

#3 Understanding Wind Turbines



Age: 8 – 11 12 – 15 **16 – 18**

Keywords: Renewable Energy, Engineering, Physics, Aerodynamics.

Windmills convert wind energy into electricity. This happens when the wind turns the wings and electricity is produced. But how does the wind turn the wing? The blade of the wing has airfoil cross sections which helps the wind turbine achieve rotation. Furthermore, the blade is positioned in a tilted manner in order to align with the wind speed. Wind turbines should face wind direction for maximum power extraction. As the wind direction changes, a sensor is placed at the top which sends a signal to turn the wind turbine align with the wind direction.



On-shore Wind Turbines: Onshore wind energy generates power by wind turbines which are located on land. Onshore wind farms are usually located in rural areas where buildings do not interrupt the wind. Onshore wind farms are one of the least expensive forms of renewable energy.

Off-shore Wind Turbines: Offshore wind energy produces electricity from wind blowing across the sea. Offshore wind farms are considered more efficient than onshore wind farms. This is because offshore, the wind speed is higher, more consistent and there are no physical human-made interferences present on land.



To view the Augmented Reality (AR) content associated with this case-study, please download the Zappar App on your mobile device (AppStore/ Google Play) and point it toward this flyer. Enjoy and have fun learning!



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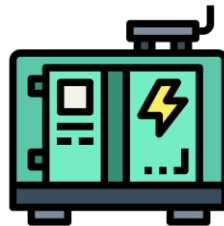
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Take the AR-based Quiz below to test your knowledge on wind turbines.

- 1) The movement of the blade generates electricity directly in the generator



- 2) Wind turbines have sensors in order to move towards the wind direction in order to maximise energy creation



- 3) Off-shore wind farms are less efficient than on-shore wind farms as the wind is at a lower speed



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Take on this challenge and build your own wind turbine!

You can start by designing a wind turbine on SketchUp, similar to the 3D model you saw on page 1.

By experimenting with the design of wind turbines, you'll gain a better understanding of how they work, which will help you in your future studies and career. Plus, it's a fun and exciting way to learn!



*Zap the code with
the Zappar app*

Tip: Use SketchUp

SketchUp is 3D design software that makes 3D modelling for everyone. It has a simple to learn yet robust toolset that empowers you to create 3D models

SketchUp: <https://www.sketchup.com/>

Take on this task and see what amazing things you can create!

Best of luck!



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