

Saving the World, 3-kW at a Time

By Lise Goddard

Although it may seem like the norm, given that it's the third year in a row that we have done it, anyone looking into Midland's Middle Yard may perceive that they were glimpsing a breeding ground of teenage optimism and pro-action. Midland's sophomore class learned the science and history of a finite and polluting fossil fuel-based economy, learned how solar panels work, and then helped install a 3-kW photovoltaic (PV) system that will meet another 3-4% of the campus's electricity needs and will prevent the emissions of 4 tons of CO₂ into the atmosphere each year.

Not only are solar installations in line with Midland's mission of self reliance, authentic student leadership, and environmental stewardship, but the scale of Midland School allows every sophomore to participate in a project that makes a measurable difference. Guided by a campus energy plan, and alongside energy-conserving strategies, Midland intends to install a renewable energy system every year with successive sophomore classes until much or most of the campus is powered by the sun. After installing our second 3-kW PV array each year, about 7% of the campus's communal electricity needs, or 20% of the needs of Stillman Hall, our dining facility, will be met by solar energy.

We have chosen increments of 3-kW because economies of scale make this an optimal size for our budget, and because arrays this size could power reasonably energy-efficient households. On a house's rooftop, however, such a system would escape notice by all but the neighbors and the inhabitants, whose electricity bill could shrink to the \$8-\$10 monthly fee associated with the man checking the meter and dropping the bill for this service into the mailbox.

At Midland, the investment in a 3-kW system has a wider sphere of influence. Midland is becoming a training ground for young solar ambassadors, who can speak passionately and intelligently about the value of renewable energy, because they used their own minds and hands to help install a working system. After the installation, they became community teachers, speaking at a free community workshop on the technical, environmental, economic, and practical aspects of solar energy.

The students cannot take all the credit for this new installation, however. Grid-tied PV systems must be installed by licensed professionals, and Midland has enjoyed a good track record with REC Solar, Inc. This year, however, the installation had more complexities than simply clipping new panels into aluminum racks, and affixing positive to negative terminals with quick connects. With approval from the Board of Trustees, Midland took advantage of the opportunity to buy a large lot of "experienced" panels from Tor Allen of the Solar Schoolhouse and Rarus Institute for the excellent price of \$2 per DC watt. These panels were put on rooftops in Sacramento by the Sacramento Municipal Utility District (SMUD), as part of the "PV Pioneer I" Research and Development project in 1993. Because the utility maintained ownership of the panels, many arrays came off the roofs at the end of the project, and can still produce electricity at around 90% of their original capacity. In 1993, these Solarex 64-watt modules were mounted on steel racks. A rack with six modules weighs about 170 pounds, and Midland students can tell you how fun it is to lug them around for cleaning, testing, re-wiring and mounting. Lyle Nighswonger, a senior foreman from REC Solar, Inc., devised a simple

and appropriate way to mount these racks on a conventional ground-mount system, and for the third year in a row, allowed Midland students and faculty to be his apprentices.

Midland purchased 12-kW of these panels, enough for four sophomore classes to do an annual 3-kW installation. Midland was awarded two \$10,000 BP “A+ for Energy” grants for solar installations in 2004 and 2005. Coupled with Midland’s annual environmental projects budget and other donations, these grants have provided the seed money to realize our dream of installing a renewable system every year. Not only is this incremental approach with experienced panels affordable for Midland (as opposed to, say, a one-time investment in 10-20 kW array), but it touches *every* one of our students, who take ownership of their class’s individual array.

We hope that this project empowers our students with skills, confidence, and wisdom to make a difference in their home communities beyond Midland.