

A4 ACTIVITY 3: ENERGY FROM THE SEA

Background

As the non-renewable energy resources are dwindling, the demand for energy is increasing. Despite over 97% of the Earth being covered by water, using it as a primary source of energy has not really been exploited until now. **Ocean energy** is also referred to as **marine energy**. The movement of the oceans creates a vast store of kinetic energy – waves, tides, temperature differences – all of which can be used to generate electricity. The rhythmic nature of the oceans is more reliable for generating electricity than the unpredictable and random nature of wind.

Suggested approaches:

- Ask the students to compare the advantages of solar energy with those of wind energy. What might the disadvantages be – Is wind energy always available? How can it be used to generate electricity? What about solar energy, can we depend on it? What about the seasons? Could it be too hot for solar panels to work? (You might like to show this video to help the discussion <http://www.livescience.com/39409-new-sun-reflecting-london-skyscraper-melts-cars-video.html>). Do the advantages outweigh the disadvantages?
The following video is an excellent introduction to wave energy, <https://www.youtube.com/watch?v=bEfrtAOMuvk>.
- How many advantages can the students list for developing ocean energy? What is the source material? What might some of the disadvantages be? Are there any ethical issues to consider – for example, what about marine habitats? Which should have priority, our need for energy or marine life?
- The two sheets – **A4 ACTIVITY 3 (I) DISCUSSION POINTS: WIND VERSUS SUN** and **A4 ACTIVITY 3 (II) DISCUSSION POINTS: WHY GO TO THE SEA?** – could be used as guidelines for debating the issues, providing students with the opportunity to carry out their own research and then present their arguments.

Resources:

1. <https://www.youtube.com/watch?v=Tsyx1qhzy08>
This short video describes how waves are created in the test laboratory at Cork University.
2. <http://www.oceanenergyireland.com/Planning>
This is a short introduction to converting tidal power into electricity.
3. <http://www.oceanenergyireland.com/TestFacility>
This site looks at the Atlantic Ocean as a power source.
4. <http://www.oceanenergyireland.com>
This is a short video making the case for developing ocean energy.

A4 ACTIVITY 3 (I) DISCUSSION POINTS: WIND VERSUS SUN

1. Is wind energy always available?
2. Is it possible to predict how much energy the wind will generate in any given place at a given time?
3. Is energy lost in storage?
4. How can wind energy be used to generate electricity?
5. Can we depend on the quantity of energy generated by the sun in any given place?
6. Is it ever too dark for solar panels?
7. Is it ever too cold for solar panels?
8. Is it ever too hot for solar panels?
9. How can solar panels be used to generate electricity?
10. List some disadvantages of using wind energy.
11. List some advantages of using wind energy.
12. List some disadvantages of using solar energy.
13. List some advantages of using solar energy.
14. List some advantages of solar energy over wind energy.
15. List some advantages of wind energy over solar energy.
16. What is the role of ethics in research?

A4 ACTIVITY 3 (II) DISCUSSION POINTS: WHY GO TO THE SEA?

1. List some advantages for Europe in developing ocean energy.
2. List some advantages for Ireland in developing ocean energy.
3. Which energy sources are harnessed when using the ocean as an energy generator?
4. List some possible disadvantages of using the ocean to generate energy.
5. What is the role of ethics in research?
6. What effect could using the ocean have on marine habitats?
7. Our need for energy could compromise marine life — which should have priority?
8. What ethical issues might need to be considered before embarking on harnessing ocean energy?