



Case Study: Carbondale Recreation Center

By Cam Burns and Terray Sylvester



Carbondale Recreation Center Nearing Its Potential

The Town and people of Carbondale, Colo., have long had a passion for environmental stewardship. The town is home to numerous environmental groups, one of the nation's first solar-energy schools, and the town government has both an environmental board and a tree board. And now, Carbondale boasts the world's first LEED Platinum recreation center—an amazing achievement for a small community with limited resources.

To create the first LEED building of its type wasn't in the original plans for the rec center, but the story of the building shows what a community can achieve when it pools resources.

In 2004, Carbondale voters approved a sales tax and \$2.8 million in bonds to build the 15,200-square-foot facility. Town trustees picked a site downtown, close to offices, stores, restaurants, a regional bike path system, and the local bus route. Initially, community members and town leaders hoped to incorporate whatever sustainable design principles they could and achieve basic LEED accreditation.

"It was always our intention to pursue LEED certification, but we didn't set a specific goal, we just simply said

to the design team 'do the best you can,'" then Mayor Michael Hassig told the *Glenwood Springs Post Independent* in 2009. "It really was a collaboration between the design team, town staff, the contractor and consultants who worked hard to make this happen."

The most noticeable element is a 288-panel photovoltaic system on the roof, financed by a power purchase agreement that eliminated up-front costs. The 52-kilowatt system, designed and installed by Sol Energy would—it was initially thought—produce two-thirds of the building's electricity needs.

Other features include water-efficient toilets, skylights, recycled and natural materials and finishes, and a xeriscaped park outside—the irrigation system uses nearby ditch water and runoff from the building's roof.

In March 2008, the center opened. By the spring of 2010, however, it was apparent, that it wasn't operating at its full potential. Despite the energy efficient features, the building was using too much electricity. By 2009, the

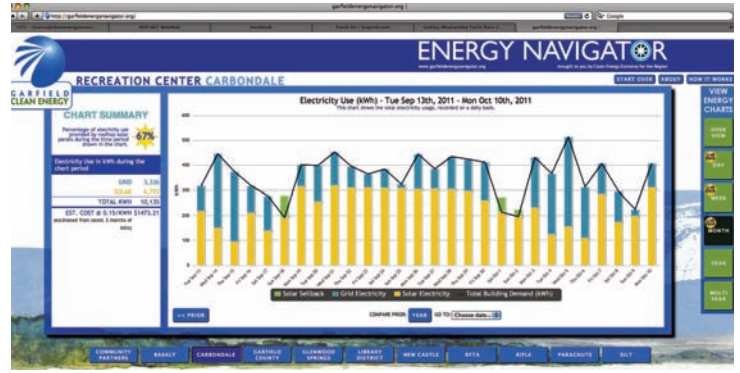


The 228 solar panels on the Carbondale Recreation Center make a bold statement about energy use. Photos by Cam Burns

building's gas and electricity had climbed more than \$5,000 above projections, despite the fact that it was using less gas than expected.

Employees of the local non-profit organization CLEER (Clean Energy Economy for the Region), who had compared energy bills to the building's design forecasts to uncover the energy waste, began investigating why the recreation center why it was sucking extra energy.

Mike Ogburn, an energy engineer for CLEER, identified several issues. For one, the lighting system wasn't working as designed. Staff and recreation center users were overriding the malfunctioning system because some of the features intended for maximum energy efficiency weren't working. Many lights were on when they



Left: The gym sits underneath the solar panels at the Carbondale Recreation Center. Right: This screenshot of the Energy Navigator shows a month of electricity use, from Sept. 13 to Oct. 10, 2011. Yellow represents solar energy produced by the panels. The blue represents grid (coal-based) electricity use. The green represents the solar “sellback” to the utility via the grid.

weren’t needed, and they were turned on to their brightest settings even when sun was pouring through the skylights.

But the building’s most significant inefficiencies were the result of problems in the setup of the heating, air conditioning, and ventilation (HVAC) system. For example, the gym was designed with an “occupancy timer” on the wall. The hope was to have gym users turn the dial for extra heating or cooling if needed, but the installers didn’t enable this feature. Instead, the gym wastefully operated as though it was occupied for 16 hours a day. In another area of the building, one heating and cooling unit was responsible for controlling temperatures in both the lobby area and in the workout area. But since those rooms are kept at different temperatures, the unit had to work harder than anticipated, reheating air for the offices that it had just cooled.

With several tweaks to the software and some guidance from Ogburn on managing the building’s systems, the lighting and HVAC problems were addressed. With help from CLEER, expert HVAC technicians, and expert lighting programmers, the staff at the recreation center in fall 2010 reduced

the HVAC system’s running time to match building use and improve the operation of automatic lighting. This simple change to settings and software—costing about \$1,000—meant the town spent \$6,390 less in the 12 months since the change compared to the prior 12 months. However, the real cost avoided was higher since energy prices rose during the last year. Taking the price increase into account the project is estimated to have saved more than \$10,000 in annual energy costs last year compared to doing nothing as prices rose.

In spring 2011, CLEER installed the Energy Navigator—a locally developed energy-monitoring system that lets building managers see energy use in 15-minute intervals. Before the Navigator was installed, less than 30 percent of the previous year’s electricity had been provided by the sun. Today, after a year of cutting energy demand, the building’s solar system supplies 50 percent of the building’s electricity. “By getting our meters hooked up to display our energy consumption in 15-minute intervals, rather than looking at a bill a month later, we were able to see the effect of the building control software changes we made to our automation schedules the next day and

adjust them appropriately,” wrote Recreation Center Manager Eric Brendlinger in a letter to the Garfield County commissioners. “The tangible and easy-to-understand graphs on the ‘Energy Navigator’ website display the savings garnered from our actions and place a monetary value on those savings. This was all accomplished without a large capital investment or retrofit to our existing systems.”

Empowered with new information from the Energy Navigator, CLEER and Brendlinger are working on a further energy cost-saving measure at the recreation center: cutting costly demand charges by reducing electricity spikes that occur on cold mornings.

“In commercial buildings, just one electricity demand spike can result in high costs for an entire billing month,” said Ogburn. “By tuning the building HVAC software further, we hope to warm up the building on cold mornings using only natural gas heat, avoiding costly electricity spikes.”

Garfield Clean Energy/CLEER
 520 S. Third St., Ste. 29
 Carbondale CO 81623
 970-704-9200
 info@cleanenergyeconomy.net
 www.cleanenergyeconomy.net
 www.garfieldcleanenergy.org