YEARS 5-8

Renewable energy solutions

OVERVIEW

Explore the difference between renewable and non-renewable energy sources and identify impacts of their use, recognising sustainable choices.

NZ CURRICULUM LINKS

LEARNING AREAS:	ACHIEVEMENT OBJECTIVES:	LEVELS:	YEARS:
Science: Physical World: Physical inquiry and physics concepts Nature of Science: Participating and contributing	Explore various aspects of an issue and make decisions about possible actions. Explore, describe, and represent patterns and trends for everyday examples of physical phenomena.	3-4	5-8
Social Science	Understand how people make decisions about access to and use of resources.	3-4	5-8

TEACHER INFORMATION:

Learning sequence

INTRODUCING KNOWLEDGE

EXPLORE AND INVESTIGATE

CREATE AND SHARE

REFLECT AND EXTEND

MAKE A DIFFERENCE

Learning intentions

Students are learning to:

- Compare renewable and non-renewable energy sources and their uses.
- Identify the impacts of energy sources on the environment.

Success criteria

Students can:

- Classify energy sources as renewable or non-renewable and describe their use.
- Research energy resources to determine their environmental impacts and sustainability.

Resources needed

Slideshow: Renewable Energy Sources Student worksheet: Renewable or non-renewable?

Additional Support

What are renewable and non-renewable energy?

Renewable energy is made from naturally plentiful resources that don't run out, such as wind, water and sunshine. Renewable energy is also called 'clean energy' because it doesn't cause pollution or climate change.

Non-renewable energy is a source of energy that will eventually run out. Most sources of non-renewable energy are fossil fuels, such as coal, gas, and oil. These sources of energy are not sustainable.

Energy resources and carbon dioxide (CO^2) in the atmosphere.

Non-renewable energy sources such as coal and oil emit greenhouse gases such as carbon dioxide (CO^2) into the atmosphere. This contributes to climate change and is not a sustainable choice for the future.

Renewable energy sources such as wind and solar do not emit greenhouse gases such as carbon dioxide as they are transformed into electricity. These more sustainable energy sources will protect our planet.

Genesis is committed to providing renewable energy generation and reducing carbon emissions.

Vocabulary

Renewable, non-renewable, electricity, resource, source, energy, coal, oil, wind, solar, hydroelectricity, tidal power, geothermal, natural gas, potential and kinetic energy, generate, fuel, chemical, turbine, sustainability.

LEARNING EXPERIENCE

Note: These are suggestions only and teachers are encouraged to adjust the activity to suit the needs and interests of their students.

INTRODUCING KNOWLEDGE

Allow approximately 45 minutes

- What do you think the words 'renewable' and 'non-renewable' mean? Share and discuss.
- What does the word 'sustainable' mean and why is it important when we talk about energy sources?
- View and discuss the Renewable Energy Sources slideshow.
- After viewing, students can complete the student worksheet: Renewable or non-renewable? on page 4. Rank the energy generation options from most sustainable to least sustainable and discuss their reasons.

Any text highlighted in orange represents a link to further material. If you have printed this resource, please return to schoolgen.co.nz/for-teachers/resources to access the linked material.

Renewable or non-renewable

Use the facts in the Renewable Energy Sources slideshow to complete the table and identify which energy sources are renewable and/or sustainable. The first row is completed for you.

Energy Source	Renewable or non-renewable?	CO^2 emissions	Other environmental impacts	Sustainable energy source?
Coal 	Non-renewable	High	Releases pollutants like soot, carbon monoxide and sulphur dioxide	No
Geothermal 				
Hydro (water) power 				
Solar 				
Wind 				
Tidal/ wave power 				
Biomass and wood 				
Gas 				
Oil 				

EXPLORE AND INVESTIGATE

Allow approximately 10 minutes

THINKING LIKE A SCIENTIST:
Think about the following listed activities and discuss what type of energy is used for each of them. This may differ for individuals. What are the options for each scenario?

Heating hot water	Making a campfire	Travelling to a park	Using a BBQ at the beach	Defrosting dinner
				

Are these renewable sources of energy or not? Reflect and discuss in groups.

CREATE AND SHARE

Allow approximately 60 minutes

- Draw or cut out pictures from magazines which illustrate examples of renewable energy.
- Students can classify pictures into categories such as: sources of energy, renewable energy, non-renewable energy, electrical energy, heat, light, sound, and other. Use markers to make connections and add vocabulary to make a display.

REFLECT AND EXTEND

Allow approximately 30 minutes

- Reflect on what a renewable energy source is. Which energy sources do we use the most in New Zealand? Are they renewable? See this link for useful information from energymix.co.nz on energy consumption.
- Discuss which energy sources you think we should use more of in New Zealand and why. How can New Zealand work together to reach our target of renewable energy by 2035? Genesis is working hard towards reaching the target of 100% renewable energy by 2035. For more information see the genesis website on sustainability and caring for our environment.

