

# A New School of Solar Thinking



Courtesy Midland School (2)

Midland School's 2011 solar installation team with the newest 3 kW photovoltaic array.

High school students at Midland School in Los Olivos, California, are not afraid to get their hands dirty. For a week each spring, they participate in hands-on learning activities that supplement their classroom lessons. For the eighth consecutive year, sophomore chemistry students have worked alongside a professional electrician to install a PV system for the school.

"Students learn this is something *they* can do rather than simply watching the professionals do it," says Lise Goddard, Midland's chemistry teacher and director of environmental programs. "Students do not work with any live wires or high voltage. The electrician makes the final connections and closely supervises all work, but the students do everything else."

Over the course of three days, roughly 25 students dig the post holes by hand, mix and pour the concrete for the post footings, cut the rails for the rack, and bolt down the PV modules.

In 2011, students installed a 3 kW grid-tied PV array to offset the energy use of two well pumps that supply potable water for the more than 100 school residents. The array joins another 3 kW PV array that the students installed last year to provide energy for about 50% of the school's water-pumping needs.

"Setting up the array from scratch gave me a whole new understanding of solar energy and the ways it can be used. I would like to work with water quality issues in the future, and I'm curious to see how renewable energy can be used to clean and preserve our water sources," says Miguel Provencio, 16, a sophomore who helped dig the post holes and mount the PV modules for the installation.

Installer Gary Gordon, of Santa Ynez Valley Solar, didn't know what to expect when he signed on to work with the school last year. "I must admit I thought there would be some grumbling about all the work. But the kids surprised me," he says. "There was such camaraderie and enthusiasm from

## Contribute

To meet their goal of being powered 100% by solar energy, Midland School continues to seek grant and donor support. Learn more at [www.midland-school.org](http://www.midland-school.org).

them: ‘What can I do next? What can I do now?’ We had a tractor auger to dig the post holes last year, but the kids chose to dig all the holes themselves this year. That is impressive, given the state of the rocky ground.”

Gordon has worked with Midland for the past two years and plans to continue working with the school in the future. Like other installers of years past, he donates his time to the projects.

Solar energy is a natural fit at Midland, where self-reliance and environmental responsibility are core to the curricula. Since 1932, the boarding and day school, which serves grades nine through 12, has taken a distinctive “close-to-nature” approach to education.

**Students gain valuable knowledge of renewable energy systems by working with them directly.**



Students are relatively unplugged from outside influences and live in basic cabins on the 2,800-acre campus—a large percentage of which is untouched wilderness. Among other chores, students chop the wood used to fire the boilers, which provide domestic water heating, and raise organic vegetables served in their dining hall.

The PV program got its start in 2003 when Goddard moved on campus to head the school’s environmental programs and donated a 150 W system previously used on her off-grid yurt in the Santa Barbara hills. Following two weeks of classroom lessons in solar electricity, chemistry students worked with a local electrician to assemble and wire the pilot system to power the lights in the student commons room.

## New Federal Program Promotes High-Performance Schools

Energy is an enormous expense for schools—approximately \$6 to \$8 billion each year—and sadly, much of that energy is wasted. The U.S. Department of Education’s Green Ribbon Schools program encourages schools to cut expenses through energy efficiency and green building measures. The voluntary program will provide incentives to and recognize K-12 schools for taking steps toward greener spaces and education.

The final criteria are still in development, but emphasis will be put on new strategies in environmental curriculum development, teacher training, facilities management, operations, and community engagement. A key component will be that schools use green innovations to educate students about science, technology, and the environment.

“In a time when budgets are tight, the Department of Education is encouraging schools to engage in a creative win-win scenario—cutting expenses while using the school facilities as dynamic learning labs for students,” says Larry Schweiger, president and CEO of the National Wildlife Federation.

The U.S. Department of Energy estimates that smarter energy management in schools could reduce energy consumption by as much as 25% and cut school energy costs nationally by more than \$1 billion annually.

“No other building type speaks more profoundly to the benefits of green building than the places where our children learn,” says Rick Fedrizzi, president, CEO and founding chair of the U.S. Green Building Council. “Green schools reduce energy consumption, save money, and foster healthier learning environments for our children.”

The Department of Education will manage the program with support from the U.S. Environmental Protection Agency and the White House Council on Environmental Quality. Additional details and applications will be released later this year. The program is open to public and private schools. See [www.ed.gov](http://www.ed.gov) for more information.

Since then, students have installed roughly 3 kW of PV annually. Two \$10,000 grants from BP Solar's A+ For Energy program covered a portion of the tab. Discounted and used modules, with donated labor from area installers, helps keep costs down. The arrays installed by students over the years now meet about 20% of the campus electricity needs.

Midland aims to install enough PV each year to offset 3% of the campus electricity needs—and keep going until solar electricity meets all of the school's needs. "If we do it right, we will produce more than just clean kilowatt-hours," Goddard says. "We will produce kids with skill sets to continue building, scaling up, and evolving the infrastructure for our renewable energy future. We will produce kids who 'get' it."

Mariah Chen, 18, worked on the system installed in 2009 and credits the experience for motivating her to study environmental policy at Barnard College in New York next year. "You definitely rise to the occasion and recognize that you are a part of something bigger—something that will have a life of 25 years or more, something that will help sustain Midland," says Chen. "It is an experience that I will keep with me for the rest of my life and remember every time I make energy choices."

Goddard hopes the school's initiative will demonstrate that small steps make a difference. "We need to take courageous steps out of the spiral of procrastination. We may not be able to solve the climate change problem in one day, but we can move in the direction of sustainability, in increments."

"The campus mindset is that we will install an array next year, and another the year after that," Goddard says. "We will keep doing this because this is what we do. Just like brushing our teeth or doing our laundry or taking final exams. This is what we do."

—Kelly Davidson

## Referrals

Know of a nonprofit or outreach effort in the renewable energy community that deserves some praise? Send your idea to [returns@homepower.com](mailto:returns@homepower.com).