

Wind Turbines and Wind Energy



Introduction to clean and renewable Energy technologies

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INDEX

- **Wind Energy:** characteristics and advantages
- **Wind Turbines:** parts and components, layouts
- **How does a wind turbine generate power?**
- **From the wind turbine to the wind farm**

A photograph of a series of offshore wind turbines in the ocean. The turbines are white with three blades each, and they are arranged in a line that recedes into the distance. The water is calm, and the sky is a clear, light blue. The turbines are reflected in the water.

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- **Green Power:** its generation produces no pollution or greenhouse gases.
- **Sustainable:** Wind is a renewable energy resource, it is inexhaustible and requires no "fuel" besides the wind that blows across the earth.
- **Affordable:** Wind power is a cost-competitive source of electricity.
- **Economic Development:** wind power is a locally-produced source of electricity that enables communities to keep energy dollars in their economy.

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► The main tool used to generate power from wind is the **wind turbine**. Its main parts are:

- **Blades - rotor**
- **Nacelle**
- **Tower**
- **Foundation**



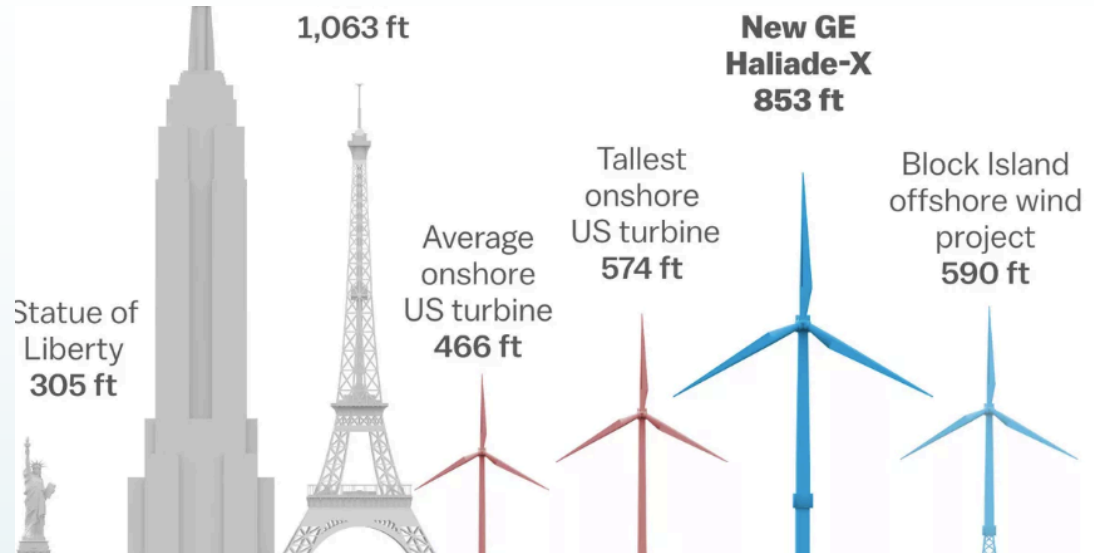
Blade

Turbine

Tower

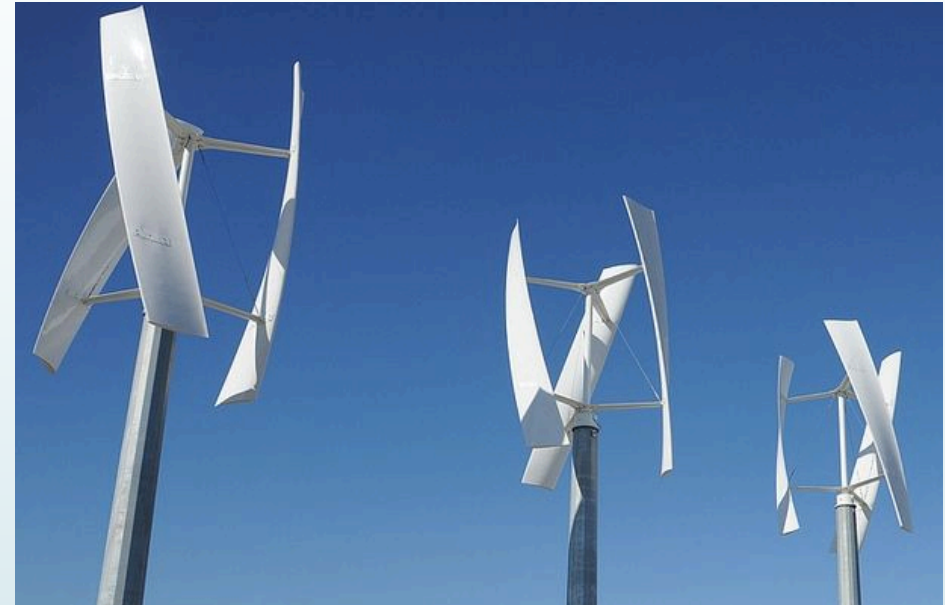
Foundation

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► Vertical axis turbines examples





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► **How does a wind turbine work?**

See the following link...

