

# Reflecting on 'Why is wind a renewable energy source?'

For thousands of years, people around the world have used the force of the wind to lift, push, and pound. With the invention of devices that can turn motion into voltage, wind is a power source that will never run low no matter how often we use it.

### Video summary

(Approximate running time: 3 ¼ minutes)

- Wind is an ancient source of power used to drive technology for many centuries.
- Turbines can be used to turn magnetic mechanisms, once called dynamos, which drives an electrical current through a conducting material.
- Many different sources of motion can be used to push turbines to create induction, including flowing liquid water and steam.
- Wind is another increasingly common source of power, produced as the Sun heats the planet and creates convection currents in the atmosphere.
- Since convection currents are created at a rate faster than technology can extract energy from them, they are a renewable resource for energy.
- Different wind turbine designs are used to transform moving energy in wind into electricity for different applications.

### Resources

- Multiple choice Q&A worksheet
- Classroom activity: Making a mini turbine (advanced)
- Digital interactive activity: multiple choice Q&A
- Digital interactive activity: The great windfarm challenge

### Literacy links

- **Dynamo:** A mechanism made up of a magnet and conductor that moves a magnetic field in a way that moves electrons to create a current. They form the basis of modern electrical power generators.
- **Convection:** The transfer of heat energy through a fluid, as particles move from a warmer zone to a cooler one.

### Research tasks: Want to know more?

- Wind is already powering a significant part of Australia's energy needs. Just under 10% of our nation's electricity supply is from a wind-powered source. Ask students to research how this compares with wind power in other nations.
- Electricity costs are usually compared in what are known as megawatt hours (MWh). This is amount of electricity generated by a one megawatt generator running for 60 minutes. In Australia, the average costs are a little over \$100/MWh. Wind can be as cheap as a little over \$50/MWh. Ask students to research costs of renewables, and what might make them cheaper in the future.
- Nuclear power doesn't release carbon gases into the atmosphere, making it a form of electricity generation that could meet society's needs without contributing to global warming. Critics argue the radioactive waste from fission – the process that releases energy as uranium decays – makes it an unsuitable alternative. Nuclear fusion, on the other hand, might one day be a clean, efficient source of energy. Ask students to research nuclear fusion technology, and ask them if they think it is based on a renewable resource.

# TEACHER NOTES

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## Reflecting on 'Why is wind a renewable energy resource?'

### Curriculum links

Australian Curriculum Science, year 8

- Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems (ACSSU155)
- Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE135)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy, Ethical understanding

NSW Curriculum Science, stages 3 and 4

- Discusses how scientific understanding and technological developments have contributed to finding solutions to problems involving energy transfers and transformations (SC4-11PW)
- Appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them (SC4-1VA)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy

Victorian Curriculum Science, Levels 7 and 8

- Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another (VCSSU104)
- Science and technology contribute to finding solutions to a range of contemporary issues these solutions may impact on other areas of society and involve ethical considerations (VCSSU090)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy

### Worksheet Answers:

#### Question 1

B) Each pole pushes and pulls electrons through a conductor

#### Question 2

B) A natural resource that can't be replenished as quickly as it is used

#### Question 3

D) It warms, and rises

#### Question 4

B) Convection current

#### Question 5

A) As long as sunlight warms our atmosphere, wind will be produced as quickly as we can use it