Year 6: Science

Lesson Plan: Exploring wind farms

Introductory Activities (Engage)

(10 minutes)

As a class group discuss:

- When talking about a weather phenomenon, what is wind?
- In weather terms, what do you know about the speed of wind? What are some descriptions?
- In what ways is wind affected? E.g. landscapes, buildings …
- How is wind speed measured?
- What do you think makes some parts of Tasmania good locations for the building of wind farms?

Collate your answers on a flip chart, poster or other

Possible Responses
• Wind is air in motion and it is produced by the uneven heating of the Earth's surface by the Sun's energy.
• Wind speed can be different from a breeze to large gusts
• Described as strong, gale force, gentle.
• The shape of the land, plains, mountains, trees and buildings make it either slow down or change direction.
• Wind speed historically measured by an anemometer however ultrasound is now commonly used.
• **A good wind resource, available land use, proximity to the electricity grid.**

Lesson 1 (Explore)

(30 minutes)

Hydro Tasmania's first wind farm, Huxley Hill was built on King Island in Bass Strait in 1998. This was followed by:

- Woolnorth Bluff Point Stage 1 (2000)
- Woolnorth Bluff Point stage 2 (2002)
- Woolnorth Studland Bay (2006)
- Musselroe (2013) and,
- Flinders Island (2016)

Materials	Quantity
Smart board or projector	1
Internet connection	1
Activity – Design a wind turbine	1 each
Activity – Create a project plan	1 each
YouTube Clip – Musselroe Wind Farm – the full story.	

In the late 1990's and early2000's Hydro Tasmania was the largest developer of wind farms in Australia with projects in South Australia (Cathedral Rocks) and developments being progressed in Western Australia, South Australia, Victoria, Queensland, New South Wales, Tasmania and overseas in New Zealand, India and China.

The Musselroe, Studland Bay and Bluff Point wind farms are operated under a joint venture with China Energy (formally Shenhua Clean Energy (SCE). The joint venture is known as Woolnorth Wind Farm Holdings Pty Ltd. SCE owns a 75% share in the wind farms and Hydro Tasmania has a 25% share.

The following video story explores the development of the Musselroe Wind Farm. It tells and shows how a project or idea has many aspects to it before it can become a reality.

Musselroe Wind Farm – The Full Story

https://www.youtube.com/watch?v=ZxeQeJ4jW-4

1. **Before viewing;**

Tell students that while watching the video (which lasts about 20 minutes) they should notice and/or make some brief notes about:

- The location
- The project team and their commitment to:
    - the community
    - conserving cultural and heritage values
    - the environment
    - safety

2. **After watching the Musselroe wind farm video**;

   Have students in pairs or small groups discuss their observations about the project construction. Ask them to record points about:

- Design
- Challenges
- Timeframes
- Materials
- Transport

3. **Going further:**

Have students investigate whether more wind farms are being built in Tasmania.

- Where are they being built? Create a map of their locations.
- How many turbines will there be?
- How much energy will they generate?
- What are the pros and cons of wind farms?

Options for assessment and extension

	Options
LEARNING AREA – **Technologies** **Negotiate criteria for success that includes sustainability to evaluate design ideas, processes and solutions** **ACTDEP027** **Individual Activity**	**Student research/comparison exercises** 1. The turbine blades are 44 metres long a. Estimate what else is 44 metres long? i. Using appropriate safety precautions students could measure the length of the school car park, oval, basketball court, or other buildings 2. Each nacelle is 75 tonnes a. How many kilograms are there in a tonne? b. Estimate and compare the mass of three other objects. Can you suggest other objects with a mass of 75 tonnes? 3. Locate Musselroe Wind Farm on a map of Tasmania a. The shipping port was at Bell Bay, how far would each truck have travelled? (A copy of the transport route can be sourced from education@hydro.com.au)

	Options
LEARNING AREA – **Technologies** **Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions** **ACTDEP026** **Class / Small Group Activity**	**Students design and build a wind turbine** See Activity – Design a wind turbine a. As a class discuss and negotiate a set of criteria to assess and judge the success of your turbines b. In small groups design and construct your turbine c. Test, observe and record your results d. Have a class discussion to analyse and compare results
LEARNING AREA – **Technologies** **Develop project plans that include consideration of resources when making designed solutions individually and collaboratively** **ACTDEP028** **Individual Activity**	**Students create their own project pan based on the video** See Activity – Create a project plan a. Create a timeline b. Resources (people, equipment and materials) c. Engagement (community, cultural heritage) d. Contact Hydro Tasmania who can share a range of current community engagement resources with your class.

Elaborate and Review

As a class group review:

- How a wind turbine works.
- Designs and findings from the construction of wind turbines
- The location of wind farms in Tasmania.
- Proposals for new wind farms.
- How much energy wind farms contribute to Tasmania's overall energy supplies?
- The effectiveness of wind energy as a renewable resource.
- Use Google Earth to find and zoom into wind farms and note how much space a wind turbine uses within the wind farm footprint.