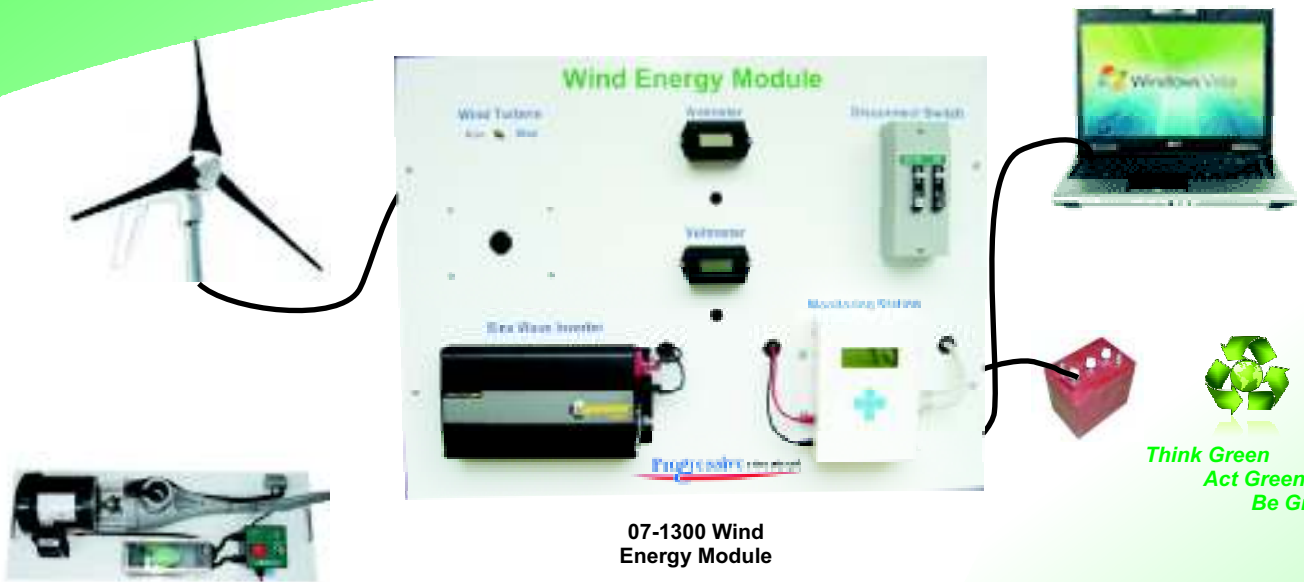


Wind Energy Module

Green-Ed™



Optional In-Class
07-1105

07-1300 Wind
Energy Module

Not Included


**Think Green
Act Green
Be Green!**

Description

Fossil fuels and nuclear power are at the center of today's most divisive political and environmental issues. What are the alternatives to these polluting, nonrenewable fuel sources?

Renewable energy is defined as "energy derived from resources that are regenerative or for all practical purposes can not be depleted." Renewable energy sources contribute approximately 29.3% of human energy use worldwide. A prime source of renewable energy is Wind.

Mankind's traditional uses of wind power are widespread in developed and developing countries. However, the mass production of electricity using renewable energy sources has become more common place only recently. This reflects the major threats of climate change due to pollution, exhaustion of fossil fuels, and the environmental, social and political risks of fossil fuels and nuclear power. Many countries and organizations promote renewable energies through taxes and subsidies.

The 07-1300 Wind Energy Module program demonstrates how wind turbines are beginning to transform the way the world is powered.

In the Wind Energy module, students learn about one of today's major forms of alternative energy and how technology is used to convert and transmit this energy. They explore wind as an energy source that can be used to help reduce dependence on exhaustible, non-renewable fuel sources. They gain a global perspective when they understand the economics, efficiency, and low environmental impact of producing energy from non-polluting, renewable sources.

The Alternate Energy module includes everything required to function as a "turn-key" learning station; lesson plan, student guide, DVD video, training station with fault insertion and energy producing equipment. The module provides student instruction, in teams of two, for up to 20 hours.

