

Solar Power in Tokelau

by Iona McNaughton

Junior Journal 57
Level 2

This text is levelled at Gold 2



Overview

This report highlights the world-first achievement of Tokelau in using renewable energy sources (solar energy and coconut oil) for all its electricity. It explains why Tokelau decided to switch from using fossil fuels and includes comments from a Tokelau family that illustrate the impact of the change. This article builds on ideas about renewable energy introduced in “Power from the Sun” and the poem “Borrower” in this journal.

A PDF of this text and an audio version as an MP3 file are available at www.juniorjournal.tki.org.nz

The text requires students to “confidently use a range of processing and comprehension strategies to make meaning from and think critically about” text (from *The Literacy Learning Progressions*, page 14).

You can find further information about the science content in this article in Building Science Concepts Book 20: *Our Star, the Sun* (Levels 1–2), Book 29: *Solar Energy* (Levels 2–4), and at [Science Online: What do my students need to learn?](#)

Related texts

Other texts about solar power or other forms of electric power: “Power from the Sun” and “Borrower” (a poem, both in JJ 57); “Heat It Up” (*Connected L2 2015*: a text about making a simple solar oven)

Other texts about the sun: “Cool Facts about a Hot Place” (SJ L2 Oct 2015)

Other texts featuring Pacific contexts: *White Sunday in Sāmoa* (Ready to Read, Turquoise); *A Quilt For Kiri* and *That's the Way!* (Ready to Read, Purple); *A Gift for Aunty Ngā* (Ready to Read, Gold)

Text characteristics

“Solar Power in Tokelau” includes the following features that help develop the reading behaviours expected at Gold.

The structure of the text as a report with an introduction, a series of main points (including an example of a family using solar power in Tokelau), and a conclusion

A mix of explicit and implicit content within text and visual language features that requires students to make connections between information in the text and their prior knowledge to ask questions, track information, and identify main ideas

Solar Power in Tokelau
by Iona McNaughton

Tokelau is a very small and very sunny country in the middle of the Pacific Ocean. Tokelau is also a very special country because it uses only renewable energy. It gets nearly all of its electricity from the sun.

Atafu Atoll

Nukunono Atoll

Fakaofa Atoll

Tokelau

New Zealand

Visual language features such as headings, photographs, captions, a map (with power station locations marked), a numbered list, text boxes, and words in bold print linked to a glossary

Ideas and information organised in paragraphs

Some information that may be unfamiliar

Some vocabulary that may be unfamiliar, including subject-specific vocabulary and some proper nouns, the meaning of which is supported by the context, the sentence structure, the visual language features, and/or definitions or explanations

A variety of sentence structures so that students are required to notice and use linking words and phrases (for example, “also”, “because”, “to”, “but”, “as”, “like”, “which can”, “But if”, “that”, “such as”) and punctuation to clarify the links between ideas



The Literacy Learning Progressions



Reading standard: after three years at school

The above spread:

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Teacher support material for “Solar Power in Tokelau”, Junior Journal 57

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English (Reading)

Level 2 – Ideas: Show some understanding of ideas within, across, and beyond texts.

Level 2 – Processes and strategies: Selects and reads texts for enjoyment and personal fulfilment.

Science

Levels 1 and 2 – Planet Earth and beyond: Interacting systems: Describe how natural features are changed and resources affected by natural events and human actions.

Technology Level 2

Level 2 – Nature of Technology: Characteristics of technology: Understand that technology both reflects and changes society and the environment and increases people's capability.

Select from and adapt the suggestions below according to your students' strengths, needs, and experiences – their culture, language, and identity (*Reading and Writing Standards for Years 1–8, Knowledge of the Learner*, page 6).

Possible reading purpose

(*What can the students expect to find out or think about as a result of reading this text?*)

- To find out about solar power in Tokelau
- To find out more about renewable energy and why it is important

Possible learning goals

(*What opportunities does this text provide for students to learn more about how to “read, respond to, and think critically” about texts?*)

This text provides opportunities for students, over several readings, to:

- **make connections** between the information in the article and their prior knowledge to **make inferences**
- **ask questions** and look for or think about possible answers
- **summarise** information
- **identify and discuss main ideas**
- **monitor** their own reading and when something is unclear, take action to solve the problem, for example, by rereading a sentence or looking for clues close by.



