

6 Energy

This chapter lists the questions about energy that we would like addressed. We present a summary of the analysis of the official data that addresses those questions. We then outline the initiatives that have been identified to address our energy information needs.

New Zealand's environment and economy interact through many obvious links. One such link is energy – or more specifically – the supply, distribution, and use of energy.

This link functions as follows – energy is sourced from the environment through different forms, both renewable and non-renewable. This energy is then distributed to the economy – typically as electricity – to supply the needs of industries, businesses, and households.

Renewable energy plays an important role in New Zealand's energy supply system, as described in the [New Zealand Energy Strategy](#). Concern about climate change and limits on fossil fuel reserves is driving the development and uptake of even more renewable energy technologies to generate electricity, provide heating, and power our vehicles (Energy Efficiency and Conservation Authority, 2013).

Energy questions

This section presents the enduring questions and the supplementary enduring questions on energy.

Enduring question

What is the environmental impact of New Zealand's generation, distribution, and use of energy, and to what extent are renewable options taken?

Supplementary enduring questions

A. What and where are New Zealand's current energy resources and what is the potential for future exploitation and development?

B. What and where is the environmental impact of energy¹ generation², distribution, and use in New Zealand?

C. What and where is the environmental impact through the life cycle³ of renewable energy generation, and which types of renewable energy best support New Zealand's sustainable development?

D. To what extent are energy conservation and energy efficiency options being taken, and where and how are these affecting the demand for energy?

E. What and where are the environmental-cultural risks and impact of energy generation, distribution, and use, for Māori, and how can they be minimised?

F. What and where is environmental protection effort⁴ being done to address the environmental impact of energy generation, distribution, and use?

Notes

1. Both non-renewable (includes, but is not limited to, coal, gas, and oil) and renewable (includes, but is not limited to, hydro, geothermal, wind, biogas, solar, tidal, and wave) resources.
2. Generation refers to extracting and capturing resources for productive use.
3. The life cycle covers the cumulative environmental impact of building power generation capacity, and maintaining, running, and decommissioning plant and equipment.
4. Environmental protection effort includes remediating environmental damage, resource management, expenditure, areas protected under regulation and legislation, damage avoidance, research, and minimising natural hazards.

Gap analysis

Table 12 summarises how well official information (including Crown research institute data) informs the supplementary enduring questions on energy. See appendix 3 for details of the analysis process.

Table 12**How well official data informs supplementary enduring questions on energy**

Supplementary enduring question (SEQ)	Question topic	Level at which official data informs SEQ
A	Current and potential resources	Medium
B	Environmental impacts of energy	Low
C	Life cycle and sustainable development	Low
D	Energy conservation and efficiency	Medium
E	Risks to Māori	Low
F	Environmental protection effort	Low

We scored three data sources highly for informing the supplementary enduring questions:

- Energy efficiency and renewable energy monitoring process
- New Zealand's greenhouse gas inventory
- Energy statistics (produced by the Ministry of Business, Innovation and Employment).

Energy initiatives

This section presents the energy initiatives by priority and a discussion of each in detail.

EN1 Establish baseline knowledge of energy supply and environmental impacts

This is one of the top-rated initiatives for the energy topic. It aims to gather baseline data on energy supply and subsequent environmental impacts. Baseline knowledge is important for understanding energy and its relationship to the environment and economy.

Baseline parameters may include:

- fuel prices
- discretionary income
- land use
- water quantity and quality
- air quality.

EN2 Conduct research into distributed energy generation

Assess the current state and potential for distributed energy generation in New Zealand.

Distributed generation or small-scale distributed energy production systems could play an important role in the primary production sector, which is a key contributor to New Zealand's economy. These systems can be a more reliable supply for users, and potentially avoids various costs. Currently, benefits are for users only; however, this initiative may also benefit the whole country after an increase in the use of micro-energy production.

Part of this initiative may be the need to assess the costs of distributed generation. We may need to consider the costs on infrastructure from widespread distributed generation as well as those from electricity suppliers that need to be factored in. In the short term, high costs are likely and benefits may not be clear.

We need to explore the potential for distributed generation and if it will likely happen. Currently, distributed generation is complex to set up. There are small-scale energy sources in operation in New Zealand (eg in agriculture), but many rules and regulations in place for those wanting to invest in distributed generation.

Beyond farming, there is also a potential for distributed generation for homes and other sectors.

The Electricity Authority, Energy Efficiency and Conservation Authority, and Crown research institutes would work with industry to assess the potential for developing and exploiting distributed generation. Electricity Authority has already undertaken work on exploring the regulatory setup for distributed generation.