The Lesson Plan includes an Instructor's Guide which provides instructions for installing, setting up, and implementing the module. It also includes learning outcomes, testing and evaluation procedures, answer keys, student skills response, inventory list and print CD.

The Student Activity manual guides students through 10 multi-disciplinary activities using the tools, and equipment included with the module package. It also contains optional enrichment and career exploration activities, daily activity response sheets and activity notes.



Computer Monitoring

The Renewable Energy Systems from Progressive Educational Systems are monitored through an interface component on each station called the Green Meter. The monitoring is connected through a stand-alone computer, computer network/school network or through an optional on-line monitoring site which is assigned to the particular station. The monitoring enables individuals, classrooms of students or home study to participate in the curriculum.

The monitoring not only provides the voltage, current and wattage of the Solar, Wind, Batteries and Inverter but also calculates savings based on the regional KWh costs. Co2 emissions savings is also calculated. All data can be seen over a period of one hour, day, week or year as a trend graph. Data can then be exported to different file types.

Upon the completion of the Wind Energy Student Activity Manual, students should be able to:

- Describe the various alternate energy solutions.
- Understand the hazards associated with the wind energy module.
- Explain the pros and cons of wind energy.
- Describe the basic history of wind alternate energy.
- Explain how a wind turbine works.
- Test wind generator to determine their voltage and current outputs.
- Use digital volt and ammeters to monitor system activities.
- Explain the difference between batteries connected in series, parallel and series-parallel.
- Explain the effects on voltage and current output when the system is loaded.
- Draw a graph showing a wind generators power curves.
- Discuss the effects of circuit loading on wind generators.
- Explain the purpose of a voltage regulator.
- Understand the procedures necessary to properly site a wind turbine.
- Apply math to calculate Power in watts produced by the wind turbine.
- Use a computer interfaced system to monitor the input voltage and current.
- Explain how the energy produced is converted into energy we use.
- Use basic 5 step troubleshooting techniques to solve system faults.
- Describe some of the employment opportunities involving alternate energy.
- Identify various methods of storage devices.
- Explain how a deep cycle battery operates.
- Use the internet to explore the various types of renewable energies.
- Solve a problem based on information accumulated to date.

07-1300 Training System Includes the following:

Wind Generator

Delivers 400W (or 200W) of power at wind speeds of 45km/h Carbon fibre composite blades sophisticated internal charge regulator.

Power Inverter

Converts 12V DC battery power to 120V AC solid state control circuits provide a maximum 1,000W of power and 2,000W of surge capacity. (Size varies with requirements)

Systems Monitoring

Volt and Ammeter for both solar and wind generating systems. Audible alarm warns of low battery voltage. Auto shutdown protects against overload, short-circuit, over heating and low and high battery condition. Computer monitors solar and wind generators input for voltage and wattage as well as inverter and battery. Records system history from 1 hour up to 1 year. Produces a variety of graphs and determines costs savings.

12V Renewable Energy Deep Cycle Battery

Renewable energy deep cycle battery. 12V sealed deep cycle lead acid battery. 100 ah at 100 hour rate (Size and quantity vary with requirements)

Load Device

Variable load device provides up to 240 watt maximum load at 60watts intervals.

Curriculum

Student activity manual provides 10 regular activities with 5 enrichment activities for up to 20 hours of instruction. Includes DVD, Alternative Power Sources and Renewable Energy and Instructor Guide.

Optional Mounting

Note: The Renewable Energy training systems are usually permanently installed. It is recommended that a licensed Renewable Energy Technician install this system.

There are many methods of mounting the solar panel(s) used in the Progressive Educational Systems solar training systems. These include outside on ground, roof and pedestal as well as tracking systems. Inside mounting is also available. For further information on mounting options refer to the mounting and accessories data sheet.

Optional Monitoring/Curriculum

The Progressive Educational Systems Web-Lab is an on-line monitoring system with optional on-line curriculum for both wind and solar energy. This system can be used to monitor any wind and/or solar renewable energy system including:

- Any Progressive Educational system trainer
- Any Progressive Educational Systems Component board
- Any existing school wind or solar energy equipment
- Any local renewable energy installation (with permission)
- As a stand-a-alone system monitoring a Progressive Educational Systems installation



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