

Module Overview

This module introduces students to wind energy and the rapidly expanding world of wind-generated power. It covers the basic principles of capturing wind energy as well as the past, present, and future of the industry. The module also introduces trainees to wind turbine construction and the key components of horizontal axis units. To complete the industry introduction to future wind energy technicians, an overview of the wind farm environment and a description of the career field are presented.

Prerequisites

Prior to training with this module, it is recommended that the trainee successfully complete *Power Industry Fundamentals*.

Objectives

Upon completion of this module, the trainee will be able to do the following:

1. Evaluate the advantages and disadvantages of wind power technology.
2. Identify the important events, people, and organizations in the history of wind power to date.
3. Describe wind energy concepts and how the energy is captured.
4. Identify the basic functions and classifications of wind turbines.
5. Identify major horizontal-axis wind turbine (HAWT) components and their function.
6. Describe the wind farm environment and characteristics of the wind energy maintenance technician.

Performance Task

This is a knowledge-based module; there are no performance tasks.

Materials and Equipment

Markers/chalk

Pencils and scratch paper

Whiteboard/chalkboard

Introduction to Wind Energy

PowerPoint® Presentation Slides
(ISBN 978-0-13-257337-5)

Multimedia projector and screen

Computer

Appropriate personal protective equipment

Module Examinations*

* Use your access code to download this Exam from the IRC.

Safety Considerations

Ensure that the trainees are equipped with appropriate personal protective equipment and know how to use it properly if any time will be spent in contact with systems or components. Review safety guidelines associated with working on electrical or mechanical systems and equipment. Emphasize the importance of proper housekeeping.

Additional Resources

This module presents thorough resources for task training. The following resource material is suggested for further study.

Introduction To Wind Principles. Thomas E. Kissell. Pearson Education, publishing as Prentice Hall.

Wind Power. Paul Gipe. White River Junction, VT: Chelsea Green Publishing Company.

American Wind Energy Association (AWEA). www.awea.org.

U.S. Department of Energy, Wind Powering America Program. www.windpoweringamerica.gov.

Teaching Time for This Module

An outline for use in developing your lesson plan is presented below. Note that each Roman numeral in the outline equates to one session of instruction. Each session has a suggested time period of 2½ hours. This includes 10 minutes at the beginning of each session for administrative tasks and one 10-minute break during the session. Approximately 15 hours are suggested to cover *Introduction To Wind Energy*. You will need to adjust the time required for hands-on activity and testing based on your class size and resources.

Topic	Planned Time
Session I. Introduction; The History of Wind Power	
A. Introduction	_____
B. The History of Wind Power	_____
Session II. The Wind Industry Today; A Study in Wind Energy	
A. The Wind Industry Today	_____
B. A Study in Wind Energy	_____
1. The Power of the Wind	_____
2. More About Wind Speed	_____
3. Wind Speed and Height	_____
4. Wind Data Acquisition and Use	_____
Session III. Intercepting Wind Energy; Wind Turbines	
A. Intercepting Wind Energy	_____
1. The Betz Limit	_____
B. Wind Turbines	_____
1. HAWTs and VAWTs	_____
2. Blade Count	_____
3. Blade Size and Construction	_____
4. HAWT Yaw and Pitch	_____
5. Supervisory Control and Data Acquisition (SCADA)	_____
Session IV. HAWT Turbine Systems	
A. HAWT Turbine Systems	_____
1. Wind Turbine Towers	_____
2. Nacelles	_____
3. Electric Power Components	_____

Session V. HAWT Turbine Systems; The Wind Farm; The Wind Energy Technician

A. HAWT Turbine Systems

1. Drive System Components

B. The Wind Farm

1. Wind Farm Maintenance

C. The Wind Energy Technician

Session VI. Review; Module Examination

A. Module Review

B. Module Examination

1. Trainees must score 70 percent or higher to receive recognition from NCCER.
2. Record the testing results on Training Report Form 200, and submit the results to the Training Program Sponsor.
