



Year 6: Science, Technologies and HASS

Lesson Plan: A renewable energy solution for the Bass Strait Islands

Introductory Activities (Engage)

(10 minutes)

As a class group discuss:

How many students have solar panels installed on their homes? Why? (environmentally conscious, reduce electricity bills, prefer to be off grid.)

Have students respond to the following statements with a thumbs up (agree) or a thumbs down (disagree)

The bulk of Tasmania's energy generation is renewable.

For students who disagree ask where electricity is generated? What would be their energy options if there was no access to the grid?

Did you know?

Australia has the highest average solar radiation per square metre of any continent in the world.

Tasmania is Australia's largest producer of renewable energy.

Lesson 1 (Explore)

(45 minutes)

Like thousands of other islands across the globe, King and Flinders Island have historically relied entirely on diesel generators for their electricity supply. Diesel is reliable but costly and it is an emissions intensive source of power.

The diesel power stations were located in the towns on the islands but farms further away from the towns had to rely on their own generators for power.

Both islands attract tourism and King Island is renowned for its dairy and beef products, and kelp farming. Flinders Island's dramatic landscapes and beaches along with abundant fishing and a growing food scene is a popular visitor destination. However, that beauty has been tempered with the knowledge that power generation has been sourced from fossil fuel.

Since 1986, Hydro Tasmania has been seeking ways to reduce the reliance on imported diesel fuel through introducing a range of technologies and renewable energy solutions.

Materials	Quantity
Map of Tasmania	1
Hydro Tasmania Video Flinders Island	1
ABC New video grab	1
Smartboard	
Internet access for the students	n/a
Activity – Renewable energy sources	1 each
Template – Q and A	1 each

1. What is renewable energy?

- Provide students with the activity sheet, 'Match the renewable energy sources.'
Have complete the activity through researching the various renewable energy sources, and identifying the advantages and disadvantages of each one.

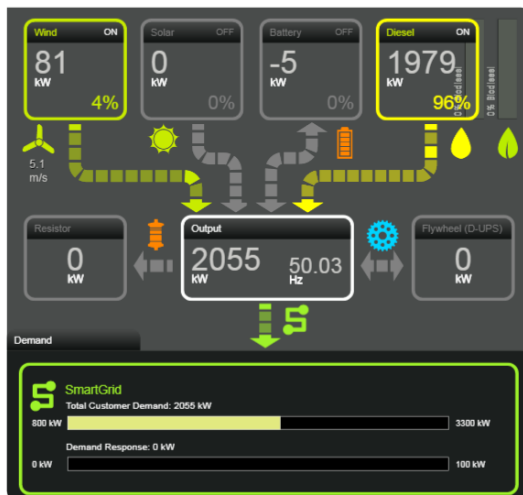
2. Study the King Island renewable energy integration project.

- Refer students to the Success stories: King Island website, www.hydro.com.au/clean-energy/hybrid-energy-solutions/success-stories/king-island
- Have students respond to the following questions (teachers may wish to use the Q and A template for their responses and have students work in pairs):
 - What was the main goal of the King Island Renewable Energy Integration Project?
 - Given the islands location (remote from Tasmania) and flat topography, could hydro or wave power be considered? Please explain your answer.
 - What was the most significant achievement of the project?
 - Why was the installation of new diesel —uninterruptable power supplies (D-UPS) — critical for reliance on renewable energy generation?
 - What are the two main benefits of the Smart Grid?
 - What are the two renewable energy sources on King Island?
 - Why is important to have a diesel back up system?
 - Why do you think biodiesel has been utilised at the King Island power station?
 - Why is battery storage so important for the King Island power station?

3. King Island real time energy dashboard.

- Referring to the Success stories: King Island website, www.hydro.com.au/clean-energy/hybrid-energy-solutions/success-stories/king-island, have students locate the King Island real time energy dashboard.

Real time energy dashboard



- Ask students to monitor the energy dashboard for a period of a week.
- Monitoring should occur:
 - i. In the morning when people are getting up to go to work and school.
 - ii. In the middle of the day – compare weekends with weekdays.
 - iii. At the end of the day around tea time.
- Record which energy source contributes the most power for each period of the day.

- Note the weather on King Island by referring to the Australian Government Bureau of Meteorology (BOM) website www.bom.gov.au and compare that with the energy source on the day. What does that indicate about the reliability of only one source of renewable energy?
- Consider: If you were living on King Island, would you find the energy dashboard a useful tool?

Options for assessment and extension

Option 1	
<p>LEARNING AREA –</p> <p>Science</p> <p>Content Description</p> <p>Scientific knowledge is used to solve problems and inform personal and community decisions</p> <p>ACSHE098</p>	<p>Research the Flinders Island Energy Hub and make comparisons with King Island. Prepare a pictorial poster highlighting the differences.</p>
Option 2	
<p>LEARNING AREA –</p> <p>HASS</p> <p>Questioning: Develop appropriate questions to guide an enquiry about people, events, developments, places, systems and challenges.</p> <p>ACHASS122</p>	<p>Watch media coverage on the Flinders Island communities’ response to the introduction of renewable energy.</p> <p>ABC News, Flinders Island is moving to renewable energies, www.abc.net.au/news/2017-11-05/flinders-island-is-moving-to-renewable-energies/9112898</p> <ul style="list-style-type: none"> • Australian Renewable Energy Agency https://arena.gov.au/projects/flinders-island-hybrid-energy-hub/ <p>What was the communities’ reaction? Invite the Hydro Tasmania Production Manager on Flinders Island to contact your classroom for a discussion.</p>

Elaborate and Review

As a class group:

Discuss the advantages and disadvantages of renewable energy sources. Compare your responses with your earlier discussion. Determine the benefits of not relying 100% on diesel fuel to produce electricity.

Comparison of two renewable energy solutions.

1. Compare the King Island renewable energy integration project with the Flinders Island Hybrid Energy Hub.
 - Identify the differences between them (Flinders Island is containerised, modern rows of solar panels).
 - How much energy does each system produce?
 - What percentage can residents expect to rely solely on renewable power on each island?
 - What impact do the renewable energy solutions have on power reliability (blackouts)?

Community response to renewable energy solution.

1. Two videos are provided, one by ABC news, the other on Hydro Tasmania's website.
 - Watch both videos and identify what comments the general public make about the new energy source.
 - Do you think tourists will find a renewable energy source more acceptable than diesel? Why?
 - Why would a renewable energy supply be more appealing for residents? (Reliable power supply, low emissions (pollution), good for the image of a pristine island, long term solution, attracts more people to live on the island, good for the economy, offers a great lifestyle)