



## Wind Energy on Farms – Module Overview

### AG SERVICE PROVIDER (ASP) TRAINING DESCRIPTION

- 1) Learning Objectives - Participants in the educator training session will understand the basics of wind energy and how it may be used to reduce energy costs on the farm. This includes the ability to:
  - a) Understand why the wind blows.
  - b) Understand how much wind is necessary to reliably generate electricity.
  - c) Use a wind map to preliminarily estimate the wind resource at the location.
  - d) Estimate the amount of electric energy that may be produced at a specific location.
  - e) Be knowledgeable regarding other benefits associated with the use of renewable energy (tax benefits and renewable energy credits).
  - f) Understand other siting issues related to wind energy applications.
  - g) Be aware of net metering and its function.
- 2) Presentation Outline –
  - a) 05 min - Introduction – Introduce self, purpose of presentation; give brief overview of wind energy concepts. Point out that it DOES matter where you live as slide 11 will illustrate.
  - b) 05 min – Outline the minimum wind requirements and emphasize that height matters.
  - c) 10 min – Describe the process of turning the kinetic energy of the wind into useful electric power. Point out that while we often use calculators to estimate power production, the real math behind the calculator is shown here, even if that’s just so you can say you’ve seen it.
  - d) 10 min – Discuss design and site selection criteria affecting electric generation. Describe net energy metering benefits and its basic operation including how the system may be optimally sized to produce the amount of energy the farm consumes annually.
  - e) 15 min – Emphasize that wind turbines are often not the most economic choice for renewable energy generation. Simple paybacks are frequently long, longer than is desirable.
- 3) Activity – ASPs will be asked to estimate wind energy production based on a specific location and mounting height.
- 4) Calculation Tools – ASPs will use the small wind calculator. This calculator accepts most of the variables needed for the electric production estimation for specific locations, and includes explanatory notes regarding the variables. ASPs will also consult the wind maps to determine if the region under consideration is suitable for a wind turbine installation.

### SUPPLEMENTAL FILES

- Presentation File - Wind Energy on Farms—ASP Presentation (38 slides)
- ASP Activity Sheet – Wind energy on Farms – Activity (including solution)
- Calculation Tool –Small Wind Calculator 2013.xls (from: <http://www.windustry.org/resources/small-wind-calculator>)
- Additional Reading for ASP – Wind Fact Sheet PSU.pdf

## FARMER TRAINING DESCRIPTION –

- 1) Presentation Objectives – Farmers who participate in the farmer presentation will learn about wind energy applications on the farm and estimation techniques used to determine if wind energy is economically viable. This includes:
  - a) Being aware that wind energy may be converted into electricity.
  - b) Knowing that a calculator and wind maps exist to estimate the amount of electric energy that may be produced at a location.
  - c) Know that there are other benefits associated with the use of renewable energy (tax benefits and renewable energy credits) which can improve wind economics.
  - d) Understand siting issues related to wind energy applications.

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### SUPPLEMENTAL FILES

Presentation script – Wind Energy on Farms – Farmer Presentation Outline

Slide File for Farmer Training – Wind Energy on Farms –Farmer Presentation (PowerPoint, 29 slides)

Fact Sheet for Farmer Training – Wind fact sheet PSU.pdf – Describes wind turbine system aspects and benefits.

Case Study for Farmer Training – Small Wind Case Study.docx (from:

<http://www.awea.org/Issues/Content.aspx?ItemNumber=4647>

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