



# Renewable

## Renewable Energy

Renewable Energy technologies are essential contributors to sustainable energy as they generally contribute to world energy security, reducing dependence, on fossil fuel resources. New renewable, including wind and solar, are growing very rapidly.

**Future Tek provides training systems designed to produce qualified technicians for this growing industry.**

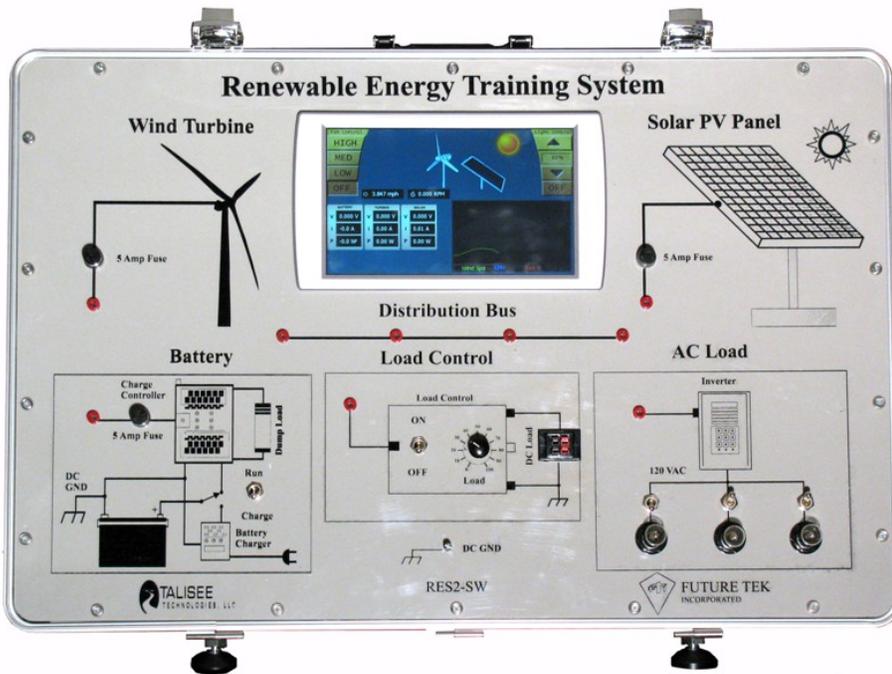
The **Renewable Energy System** demonstrates energy production utilizing solar photovoltaic and wind turbine methods. This trainer allows experimentation involving adjustments in light intensity, wind speed, yaw, ... measuring how these changes affect voltage, current, and power.

Future Tek's **Factory in a Box—Green Processes** provides training in the industrial processes involved in Renewable Energy. This trainer gives the student an in-depth understanding of these processes and advanced PLC control of the system.

The **Wind Technology Package** is a collection of trainers which together provide the skills required by Wind Turbine Technicians.

Included systems are:

Belt/Chain Drive Trainer, Shaft/Coupling Alignment Trainer, Bearing Maintenance Trainer, PLC and PLC Troubleshooting Trainer Systems, Motor Controls and Motor Controls Troubleshooting Trainers, Hydraulics Training Systems.



Dimensions: 32" x 21" x 15"

Inverter  
40 Watts AC  
Connects to DC Bus

DC Bus  
PV Solar  
Wind Turbine  
Battery

Controller  
10.5" touch screen

Real time trending variables  
(voltages, currents, power, wind velocity, turbine RPM, light intensity)

Battery charging control  
Wind speed control  
Touch screen (HMI)

## Renewable Energy System

The Renewable Energy System enables a variation of wind speed, light intensity, wind direction, blade pitch, etc. for an in depth understanding of the interrelationships involved and how these affect energy production.

### Control System Unit (RES2-SW)

The Control System Unit includes an off grid inverter which can be connected to the Wind Turbine (RES2-W) and/or Solar Photovoltaic System (RES2-S) outputs. Several DC and AC loads are provided for various exercises.

Instruments to measure wind velocity, voltage, current, power, light intensity, solar panel temperature, and turbine angular velocity are provided. Multiple voltage and current measurements are taken at various locations within the system to demonstrate power distribution. A control system with color touch screen is used to monitor and control both the wind and solar systems as well as view real-time analysis and plotting.

A battery charge controller is included which allows the student to vary the charge characteristics for both systems. The 12 volt re-chargeable battery is capable of supply power in the absence of wind or light for a period of time determined by the state of charge and load conditions.



Dimensions: 24" x 27" x 31"

Voltage: 13.5 VDC Nominal

Power: 40 watts

Light: 25,000 lm (Variable)

## Renewable Energy System

### The Solar Photovoltaic Unit (RES2-S)

The 40 watt photovoltaic system has a variable light source designed to be used in the laboratory environment, allowing the student to simulate changing sunlight conditions. An additional solar panel is available for outside use to allow for real world measurements.



Dimensions: 24" x 24" x 56"

Voltage: 13.5 VDC (Nominal)

Power: 40 watts (Scaled)

Blades: 18" diameter

Max angular velocity: 300 rpm

## **Renewable Energy System**

### **Wind Turbine Unit (RES2-W)**

The wind turbine is used to demonstrate how wind energy is converted to electrical energy. The turbine power has been scaled, based on the power equation for a wind turbine, and designed to be used in a laboratory environment. A variable speed fan is used to control the wind velocity and thus manage the electrical output power. This used to control the wind velocity and thus manage the electrical output power. This allows the student to use the system at any time regardless of the weather conditions.

The wind direction as well as the blade pitch can be adjusted by the student to allow measurement of performance variation.