

MECHANICAL ENGINEERING WITH PROFESSOR JENNIFER FRANCK

TALKING POINTS

COMPREHENSION

1. What are two big problems with using fossil fuels as a source of energy? Can you think of others?
2. How would you describe the advantages and disadvantages of wind power? And of solar power?
3. In your own words, how does an oscillating hydrofoil capture the motion of tidal water?

APPLICATION

4. Compared with an equivalent technology on land, what additional challenges exist for developing technology for use in the sea?

ANALYSIS

5. How is it possible for engineers to try out new designs without actually building anything?
6. What do you think an aerofoil is? How is it similar/different to a hydrofoil?
7. How is the movement of an oscillating hydrofoil similar to the way a fish swims?

EVALUATION

8. To what extent do you think marine energy will be used in the future and why?

CREATIVITY

9. Can you think of a simple demonstration to show how a hydrofoil is pushed at right angles to the flow of water?

ACTIVITIES

Find out what the energy mix is in your country:

- Go to Our World in Data: ourworldindata.org/sources-global-energy and select your country through the 'Add country' tool.
- How much energy is renewable? How does it compare to the global average?
- How has the share of renewables changed since 2000?
- What other energy sources were not mentioned in the article?
- Add different countries and see how they compare.
- What surprises you about these figures? To what extent are they as you would have predicted?

Find out how high the tides are near you:

- Tidal range is the difference in height between low tide and high tide, and this varies depending on where you are in the world.
- Look at a map made by NASA at en.wikipedia.org/wiki/Tidal_range to see how it varies around the world.
- What is the tidal range at your nearest bit of coastline?
- Where are the largest tides in the world? What impact could this have on marine energy production?

MORE RESOURCES

- Visit the website for Jennifer's Lab: www.cfd.engr.wisc.edu
- Energy.gov provides up to date information about marine energy use in the US: www.energy.gov/eere/water/downloads/marine-energy-united-states-overview-opportunities
- The European Marine Energy Centre has some useful information on its website, including a video about marine energy in the UK: www.emec.org.uk/marine-energy