Ohio Schools Going Solar Program and Ohio Energy Project

Ohio Schools Going Solar

Ohio Schools Going Solar began in the spring of 1999 with the installation of a 2-kilowatt solar array at Bluffsview Elementary School in the Worthington City School District. The program began as a partnership between the school district, Foundation for Environmental Education, American Electric Power Company, Viron Energy Services, the Ohio Department of Development's Office of Energy Efficiency (ODOD/OEE), and the U.S. Department of Energy.

Today, there are over 40 participants in the Ohio Schools Going Solar Program. "Solar Schools" are predominantly associated with elementary and middle schools throughout the state. Schools participating in the program receive commendation from the ODOD/OEE and become a partner in the U.S. Department of Energy's Million Solar Roofs Initiative. The Ohio Schools Going Solar program is supported by the Foundation for Environmental Education and ODOD/OEE. Educational and curriculum support is provided to solar schools through the Ohio Energy Project.

The Ohio Energy Project (OEP) and NEED Project

The Ohio Energy Project is a not-for-profit educational outreach organization whose mission is to promote an energy-educated society and facilitate leadership through effective partnerships with schools, businesses, government, and communities. Ohio Energy Project is a state affiliate of the National Energy Education Development (NEED) Project.

OEP conducts a variety of education programs including:

- The Energy Bike Program
- Youth Energy Summits
- Ohio's EnergySmart Schools Program
- Energy Workshops and Fairs
- Customized Energy Workshops
- Professional Development
- Energy Camp

Schools who participate in OEP programs are encouraged to document activities and accomplishments in an Energy Portfolio or Scrapbook and be recognized at the annual Youth Energy Celebration. For more information contact:

Ohio Energy Project
200 East Wilson Bridge Road, Suite 320
Worthington, OH 43085
614-785-1717
www.ohioenergy.org

Purpose of the Teacher Resource Guide

The Teacher Resource Guide is designed for Ohio schools that are equipped with a Photovoltaic (PV) or solar array. The Teacher Resource Guide provides activities and lesson plans that are correlated to Ohio's Academic Standards for the following: **Measurement; Patterns, Functions and Algebra; Data Analysis and Probability; Number, Number Sense and Operations; Mathematical Processes; Physical Sciences; Science and Technology; Scientific Inquiry; Scientific Ways of Knowing; Science and Technology and Earth and Space Sciences**.

Sections of the Teacher Resource Guide can be applied to many different grade levels from upper elementary through high school aged-students. In its current form, the guide is well suited for middle school students, but is just as appropriate to younger and older students with simple teacher adaptations to the curriculum. For example, certain sections in the guide may be more appropriate for middle school grade levels (e.g., where unit conversions, equations and basic algebra are being applied). In these particular sections, simple modifications to the lesson plans and activities at the teacher's discretion are encouraged to best suit their students.

How do teachers and students obtain data from their PV array for activities and lessons? How is it monitored? Soltrex, a company that specializes in web-based solar monitoring services for schools and businesses, monitors your school's solar data and information on their web server. Through Soltrex, your school's data and information are viewable anytime from an internet enabled computer, whether from home or school. To access your school's solar data, please visit www.soltrex.com and find your school. It's that simple!

Curriculum Overview

All activities are correlated to Ohio Academic Content Standards. Conveniently, each of the major bold sections below outlines the standards and benchmarks it addresses. The titles of the organizational sections below are meant to reflect practices used by scientists. The intent is for students not only to consider scientific topics and methods, but also to see science as a dynamic way of understanding and improving our world. The organizing ideas are:

- **Learning the Tools of the Trade** – This section provides students with a background on photovoltaics (mechanism where light produces electricity) and their solar panels in particular so that they are equipped to design and conduct experiments.

- **Designing and Conducting Experiments** – This section discusses techniques for setting up experiments such as identifying and accounting for variables, collecting data, creating graphs, analyzing and discussing results. It provides students with templates for suggested experiments to conduct with their PV system.

- **Making Use of Models** – This section recognizes the power of modeling used by many researchers today. Since it may not always be possible or affordable to obtain the ideal conditions an experimenter may desire, small-scale models or computer simulations can provide valuable insights. Activities are provided that include a computer simulation of a solar panel where students can alter the panel's geographic location, size, and placement as well as hands-on activities with miniature solar panels to explore the effects of different light levels and temperatures on panel performance.

- **Connecting Science and Society** – This section explores how scientists contribute to a larger community of scientists – the spirit of scientific advancement comes from a community of scientists talking to one another. It encourages students to find out what other Solar Schools across the state and country have learned and to start a conversation with them. In addition, this section explores science's role in society considering the everyday impacts and contributions the PV system makes and could make in our lives.

For many of the activities and lessons, detailed worksheets and teacher guides are provided. Our hope is that we provide sufficient detail and information to make the lessons easily feasible for teachers and fun for students. Since curriculum development is an on-going process, we welcome feedback and suggestions for improvements.

Many excellent materials are currently available for studying solar energy and photovoltaic. Some recommended resources are listed and briefly described in the "Additional Resources" section of this packet. The activities in this packet have been designed specifically for Ohio Solar Schools with their needs and systems in mind.