Wind energy power plant

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Wind energy is old--so old that ancient Egyptians used this bountiful, blustery resource,according to the U.S. Energy Information Administration,to propel their boats down the Nile River. The first wind turbines (or windmills, as they were originally called) were made from abundant materials, such as wood or reeds, which were woven into tight blades and spun to pump water for farms, grind grain, and, eventually, power entire communities.

Wind is born when pockets of the Earth"s craggy surface get different amounts of sun and cool or heat faster than others nearby. To balance those differences, like mixing hot and cold water in a bathtub, air moves around the world--gaining or losing speed as it dips through valleys and sprints over rivers. That creates--you guessed it--wind.

Wind can be powerful enough to whisk birds through the sky, move sailboats across the ocean, and even rip trees from the ground. In comparison to all that, pushing wind turbine blades is easy! It"s that movement of the turbines that creates electricity.

Want to know how much wind energy is humming across your state? Check out NREL"s wind maps on WINDExchange.

Wind turbines, like windmills, catch the wind"s energy with propeller-like blades. These blades can have a horizontal axis, like a fan, or vertical one, like a merry-go-round. The most common design is a tall tower with three large blades on a horizontal axis. But some vertical-axis wind turbines look like eggbeaters, while others look like the windmills that populated farms a century ago.

Unlike fans, which use electricity to move air, wind turbines use moving air to generate electricity. When the wind blows, its force turns the blades, which runs a generator and creates clean electricity. But some turbine designs can produce more clean energy than others. For example, because winds can be more powerful and

less volatile higher in the atmosphere, placing turbines on towers 100 feet (or 30 meters) tall--about the height of the Statue of Liberty--can help them generate more electricity. Wind turbine operators can also shift their machines to face directly into the wind--a technique called yawing.

One wind turbine can power an individual home or farm, but several built close together form a wind energy plant, or wind farm. Wind plants can be land-based or offshore, and they can be hybrid plants (meaning, they include other sources of energy, such as solar energy). Wind energy researchers are trying to learn how many wind turbines built in which arrangements can maximize energy production in wind plants.

Today, most grid-connected wind plants are at least 1 megawatt or larger. The biggest wind farm in the United States spans 100,000 acres (enough to cover half of New York City) and can power more than 250,000 homes.