS fixtures.



Salvation Army Fuqua Boys & Girls Club, Atlanta, Ga.

- Energy Use Reduction: 53.5%
- Cost Savings: \$11,300
- GHGs Prevented: 92 metric tons

The Salvation Army Boys & Girls Clubs of Greater Atlanta installed high-performance LED lighting and occupancy sensors in its Fuqua Club. They also installed web-based thermostats to help them keep track of the temperature.

HIGHER EDUCATION



Texas A&M's Teague Research Center, College Station, Tex.

- Energy Use Reduction: 46.2%
- Cost Savings: \$165,000
- GHGs Prevented: 477 metric tons

The energy management team at Teague Research Center upgraded the building automation system to direct digital controls, installed four pump VFDs, and updated the control program to reset discharge air temperature and static pressure set points for air handling units. They also initiated a lighting retrofit and occupancy sensor installation. The University also created a full-time team that worked closely

with building occupants to ensure that energy savings did not come at the expense of occupant comfort. This 'customer first' focus opened the door for collaboration between the energy team and the building occupants. These energy stewards collaborated with occupants to follow campus-wide temperature standards and raise awareness about the importance of sustainable practices.

RETAIL

Ft. Hood Warrior Way Express Store, Ft. Hood, Tex.

- Energy Use Reduction: 48.5%
- Cost Savings: \$17,300
- GHGs Prevented: 155 metric tons



The energy team here cut its energy use in half by taking a nuts-and-bolts approach. First, they got all equipment in prime working order. For instance, building HVAC units were made completely operational by cleaning coils, re-commissioning units, and installing controls to use setbacks and an economizer. Lighting retrofit kits increased light levels and quality while reducing energy use by 50 percent. The team also installed occupancy sensor lighting controls in office, stock room, and break room spaces. And outside parking lot pole and wall pack light fixtures were upgraded to lower energy, higher output induction lights. Walk-in cooler upgrades substantially reduced the amount of heat the HVAC systems had to remove. The team upgraded the evaporator motors to electronically commutative motors (ECMs). They also installed 2-speed controllers to run new motors more efficiently and upgraded the reach-in cooler door lighting to LED lights controlled by motion sensors. And lastly, anti-sweat heater controls were installed to only heat doors and mullions when needed. Controls with energy monitoring allowed the team to immediately verify savings on a daily basis. When a new ice cream freezer affected the operation of a thermostat, they were able to detect it and move it quickly.



Toms River Verizon Wireless, Toms River, N.J.

- Energy Use Reduction: 43%
- Cost Savings: \$7,400
- GHGs Prevented: 56 metric tons

Verizon Wireless replaced a total of 90 light fixtures that once used 7,050 watts daily. These heavy consumption fixtures were replaced with a total of 142 LED-based fixtures that now only use 1,700 watts on a daily basis. Furthermore, Verizon Wireless replaced three exterior neon signs with LED versions that saved an additional 3,800 watts on a daily basis. In addition to replacing the lighting fixtures within the space, the team added two inches of drivet / foam along 40 feet of the south side of the building, which has increased the overall insulation value of the space. Finally, they've installed 1,550 linear feet of solar control window film (3M PR 70), which has assisted in keeping the heat loads down within the building. Finally, an energy management system (EMS) allows Verizon Wireless to automatically turn interior lighting on and off based on the operating hours of the business. The exterior building lights and signage incorporate both lumen sensors for activation in the evening and a timing circuit for middle of the night deactivation. In addition to the EMS system, the team has set up motion sensors in private offices, closets, restrooms, the break room, and the conference room, so lighting is only on when these spaces are occupied.