<http://www.ewea.org/wind-energy-basics/how-a-wind-turbine-works/>

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► Wind Farms configuration

Wind farms are groups of turbines built in a same location that share a cabling layout.

Constructed in suitable locations – combining winds + geological conditions + site availability.

► Can be placed

Onshore

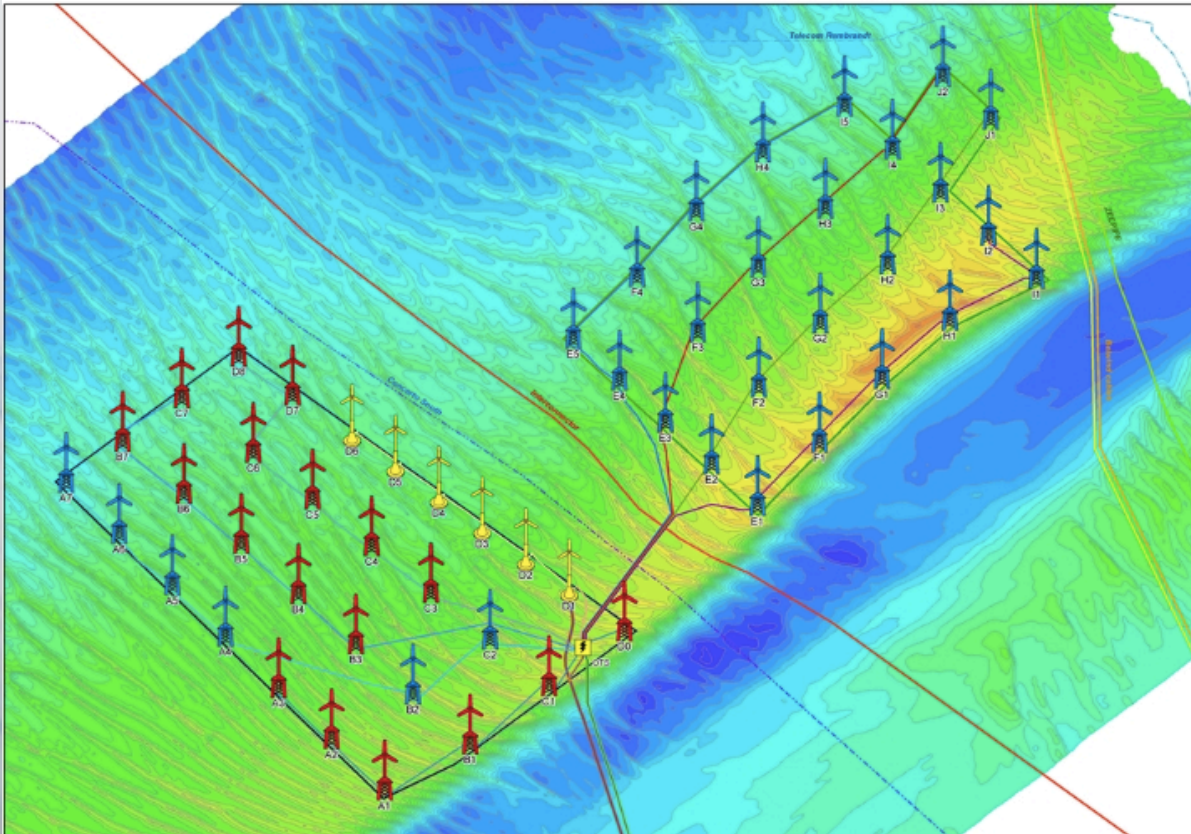


Offshore



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► Example of wind farm configuration



A row of offshore wind turbines in the ocean under a clear blue sky. The turbines are white with three blades each, and their reflections are visible in the calm water. The sky is a clear, light blue.

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THANK YOU AND....

STAY RENEWABLE 😊

Sources

- www.ewea.org
- Danish wind industry association www.windpower.org
- Siemens wind
<https://new.siemens.com/global/en/markets/wind.htm>
- Ramboll offshore wind www.ramboll.com