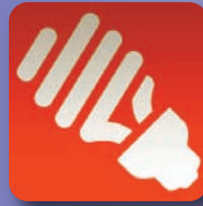




# Case Study: Mountain Valley Developmental Services

Glenwood Springs, Colo.

By Cam Burns, CLEER



## Solar Power Cutting Energy Use and Helping Clients, Students, and the Bottom Line at Mountain Valley Developmental Services' Greenhouse

A fairly normal-looking greenhouse in South Glenwood Springs is becoming a standout model for smart energy use while at the same time boosting the lives of adults with developmental disabilities and local elementary school students.

The greenhouse at Mountain Valley Developmental Services, which serves as a prevocational training facility for adults with disabilities, was last year outfitted with a solar-electric system and is now getting a complementary solar-thermal system, both of which will greatly enhance the work of both Mountain Valley staffers and teachers at Sopris Elementary school.

"What's going on is pretty cool," said Mark Browning, a fifth-grade teacher at the school. "It's fun. The kids are really into it."

One part of the meeting of solar-electric (photovoltaic) and solar-



Dana Peterson stands outside Mountain Valley's main building in south Glenwood Springs. The solar-electric system on the roof is helping Mountain Valley use its greenhouse for longer, helping clients. Photo by Cam Burns

thermal started last summer, when Dana Peterson, Human Resources and Philanthropy Director at Mountain Valley, started planning the replacement of her organization's aging roof. Specifically, she wondered whether a photovoltaic system might be possible as part of a new roof.

"Mountain Valley's always tried to be as green as possible," she said. "In doing some research on grants to help cover the costs of the roof, I realized there were some grant opportunities out there to install a

solar system. Working with CLEER (Clean Energy Economy for the Region), CORE (The Community Office for Resource Efficiency) and Sunsense Solar, I was able to devise a plan by which we would install a

### The Upgrades

- 10-kilowatt solar electric system
- New lighting ballasts throughout building and parking lot
- New LEDs lamps
- **39 percent drop in electricity costs**

### Lessons Learned

- Energy improvement benefits can cascade to other areas
- Solar-electric systems are generally very effective
- Often, much of the cost can be covered by rebates



*Sebastian Gonzalez watching Fernanda Gonzalez record plants measurements.*

new roof and a new solar system for about the cost of the roof by offsetting a lot of costs through grants.”

According to Peterson, Mountain Valley budgeted \$50,000 for the new roof. After Aspen Community Foundation provided a grant of \$25,000, Mountain Valley decided to take the remaining budgeted funds and buy a large solar-electric system. Mountain Valley received rebates and grants from CORE, and CLEER helped the organization win grants from the Governor’s Energy Office and the City of Glenwood Springs.

“We were able to install a \$50,000 solar panel system and a new roof for well under \$100,000,” she said. “Our final out-of-pocket cost was \$12,520 for the \$47,520 solar-electric system. And about \$25,000 for the roof.”

The planning process started in December 2010 and installation of the 10-kilowatt system began in June 2011 and was completed in August 2011. Sunsense Solar helped Peterson navigate the challenging steps of locating possible grants and applying for them and eventually put her in touch with CLEER Energy Coach Rob Morey.

While the solar panels are an im-

portant and highly visible addition to the building, Morey explained that to really achieve costs savings, making the building more energy efficient is crucial. He suggested and helped Mountain Valley to get lighting upgrades in the offices and greenhouse, and implement LED (light-emitting diode, a more efficient source of lighting) exterior wall lights and LED parking lot lights. The bulk of the improvements inside the office involved removing outdated and inefficient T-12 fixtures with magnetic ballasts and replacing them with new T-8 fixtures and bulbs that save significant energy and provide steady and even light output. Flatops Electric completed the retrofits.

Mountain Valley also joined the Garfield Energy Challenge, a program of Garfield Clean Energy, and ultimately received \$5,000 toward the lighting retrofits as well.

Half a year later, the folks at Mountain Valley are seeing the results. The combination of efficiency upgrades and solar-electric has prompted a huge decrease in energy use. August–December 2011, for example, saw a 39 percent drop in electricity costs and a 40 percent drop in electricity use during the

same period in 2010 (initial estimates were for a 26 percent cost savings from the renewable system). Although data on savings created by the retrofits and new solar-electric system are still limited (the system’s only been operating since last fall), first-year electricity savings—estimated at \$1,308—are on track to be closer to \$2,621. The year before the improvements were installed, electric costs averaged \$360.35 per month. Now, they’re averaging \$218.46 per month, according to utility bills provided by the Glenwood Springs Electric utility.

In terms of emissions and carbon over the life of the solar system, Sunsense Solar—the company that installed the system—estimated that the greenhouse-gas emissions reduction will equal 1,192 mature trees planted and 622,343 automobile miles not driven.

One of the greatest benefits is that the new system is directly helping Mountain Valley’s “clients,” individuals with developmental problems that the organization serves.

According to Peterson, one of the main ways Mountain Valley helps its clients is through its greenhouse programs, where they learn to work independently and with others. The prevocational program helps clients tune up fine motor skills, gross motor skills, the ability to follow tasks and rules, and the ability to do some minor problem solving. The greenhouse program is also used to help aging clients regain lost skills, and produces flowers and herbs, which are sold to the public.

