

River Ness Hydro Project - Class Teacher Tips

Learning intentions

- To understand how an Archimedes screw works and how we can use it to produce electrical energy.
- To identify and understand the differences between renewable and non-renewable energy sources.

Activity 1 – Quiz

- Watch [this video](#).
- Log into Kahoot and complete [the quiz](#).

Activity 2 – Energy Sources

❖ This task may be done individually or in pairs/groups.

- Watch this [video](#).
- In the table below, sort these energy sources into renewable and non-renewable energy sources.
 - Coal
 - Wind
 - Solar
 - Gas
 - Hydro
 - Nuclear
 - Oil
 - Biomass
 - Geothermic

Renewable	Non-Renewable
Wind Solar Hydro Biomass Geothermic	Coal Gas Nuclear Oil

c) In the table below, write down 3-5 pros and cons for renewable and non-renewable energy sources.

	Pro	Con
Renewable Energy Sources	It won't run out.	Dependant on the weather, e.g. if there is no wind then wind turbines won't produce any energy.
	Creates new jobs.	May be detrimental to local wildlife.
	Better for the environment.	High upfront cost.
	Allows countries to be less reliant on energy sources from foreign countries, e.g. oil.	We cannot store the energy as well as we can with non-renewable energy sources
	Produces less waste.	Dependant on the location, e.g. wind turbines will not work well somewhere there is little wind or has lots of hills that will prevent the wind getting to them as well.
	Improves public health as it reduces pollution.	Not enough energy is being produced just now to cover all our needs.
	Can be cheaper than non-renewable as there is not a limited amount of it and it does not need to be bought from the country that produces it.	There may be a large carbon footprint in the building/manufacturing process.
Non-Renewable Energy Sources	Easier to store than renewable energy.	They will run out.
	Easier to transport than renewable energy.	They are bad for the environment.
	Are more reliable than renewable energy, e.g. don't depend on the weather.	They produce a lot of pollution.
		Cause damage to the environment when extracting them.
		Price can rise rapidly depending on what is happening on the country it is from, e.g. wars, disagreements between countries etc.
		Dangerous to extract and can cause a lot of injuries to workers.

d) Watch these videos to learn about some careers within the renewable energy sector.

- o [James at the European Marine Energy Centre \(EMEC\)](#)
- o [Jerry at the European Marine Energy Centre](#)
- o [James at SSE](#)

e) In the table below write down some of the things that EMEC and SSE do in the renewable energy sector.

EMEC	Works with wave and tidal energy.
	Tests wave and tidal energy systems in real world conditions.
	Helps with research and development projects.
	Looks into new energy storage systems, e.g. hydrogen.
	Looks into ways of solving energy problems and reliance on fossil fuels.
SSE	Produces energy to power homes.
	Runs different kinds of power stations, e.g. wind farm, thermal power stations, hydro schemes.
	Uses the power of water to produce electricity.
	Tries to combine all renewable energies (Wind, solar, hydro etc) to produce enough energy.

Activity 3 – Group Presentation

- a) In groups, decide where in the Scottish Highlands you would build a renewable energy power facility and what you would power with the energy it would generate.

It could be an Archimedes Screw like they have built in the River Ness or any other renewable energy source you think would work well in your chosen area.

Here are some pointers to help you:

- Location:
 - Where is the location?
 - What is the geography like? Are there hills/lochs/rivers etc?
 - What is the weather like? Is there a lot of sun/wind?

- What renewable energy source are you going to use?
Wind/solar/hydro/geothermal/biomass?
 - Why is this a good energy source for the area?
- Venue powered with the energy produced by your facility:
 - How far is it from your renewable energy facility?
 - Does it require a lot of power?
 - How many people will it benefit? Do a lot of people use the venue?
- What other benefits would there be for the local area/community from using your chosen renewable energy source to produce electrical energy?
 - Will it create lots of jobs?
 - What careers and skills will it bring to the area?
 - Will it improve the air quality?
 - Will it reduce the cost of energy bills?

b) Present your idea back to your class.

- ❖ Groups could choose to present by just speaking, using a power point presentation, making a short video or any other suitable method.
- ❖ You could run the presentations in the style of Dragon's Den where each group must pitch to you and see if they can persuade you to invest.
- ❖ Instead of presenting to the class pupils could write up their ideas as a report.

Curriculum for Excellence Links

- By investigating renewable energy sources and taking part in practical activities to harness them, I can discuss their benefits and potential problems. **SCN 3-04b**
- I can explain some of the processes which contribute to climate change and discuss the possible impact of atmospheric change on the survival of living things. **SCN 3-05b**
- Having used digital technologies to search, access and retrieve information I can justify my selection in terms of validity, reliability and have an awareness of plagiarism. **TCH 3-02a**
- I can identify the costs and benefits of using technologies to reduce the impact of our activities on the environment and business. **TCH 3-07a**