

UNIT 10 WIND ENERGY – Part 1



Read the text below.

Wind Energy

Wind power captures the natural wind in our atmosphere and converts it into mechanical energy, then electricity. People started using wind power centuries ago with windmills, which pumped water, ground grain, and did other work.

Today's wind turbine is a highly evolved version of a windmill. Modern wind turbines harness wind's kinetic energy and convert it into electricity. Most wind turbines have three blades and sit atop a steel tubular tower, and they range in size from 80-foot-tall turbines that can power a single home to utility-scale turbines that are over 260 feet tall and power hundreds of homes.

Wind is a type of renewable energy, and there are three major types of wind power, namely:

- Utility-scale wind, wind turbines larger than 100 kilowatts are developed with electricity delivered to the power grid and distributed to the end user by electric utilities or power system operators;
- Distributed wind, which uses turbines of 100 kilowatts or smaller to directly power a home, farm or small business as its primary use;
- Offshore wind, which are wind turbines erected in bodies of water around the world, but not yet in the United States.

<http://www.awea.org/Resources/Content.aspx?ItemNumber=900>

Which type of wind power can you see in the picture? Find the words in the text above.

distributed wind:



utility-scale wind:



offshore wind:



These are the most important words. Look them up in a dictionary if necessary.

mechanical energy

kinetic energy

windmill

wind turbine

to harness

blade

utility-scale wind power / big wind power

home-based wind power / distributed wind power

offshore wind power

Choose the correct answer(s). Sometimes two answers are correct.

1. A wind turbine usually consists of
 - three blades yes
 - a tube-shaped tower yes
 - three wings no
2. Utility-scale wind farms deliver electricity
 - directly to the end-user no
 - to the power grid yes
 - through the power grid to utility companies yes
3. Home-based wind turbines are also called
 - distributed wind power yes
 - big wind power no
 - utility-scale wind power no

Watch this video.

https://www.youtube.com/watch?v=niZ_cvu9Fts

Decide whether the statements are true or false according to the video.

1. Sailboats and windmills used wind thousands of years ago. true
2. Wind is air in motion. false
3. The air of the water gets warm more quickly than over the land. false
4. In 2010, exactly 2% of US electricity came from wind power. false
5. Wind turbines harness the electric energy of moving air. false
6. Wind farms are different from solar farms as they do not connect individual wind turbines together. false

Match the words with their definitions.

predictable	happening in a way that is expected
uneven temperatures	changing temperatures
to harness	to control it in order to use its power
kinetic energy	energy involving movement
solar array	a number of connected solar panels
to capture	to catch, to harness
wind	air in motion

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Complete the following short text with the correct words. Look up the new words in a dictionary.

shaft

windmill

generator

blades

A wind turbine is the modern advancement of the _____ (windmill). The wind turns the _____ (blades), which spin a _____ (shaft). The shaft connects to a _____ (generator), which makes electricity.



In the following text, you can read about wind turbines in more detail. Don't use a dictionary.

How wind turbines work

Wind turbine blades spin because of lift, the same force that allows airplanes to fly. If the blades are all oriented in the same direction, they will start to spin. The blades are attached to a hub, which spins as the blades turn. Most modern wind turbines have three blades. The blades and the hub together are called the rotor.

As the rotor turns, it spins a drive shaft, which is connected to a generator inside the housing at the top of the tower. The housing is called the nacelle. The spinning generator produces electricity because it converts the mechanical energy of moving wind into electrical energy. Between the spinning rotor and the generator, there is usually a gearbox to help the generator spin fast enough to make electricity.

The amount of electricity that a turbine is able to produce depends on the diameter of the rotor and the speed of the wind that propels the rotor. Wind turbines are often grouped together in wind farms to produce large amounts of electricity. Some wind farms have only a couple of wind turbines, but the largest wind farms are made up of hundreds and hundreds of wind turbines.

http://learn.kidwind.org/learn/wind_basics_power

Decide whether the statements are true or false according to the text.

Both the blades and the hub can spin.	true
The blades and the shaft together are called a rotor.	false
The housing of the wind turbine is called a nacelle.	true
The nacelle contains a drive shaft, a gearbox and a generator.	true
The role of the gearbox is to make the speed of the shaft lower.	false
The diameter of the rotor does not influence the amount of electricity produced.	false
When wind turbines are connected, they are called a wind farm.	true

Here are the most important words. Now, you can check their meanings in a dictionary.

to spin / to turn
lift
force
to attach
hub
rotor
drive shaft
generator
nacelle
gear
gearbox
diameter
to propel
wind farm

Forum topic:

What can be the advantages of using wind turbines to generate electricity?