The New Zealand Curriculum



The Literacy Learning Progressions

Text and language features**Possible supporting strategies**

(Use these suggestions before, during, or after reading in response to students' needs.)

Vocabulary

Possibly unfamiliar words and phrases, including noun phrases:

- “Pacific Ocean”, “renewable energy”, “electricity”, “atolls”, “power station”, “engineers”, “diesel”, “fossil fuel”, “environment”, “produces”, “poisonous gases”, “supply”, “reliable”, “air conditioning”, “provides”, “natural gas”, “Scientists”, “believe”, “underground”, “solar panels”, “huge batteries”, “kilikiti”
- Pacific proper nouns: “Tokelau”, “Atafu”, “Nukunonu”, “Fakaofo”, “Hilivelio”
- Commonly used words with more than one meaning, for example, “ring”, “plant”, “mine”

Prompt the students to remember the strategies they can use, often in combination, for example:

- when **decoding**:
 - recognising words, word chunks, or syllables within a word (for example, “re-new-able”, “at-all”, “fos-sil”, “poi-son-ous”, “en-vi-ron-ment”, “pro-vides”)
 - using their knowledge of vowel sounds in Pacific languages
 - drawing on their knowledge of variations in the sounds of some letters and letter combinations (for example, “Pacific”, “Ocean”; “energy”, “engineers”, “huge”; “diesel”, “believe”) and that some letters may be silent (“Scientists”)
 - using context and sentence structure to confirm decoding attempts
- when **working out word meanings**:
 - using the context of the sentence and the paragraph and making connections to their prior knowledge
 - looking for supporting information, such as text boxes, explanations, photographs, or illustrations
 - reading on to look for further information, including looking at the next word or words to help clarify a noun phrase.

Have a dictionary available for students to confirm or clarify word meanings, but remind them that they can make a best attempt at a word and come back to it later.

Readers are able to use strategies for working out unfamiliar words only when they know most of the vocabulary in the text. For English language learners who need support with vocabulary, introduce and practise selected items before reading.



Sounds and Words

Introducing the text

A short video on the importance of introducing the text is available at <https://vimeo.com/142446572>

Before introducing this text to your students, you could listen to the audio file to familiarise yourself with the pronunciation of the Tokelau vocabulary.

Use your knowledge of your students to ensure that your introduction to the text is effective in activating their prior knowledge and providing appropriate support for a successful first reading. These suggestions assume that the students will have some background knowledge from reading “Power from the Sun”.

- Read the title. Encourage the students to share any knowledge about Tokelau or other Pacific Islands. Then read page 10 together. Ask the students to recall what they know about solar power (including knowledge gained from reading “Power from the Sun”) and to speculate about why the sun might be an important source of energy for Tokelau.
- You could brainstorm a list of key words that the students might expect to see in this article.

- You could also read and discuss page 11 together. This page introduces geographical information that may be unfamiliar. Clarify how the images move from a long-range view to a closer view of the atolls.

 Either now or after the reading, the students could use Google Maps or Google Earth to see where Tokelau is in relation to New Zealand and to zoom in on the three atolls and locate the power stations.

- Browse through the article, using the headings and photographs to predict what the students will find out in each section. Record any questions (and new key words) that arise from the discussion.
- Share the reading purpose. The students could come up with one question of their own to think about as they read.
- Provide sticky notes for the students to mark information that answers any of their questions or aspects they might want to return to.

Reading and discussing the text

Suggestions for ways that you can support the students to achieve the learning goals are in the right-hand column of the table below. **Select from and adapt** the suggestions according to your students’ needs.

Encourage the students to read the text by themselves, intervening only if it’s clear a student needs help. Much of the processing that they do is “inside their heads” and may not be obvious until the discussion after the reading. There will be many opportunities to provide support with word-solving and comprehension on subsequent readings.

Student behaviours

Examples of behaviours that will help the students achieve their learning goal(s).

Deliberate acts of teaching

Examples of how you can support individual students (if needed).

