

Wind turbine wind tube

How do wind turbines work?

Wind turbines work on a simple principle: instead of using electricity to make wind--like a fan--wind turbines use wind to make electricity. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity. To see how a wind turbine works, click on the image for a demonstration.

What is a wind turbine?

A wind turbine is a complex mix of engineering technologies. See how this is employed to produce renewable energy and keep the environment safe too. Show more A wind turbine is a complex mix of engineering technologies. See how this is employed to produce renewable energy and keep the environment safe too.

How does a wind turbine turn mechanical power into electricity?

This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity. A wind turbine turns wind energy into electricity using the aerodynamic force from the rotor blades, which work like an airplane wing or helicopter rotor blade.

How does a wind turbine pitch system work?

The pitch system adjusts the angle of the wind turbine's blades with respect to the wind, controlling the rotor speed. By adjusting the angle of a turbine's blades, the pitch system controls how much energy the blades can extract.

What is a small wind turbine?

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) defines small wind turbines as those smaller than or equal to 100 kilowatts. Small units often have direct-drive generators, direct current output, aeroelastic blades, and lifetime bearings and use a vane to point into the wind.

How big is a wind turbine blade?

Turbine blades vary in size, but a typical modern land-based wind turbine has blades of over 170 feet (52 meters). The largest turbine is GE's Haliade-X offshore wind turbine, with blades 351 feet long (107 meters) - about the same length as a football field. When wind flows across the blade, the air pressure on one side of the blade decreases.

Much of the turbine drivetrain is produced from various alloy steels and cast irons, the generator, however, can contain a more diverse range of materials depending on the type. The most common of which is the doubly ...

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Conclusion. The science behind wind energy is a testament to human ingenuity and the power of nature. Wind turbines are a remarkable technology that efficiently converts the kinetic energy of moving air into electricity, providing a ...

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Wind turbines harness the wind--a clean, free, and widely available renewable energy source--to generate electric power. The animation below is interactive. You can start and stop the turbine's movement, hover over parts to see their ...

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