

COVER PAGE

End-Use Sector Activity Being Applied For:

6.55 Power Technologies: Solar Schools Demonstration and Educational Outreach

State Special Project Title: Tucson Solar Schools

State Applying for Grant: Arizona

Other States Participating: N/A

Amount Being Applied for: \$75,000

Cost Share: \$93,184 (55% of total project costs). Sources – The Arizona Department of Commerce Energy Office, Tucson Unified School District, Tucson Electric Power Company, Greater Tucson Coalition for Solar Energy, and Foundation for Environmental Education.

Planned Completion Date: June 2004 (earliest) or 24 months from contract signing date

Congressional District of Project: Districts 2 & 5

Project Description (Abstract):

The Arizona Department of Commerce will support Tucson Unified School District (TUSD) and the Greater Tucson Coalition for Solar Energy to implement the Tucson Solar School Project. The project will demonstrate improved student performance at selected Tucson Solar Schools over two years by completing the following objectives:

1. Install six (6) kW of distributed photovoltaic systems on up to six (6) TUSD schools,
2. Integrate energy education into the curriculum at those schools as a model for other Arizona schools,
3. Promote community education on energy efficiency and applied solar technology, and
4. Share data on both the installed PV systems and student performance.

The \$75,000 DOE grant will fund the PV systems, installation, monitoring systems, and related training. The \$93,184 state & local cost share will fund personnel support, related energy-efficient remodeling projects at the selected schools, outreach services, and SunShare rebates.

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STATEMENT OF WORK

Background:

Tucson Unified School District (TUSD) is the oldest and second largest public school district in Arizona. TUSD educates approximately 63,000 students in 107 schools (K-12) spread over 285 square miles in Tucson and Pima County. TUSD spends over \$8 million per year for electricity.

TUSD initiated the Resources Efficiency Awareness Program (REAP) in 1991 to cope with rising energy and water costs. REAP has since saved over \$3.5 million in utility costs, leveraged over \$1.8 million of outside funds for related projects, and successfully demonstrated several solar energy applications. Solar installations at the Cooper Environmental Science Campus (1994-6), Habitat Solar Training Project (1998), and Photovoltaics (PV) for Schools Project (1999-2001) have all contributed useful experience for this Tucson Solar Schools Project application.

Problem Statement:

TUSD electricity costs will increase dramatically as schools are converted from evaporative cooling to air-conditioning required by the State School Facilities Board. Arizona school facilities funding emphasize lowest first cost options that discourage solar energy applications. Arizona rules on “excess utilities” funding also discourage Arizona school districts from conserving energy until 2009. Solar schools in Arizona, however, offer a unique opportunity to invest in long-term energy independence and improve student math and science scores at the same time.

Goal: Demonstrate improved student performance at selected Tucson Solar Schools.

Objectives:

1. Install six (6) kW of distributed photovoltaic systems on up to six (6) TUSD schools,
2. Integrate energy education into the curriculum at those schools as a model for other Arizona schools,
3. Promote community education on energy efficiency and applied solar technology, and
4. Share data on both the installed PV systems and student performance.

Workplan:

Project staff will work with TUSD School Councils to select up to six (6) Tucson Solar Schools for the six (6) kW photovoltaic systems. Criteria will include historical energy use, demonstrated interest, and voluntary student/staff participation. The PV systems will include BP solar panels and Trace inverters provided through Tucson Electric Power Company’s SunShare Program.

Each school will also get a data collection system so that students and staff can monitor the generation of electricity from their panels, post it to an internet web site, and share it with other schools. Teachers will receive in-service training and materials through the Foundation for Environmental Education to help them integrate the PV systems with math and science curriculum. Digital images of students and their PV systems will be used to reinforce learning and sharing.

Solar celebrations at each school will educate the community, government agencies, and the media about the Project. Sister solar school arrangements will be created with other schools in Arizona, in the United States, and around the world through the Schools Going Solar Program. Each school will receive a Million Solar Roofs (MSR) and SunShare plaque.

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Utility bills for the Tucson Solar Schools will be tracked through the Resources Efficiency Awareness Program (REAP). Energy audits at each school will prioritize low-cost energy saving projects that can include lighting retrofits, energy management controls, and mechanical upgrades. Additional renewal capital funds will be used to improve participating schools' energy efficiency as defined by the USDOE Rebuild America & USEPA Energy Star benchmarking tool for schools.