The first reading

- | Student behaviours | Deliberate acts of teaching |
|--|---|
| <ul style="list-style-type: none">• The students keep the reading purpose (and any specific questions) in mind as they read. They note aspects that seem relevant or are of particular interest to come back to. | <ul style="list-style-type: none">• Remind the students of their purpose for reading and that they can note things they want to come back to or investigate further. |
| <ul style="list-style-type: none">• The students use key words and visual language features to help track the sequence of ideas, for example:<ul style="list-style-type: none">– They use the headings to clarify the focus of each section.– They use key words and phrases such as “fossil fuel”, “coconut oil”, and “renewable” to help track connections between ideas.– They use visual language features (such as the numbered list on page 12, text boxes, and photo captions) to find further information. | <ul style="list-style-type: none">• Prompt the students to use the headings to guide their reading and to look out for key words as an indication of important information.• Remind them of the function of text boxes (on pages 12 and 13) and the glossary to provide further information. |
| <ul style="list-style-type: none">• The students notice and mark information that helps to answer their questions or that generates new questions. | <ul style="list-style-type: none">• Remind the students that asking themselves questions is a good way of thinking more deeply about the article (and that these can be followed up later). |
| <ul style="list-style-type: none">• The students demonstrate self-monitoring and problem solving, for example:<ul style="list-style-type: none">– They use the glossary to clarify the meaning of words in bold print.– On page 12, they look for clues (such as “the power would often stop”) to build their understanding of why diesel was “not reliable”.– They infer in the caption “Natural gas plant” that the word “plant” is being used with a less common meaning.– They use the word “playing” to help infer what “kilikiti” is (if they don’t already know).– They mark aspects that may be unclear or of particular interest. | <ul style="list-style-type: none">• Remind the students to think about the strategies they can use when meaning is unclear, such as rereading, reading on, using the glossary, and looking for supporting information in the visual language features. |
| <ul style="list-style-type: none">• As the students finish reading, they scan back through the text to think about aspects they have marked and what they have found out. | <ul style="list-style-type: none">• As they finish, ask the students to think about the reading purpose and any questions they had before or during their reading. |

Discussing the text

You can revisit this article several times, providing opportunities for the students to build comprehension, vocabulary, and fluency.

Select from and adapt the following suggestions. Many of them can also be “After reading” activities.

DIGITAL TOOLS  You may find it helpful to project the PDF of the report so that you can zoom in on relevant sections.

- The students share their initial responses to the information in the article.
- The students share any answers they have found to their questions, questions they still have, and/or new questions they thought of as they read the article.
- The students make connections between their prior knowledge and information in the article to make inferences, for example:
 - They infer on page 12, that Tokelau does not have any fossil fuels of its own because diesel had to be delivered by ship.
 - They make a connection between the page 12 information about coconut oil and the phrase “nearly all” on page 10 to infer that coconut oil is how Tokelau gets the rest of its electricity.
 - They use their knowledge from reading “Power from the Sun” to infer the greater capacity of the power stations (shown in the “array” of panels on page 14) compared with that of the panels at Bayswater School.
 - On pages 15 and 17, they make connections to their own lives to infer why having reliable access to the internet is important for Hilivelio and his family.
- With support, the students identify what each section of the report is mostly about and why the section is important to the article (the purpose of each section).
- The students make connections between the items in this *Junior Journal* and their prior knowledge (for example, of environmental issues or of other forms of electric power) to consider the ideas about renewable energy that seem most important.
- Remind the students of the reading purpose and ask them to think, pair, and share one thing they found out about solar power in Tokelau.
- Discuss any answers the students have found to their questions. *What helped you find the information?* Use one as an example, tracking information on a projected copy of the text.
- Remind them that reading non-fiction often leads on to asking (and researching) further questions. Discuss ways of finding answers to questions that are not answered in the article, for example, about the process of getting power from coconut oil, or about mining fossil fuels. The students could follow up on this as an “After reading” activity.
- Encourage the students to notice connections to things they already know (for example, about solar power, other energy sources, or their own experiences of using electricity) to help them better understand the information in the article and its implications.
- Ask questions to prompt their thinking:
 - *Why is solar energy such a good option for Tokelau?*
 - *What have you found out about why solar power is important to the people of Tokelau?*
- Prompt the students to draw on their knowledge of the structure of a report (an introduction, a series of main points, and a conclusion) and use the headings and/or lead sentences to identify the purpose of each section. For example, the title introduces the topic and pages 10–11 provide background information about Tokelau; the text on page 12 answers the question in the heading; the text boxes on pages 12 and 13 provide supporting information; page 14 describes the new power stations, and the information about Hilivelio helps to show what the change to solar power means for the people of Tokelau.
- Focus on main ideas: *As well as telling us about solar power in Tokelau, this article has told us quite a bit about different forms of energy.* Ask questions to encourage students to think critically about renewable energy, drawing on their prior knowledge, as well as information from this article and “Power from the Sun” and/or the poem “Borrower”. For example: *What does the author want us to think about renewable energy? Why do countries use energy that is not renewable?*