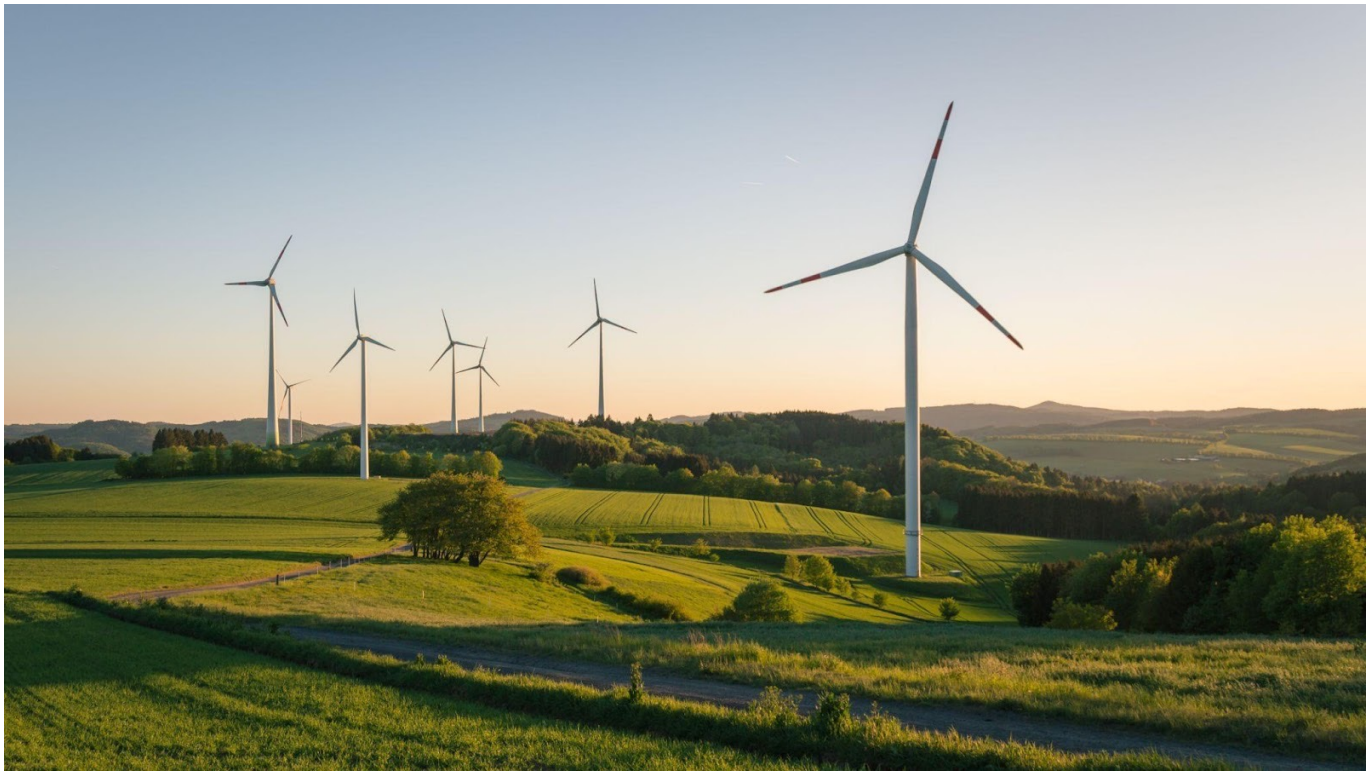
MAKE A DIFFERENCE

Allow approximately 45 minutes

- Which non-renewable sources of energy do you use at school or at home?
- How could these be replaced with renewable sources?

The Ministry of Education is offering schools subsidies to replace their old coal fired burners with more sustainable options. See their website for details about the Sustainability Contestable Fund website.

Discuss what changes the school, and students and their families could make to reduce their use of non-renewable sources of energy.



We hope you have enjoyed this educational STEM resource.
School-gen is a Genesis community initiative to get kaiako, tamariki and whānau enthused about STEM.
For more free resources please visit our Genesis School-gen website and
follow us on Facebook and Instagram @schoolgennz

Fact sheet/ Answers to student activity sheet: Renewable or non-renewable?

Energy Source	Renewable or non-renewable?	CO^2 emissions	Other environmental impacts	Sustainable energy source?
Coal 	Non-renewable	High	Releases pollutants like soot, carbon monoxide and sulphur dioxide	No
Geothermal 	Renewable	Low	Can release sulphur dioxide gas	Yes
Hydro (water) power 	Renewable	Low	Minimal after construction	Yes
Solar 	Renewable	Low	Minimal after construction	Yes
Wind 	Renewable	Low	Minimal after construction	Yes
Tidal/ wave power 	Renewable	Low	Some impacts on marine animals	Yes
Biomass and wood 	Renewable	Medium (but is considered carbon neutral).	Minimal	Yes
Gas 	Non-renewable	High	Methane emissions.	No
Oil 	Non-renewable	High	Pollutants like sulphur dioxide and nitrogen oxide	No