Student math and science proficiency test scores will be tracked at participating Tucson Solar Schools over the 2-year program. A final report will be completed to summarize the solar lessons learned for other Arizona schools and related government agencies.

Timeline	Activities	Milestones
Month 1-3	Confirm grant award and select participating schools	Signed contract, subcontractors, and school agreements
Month 4-6	Install school #1's PV system	School #1 celebration
Months 7-9	Install school #2's PV system	School #2 celebration
Months 10-12	Install school #3's PV system	School #3 celebration
Months 13-15	Install school #4's PV system	School #4 celebration
Months 16-18	Install school #5's PV system	School #5 celebration
Months 19-21	Install school #6's PV system	School #6 celebration
Months 22-24	Compile performance data	Final Report

Personnel resources & subgrant requirements:

- Jim Arwood is the Solar Energy Education Coordinator for the Arizona Department of Commerce Energy Office with over 15 years of experience in solar energy education. Jim will serve as Project Coordinator for the Tucson Solar Schools Project.
- Doug Crockett is the TUSD Natural Resources Manager who initiated the Resources Efficiency Awareness Program (REAP) in 1991. Doug is a Certified Energy Manager (CEM) with over 30 years experience in energy education, and he recently managed the successful PV for Schools Project.
- Valerie Rauluk is the Coordinator for the Greater Tucson Coalition for Solar Energy and a veteran consultant on USDOE funded projects.
- Tucson Electric Power Company is a member of the Greater Tucson Coalition for Solar Energy and has collaborated with TUSD on various energy education projects since 1991, including the Energy Patrol, Cooper Environmental Science Campus demonstrations, Solar Habitat Training, and the PV for Schools Project.
- Glen Kizer is the Energy Project Coordinator of the Foundation for Environmental Education. The Foundation is one of the leading non-profits in the country promoting solar school installations.

BUDGET/COST SHARES

Line Item	Notes	In-Kind	DOE Grant	Total
Personnel - Jim Arwood	5% of time x 2 years	\$4,628		\$4,628
Fringe Benefits	25% of above	\$1,157		\$1,157
Travel	Tucson-Phoenix trips	\$828		\$828
Equipment - TEP PV systems - Tracking systems - Digital camera	6 kW SunShare kits \$500 x 6 schools	\$12,000	\$36,000 \$3,000 \$1,000	\$48,000 \$3,000 \$1,000
Supplies	School celebrations		\$1,000	\$1,000
Contractual: - TUSD (Crockett) - PV installation - Staff training, data collection & web site - Energy Patrol - Time & materials	5% of time x 2 years By TUSD Facilities Provided by FEE Provided by TEP Provided by GTCSE	\$6,784 \$10,000 \$3,000 \$3,000	\$24,000 \$10,000	\$6,784 \$24,000 \$20,000 \$3,000 \$3,000
Construction	TUSD energy retrofits	\$50,000		\$50,000
Other (Specify)				
Indirect Costs	AZ Dept. of Commerce	1,787		\$1,787
TOTALS		\$93,184	\$75,000	\$168,184

Evaluation Criteria:

1. Demonstrated partnership with State and/or local Million Solar Roofs partnerships, local solar installers, utility, university, or state research center. (30%)
2. Demonstration of incorporation of lessons learned and tools developed during prior projects into project planning. (30%)
3. Opportunities for replication: solar outreach program designs that can be readily replicated statewide, regionally, or nationwide. (20%)
4. Feasibility of the project, relevance of the project objectives, and a reasonable method outlined to objectively measure the results of the project. (20%)

Appendices: (to be completed by the Arizona Department of Commerce Energy Office)

- A. Standard Form 424, Application for Federal Assistance
- B. Federal Assistance Budget Information Form, DOE F 4600.4
- C. Budget Explanation Form, GO-PF20
- D. Pre-Award Information Sheet, GO-PF19
- E. Environmental Checklist, GO-EF1
- F. US DOE Assurance of Compliance, DOE 1600.5
- G. Certifications Regarding Lobbying; Disbarment; Suspension and Other Responsibility Matters; and Drug-Free Workplace Requirements; FA-Certs; and
- H. Disclosure of Lobbying Activities, SF-LLL