According to Peterson, cutting energy use in Mountain Valley’s main building freed up funds and allowed the organization to expand



the use of the greenhouse and enhance Mountain Valley programs.

“Basically we are able to increase our use of energy in the greenhouse—and hence, use of the greenhouse in general—because we are offsetting so much in this building,” she said. “CLEER has been great. The ideas Rob presented were really huge, and I feel like we’ve been able to use our solar system, tie in efficiency work and offset our carbon more effectively because of the advice CLEER was able to give us.”

### Sopris Elementary Gets Green

The complementary solar-thermal system, which will create additional energy savings and offer myriad benefits, is currently being installed at the greenhouse. It’s story starts two and a half years ago, when stu-

*Students from Sopris Elementary measure plants they’ve been growing in an unused greenhouse at Mountain Valley Developmental Services in south Glenwood Springs. As part of a school science project, they are comparing plants grown in compost from worm castings to non-casted soil. Upper left: Hannah Juul measuring a plant. Left: Maria Viduari measuring a plant.*

dents in Mark Browning’s fifth-grade class started inquiring about growing their own food.

Two students in Browning’s class, Nia Myer and Meghan Cobb, contacted then-Mayor of Glenwood Bruce Christensen, Executive Director of Mountain Valley, and after several conversations, Christensen invited the class to use an unused part of a greenhouse.

Browning and his students worked with Mountain Valley’s Greenhouse Manager, Adam Juul (whose children are both students at

Sopris Elementary) and created a food production program in which the school would grow food for the cafeteria. Browning applied for and received grants to support the new program from Alpine Bank, the Aspen Snowmass Foundation, Toyota, and Colorado Big Country Resource Conservation and Development.

“We also had a lot of local support,” noted Browning. “All our soil components were donated and delivered by Gould, Caca Loco, and Zen Excavation.”

In return for use of the space, Browning applied for yet another grant (through Aspen Environment Foundation) that would fund a solar-thermal heating system.

While solar-electric systems turn sunlight directly into electricity, solar thermal systems are used to heat water. Typically, hoses are built into the floor of a building and water is circulated through panels on the roof and then through the floor of the building being heated, ultimately using the sun. In this case, the hot water will circulate under plant beds, reducing the need for other forms of heating.

According to Browning, the first phase of the solar-thermal system is done. Concrete has been laid and the beds have been planted. The next phase will be to add some components of the system, namely thermostats, plumbing equipment, and other parts.

The Environment Foundation granted the school \$5,000 toward the project and also awarded the school a no-interest loan for \$5,000. The loan will be paid back via energy savings the school and Mountain Valley achieve in the greenhouse. For example, if the energy savings produce \$300 during a month, Mountain Valley keeps \$150 and \$150 goes toward the loan. The rooftop panels will be installed in February, and Browning anticipates they will handily cut energy use for heating in the greenhouse.

"The solar systems are totally separate," said Browning. "Theirs is a photovoltaic system whereas ours is solar thermal. But the great thing is, the solar thermal system we're installing will have the capacity to heat all Mountain Valley's water. So

they'll be able to turn off their hot water heaters and save even more—an added bonus on top of what they're saving from heating the greenhouse."

"And since the produce will be fresh and the kids grew it themselves, they're going to be more apt to try it," said Browning. "It's not just iceberg lettuce in the salad bar any more."

— Mark Browning,  
Sopris Elementary

### **Bloomin' Good Stuff**

The school's food production program has blossomed quickly. Today, 400 kids from Sopris Elementary are involved in the program (all grades except first), and Browning and Juul arranged for a Mountain Valley client to work with each class. Two or three times a week, classes go to the greenhouse and tend the soil beds—the students expect their first crop in mid-February. The food produced will go to the school cafeteria. Some of the plants being grown include arugula, sorrel, buttercrunch, green oakleaf, red and green leaf beets, carrots, snow peas, sugarsnaps, radishes, spinach, and kohlrabi.

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As part of the effort, Mountain Valley and the school started a worm-composting program in the school that's directly related to academic activities going on in science classes—namely an experiment to

see if plants grow better in soil made from worm compost. Uneaten food in the cafeteria gets separated from other wastes and brought to the greenhouse where it is used to make soil.

At the end of the year, Sopris Elementary and Mountain Valley hope to have created enough worm compost using their vegetable scraps from the cafeteria to have a fundraiser for both the school and Mountain Valley.

School students will be able to take some of the worm compost soil home where Browning expects they'll promote the use of worms at home.

"The Mountain Valley greenhouse/Sopris Elementary project is a great demonstration of how collaboration and sharing resources among organizations compounds the benefits of programs for all involved – while promoting involvement by more members of the community," said Peterson. "This has been a win-win-win-win."

*The Glenwood Springs electric utility is currently offering rebates on solar-electric systems. Contact Rob Morey at CLEER (704-9200) for more information. To watch a music video of the Sopris Elementary's food-growing program, click here [http://www.youtube.com/watch?v=je8cVBtt\\_Ek](http://www.youtube.com/watch?v=je8cVBtt_Ek).*

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