

A PV array for electricity and learning

By Paul Weideman

The installation of a new photovoltaic array on the roof of the Santa Fe Girls' School was also a learning experience. The placement of the solar panels was expanded into a five-day course sponsored by the New Mexico Solar Energy Association.

The workshop, coordinated by the NMSEA's Mary McArthur, was attended by homeowners and electricians from around the state and as far away as Texas and Missouri.

The Santa Fe company Positive Energy Inc. awarded the Girls' School its first-ever Solar Photovoltaic System Grant for the \$15,000 system. The grant was created in response to what the company sees as an increasing need for education about, and development of, alternative energy.

"The class was five days — three days on design and two on installation — and we had 21 participants," said the school's development director, Cullen Curtiss, during a recent visit.

It was taught by Positive Energy personnel, including its president, Randy Sadewic. "They talked to us about four companies to source panels and we ended up using Schott Solar Inc. of Albuquerque," Curtiss said. "We thought it was important to use a local firm, if the product was exceptional."

The school's 5-kilowatt system utilizes 16 Schott 230 watt modules. Curtiss estimates the array will power 50 percent of the school's total electricity use. SFGS uses propane for heat in the wintertime, so that's a separate energy protocol.

Santa Fe Girls' School, established in 1998, is a private, nonprofit institution located at 310 W. Zia. Its students are in grades 6, 7 and 8. Enrollment is 40 this year. The curriculum is seminar-style: dialogue-based rather than lecture-based. As Curtiss put it in a proposal for the solar grant, "Socratic pedagogy requires experiential learning for application." There are no computers in the classroom.

The school building is a triple-wide manufactured-housing unit with frame additions on both ends. There's also an attached greenhouse, although the roof (oddly enough) is not glass. "That's why we originally reached out to Positive Energy," Curtiss said. "Our environmental science director, Will Barnes, wanted to see if we could get a PV panel to power lights for the greenhouse, to help grow vegetables in



The rooftop solar array at Santa Fe Girls' School

PHOTO BY PAUL WEIDEMAN

the winter season. Instead we will install four skylights, through a grant from PNM, and they invited us to apply for this photovoltaic grant from Positive Energy.

The PV system, which includes a data monitoring station, will be integrated into the curriculum. There may be a mathematics focus in the future, but there will most certainly be a tie-in with the subject of conservation, a strong part of the SFGS science program.

The sixth grade manages the school's greenhouse. The seventh and eighth grades manage Project PRESERVE, a riparian restoration program in its sixth year on a 9-acre site at the Santa Fe River at La Cieneguilla, downstream of the wastewater treatment plant.

In an e-mail interview, Barnes said his 8th-grade students study chemistry and energy. "We learn about electricity and then each student does an energy report. They each choose a different source of energy: solar, nuclear, wind, coal, etc. and try to answer the question as to whether or not this source is 'clean,' that is renewable, sustainable, efficient, safe.

"This year, in addition to all of this, we will be monitoring our own use of electricity at school; we'll keep track of how

much electricity we use at each outlet and then hopefully make recommendations to the school so that we can become more efficient. (We may need to replace our old refrigerators!) We will also track how much electricity we are producing from our solar panels and then ultimately track and try to reduce our carbon footprint."

In May of each year, SFGS invites the community to attend its Annual Public Presentation of Data. This coming May, the school will incorporate data and observations from six months of working with and monitoring the new PV array. The students also will share experiences from a new partnership with the permaculture-based Arco Iris Institute; and they will show student-filmed and -directed interviews with female conservationists.

The PV workshop at Santa Fe Girls' School was held over five days in late October and early November. Tuition was \$500 for the three-day PV design class or \$750 for the entire course on design and installation.

"We start from scratch, teaching people how panels work and the various options," McArthur said. "Our final project is a design where students are given information about a fictitious homeowner

and a garage they want to put panels on, then they're given an inverter and a brand of panels and they have to figure out the design: the sizing, how many panels, and how to connect everything."

NMSEA is an educational nonprofit established in 1972 and that promotes solar energy in New Mexico. The association offers classes for 3rd to 12th grade, on request; and adult PV classes once or twice a year. These latter are aimed at electricians, homeowners who want to know more, and students considering careers in renewable energy. Topics include the various components of photovoltaic arrays, designing and sizing a system, choosing a site, and the configuration of stand-alone (off-grid) and grid-tied (utility-connected) systems.

The photovoltaics at the Santa Fe Girls' School should come online soon. "We still have city and PNM inspections," Curtiss said in mid-November, "and so it will probably be December before we flip the switch.

For more information about the school, Positive Energy Inc., and the New Mexico Solar Energy Association, see santafegirlsschool.org, nmsea.org, and positiveenergysolar.com.