How you can support your students to be metacognitive

Here are some ways you can build students’ awareness of the processes and strategies they are using as they make meaning and think critically.

With support, the students reflect on their learning.

- The students talk with a partner about words, phrases, or ideas they found challenging and how they worked them out (or tried to).
- The students describe an example of how information in a text box helped their understanding, for example, of how coconuts can provide a form of renewable energy.

Remind the students of the reading purpose and learning goal(s).

- Ask the students to identify a challenge they had when reading and how they solved or attempted to solve it, for example, *How did you work out the meaning of “kilikiti”?*
- *How did the text boxes help you to understand information?*

After reading: Practice and reinforcement

After-reading tasks should arise from your monitoring of the students' needs during the lesson and provide purposeful practice and reinforcement. Where possible, make links to other texts, including texts generated by the students, and to the wider literacy programme (oral language, writing, handwriting, word games and activities) and other curriculum areas.

- Provide opportunities for students to reread this article and to read and discuss other texts with similar themes or topics (see Related texts).
- They could reread the article as they listen to the audio version. Audio versions also provide English language learners with good models of pronunciation, intonation, and expression.
- Provide opportunities for the students to find out more about forms of renewable energy or to investigate questions they still have. They might use <https://natlib.govt.nz/schools/topics/58e18a67fb002c192a000533/electricity>
- The students could talk with their families about the sources of power they use at home. The focus in the two *Junior Journal* articles is on electric power, but the students could also find out about other sources of energy that people use.
- To provide practice in identifying specific information (an important aspect of summarising), have the students work in pairs to sort the following statements under the appropriate headings. The discussion between students provides opportunities to clarify their understanding.

Life before renewable energy in Tokelau	Things that haven't changed	Life with renewable energy in Tokelau

Statements to sort

There is power twenty-four hours a day.	The power stops a lot.
Tokelau spends a lot of money buying diesel.	Electricity is stored in huge batteries.
Solar power is good for the environment.	Hilivelio can talk to his grandparents on the internet whenever he wants.
Diesel produces poisonous gases.	Everyone is proud.
Tokelau is a very sunny country.	Tokelau makes all its electricity from renewable energy.
There is one power station on each atoll.	Hilivelio plays kilikiti, goes fishing, goes swimming, and feeds pigs.
Tokelau has a lot of coconut trees.	Tokelau is in the middle of the Pacific Ocean.
Tokelau burns diesel to make electricity.	Sometimes people can't cook meals or cool their houses.
Tokelau has all the electricity it needs.	

Alternatively, the students could work in pairs to think critically about statements based on ideas in the text. Ask the pairs of students to decide if they agree or disagree with each statement, referring to evidence in the article (including visual language features).

	Agree	Disagree	Evidence on page ...
Tokelau is a very large country.		X	Page 2 – Tokelau is a very small country
Electricity can be made from coconut trees.			
People who live in Tokelau don't need to use the internet.			
Fossil fuels will run out one day.			
Electricity can be stored until it is needed.			
If you use solar power, you will have electricity only when the sun is shining.			
Tokelau is the first country to use only renewable energy.			

- Have the students work with a partner to identify five or six new topic words or phrases (or familiar words such as “plant” or “mine” that are used in unfamiliar ways) from the article to create their own glossary. To support the students in clarifying the meanings, they could look for contextual clues in the article, refer to a dictionary (print or online), ask an expert, or use an appropriate information website such as <https://anyquestions.govt.nz>