EN3 Explore underlying resource data

Collate, analyse, and map the underlying resource data for both renewable and non-renewable energy sources. Doing this would ensure long-term risks to the resources (such as security of supply) can be evaluated. Data on energy sources would be made publicly available.

Energy sources include, but are not limited to:

- hydro
- wind
- solar
- wave
- geothermal
- petroleum
- gas hydrates
- biomass.

EN4 Quantify environmental impacts

Establish what environmental factors are needed to define the environmental impacts of energy production, use, and generation. To do this, we need to determine a method to quantify the environmental impacts. Understanding the direct link of energy production, use, and generation to environmental impacts will help determine future best practices. This initiative could be done as a research project with funding from industries or Crown research institutes, extending work already under way.

EN5 Collate regional energy datasets

Combine regional energy datasets so they are easily accessible at a national level. A centralised regional consent database would be created to store this information. It will provide good information on such parameters as:

- environmental protection expenditure
- resource consents
- mitigation
- transport by mode.

Some standardisation may be required as regional data is often not comparable.

This database could be funded by the central government.

EN6 Collate consents information

Collate information on consents applied for, granted, and built (for both renewable and non-renewable energy) under the Resource Management Act 1991. This will provide national oversight and may be useful for assessing impacts.

The database could possibly be administered by the Ministry for the Environment or the Environmental Protection Authority.

Initiative MR4, compile regional council data, from the mineral resources topic is linked to this initiative.

EN7 Undertake survey of iwi organisations

Conduct a survey to capture information around both iwi activity and perceptions on energy. Information from the survey may help working relationships between different organisations. Survey questions could include topics such as energy concerns for iwi or what resources iwi organisations use. The Energy Efficiency and Conservation Authority and Te Puni Kokiri would be candidates for leading this work.

EN8 Expand externalities of energy data

Add requirements to current energy reporting. The additional data may include transport data and volume for getting fuel products to users.

Much of the desired information will be available from regional councils as part of consents and consent-monitoring frameworks. This links to initiative EN6, collate consents information, which may be a more efficient way of collecting that information.

The Ministry of Business, Innovation, and Employment; Electricity Authority; Ministry of Transport; Ministry for the Environment; Environmental Protection Authority; and the Gas Industry Company may carry out this initiative.

EN9 Expand research on climate change impacts

Investigate climate change impacts further. The impacts of climate change on energy generation, production, security, and use are not always obvious. Research to explore

these impacts in more detail will be useful in a wider environmental context. This research could be commissioned by a central government agency or as part of core funding for the Crown research institutes.

EN10 Influence consumer behaviour

Conduct a survey or social science research to know the public's view of energy and associated impacts. By measuring this, it may be possible to influence the public's behaviour around energy use and so reduce environmental impacts. The Energy Efficiency and Conservation Authority would be involved in this initiative and the Ministry of Business, Innovation and Employment supports research in this area.

EN11 Measure policy effectiveness

Measure the effectiveness of regional and national renewable energy policy. This initiative could be linked to the National Monitoring and Review Project, currently undertaken by the Ministry for the Environment.

EN12 Introduce cultural values census question

This initiative suggests Statistics NZ include a cultural values question to the Census of Population and Dwellings. The question will relate to cultural values on using resources. It will be targeted to Māori and broad ethnic groups.

EN13 Identify best energy practice for quantifying environmental impacts

Identify best energy practice for quantifying environmental impacts. This will build on the existing energy awards process currently run by the Energy Efficiency and Conservation Authority. This initiative is linked to initiative EN4, quantify environmental impacts.

EN14 Improve environment domain plan process

For future environment domain plans, this initiative seeks to improve consultation around gathering data for the stocktake and for engaging experts in the process.

Energy initiatives table

Table 13 lists the energy initiatives by priority, estimates of their complexity, and the supplementary enduring questions they address.

Table 13

Energy initiatives by priority, complexity, and supplementary enduring question (SEQ) addressed

Initiative number	Initiative name	Priority	Complexity	Helps inform which SEQ
EN1	Establish baseline knowledge of energy supply and environmental impacts	1=	Highly complex	All
EN2	Conduct research into distributed energy generation	1=	Complex	A
EN3	Explore underlying resource data	1=	Complex	All
EN4	Quantify environmental impacts	1=	Highly complex	B, C, E
EN5	Collate regional energy datasets	5	Complex	All
EN6	Collate consents information	6	Moderate	A, B, C, E
EN7	Survey iwi organisations	7=	Moderate	E
EN8	Expand externalities of energy data	7=	Moderate	All
EN9	Expand research on climate change impacts	7=	Highly complex	D
EN10	Influence consumer behaviour	10=	Moderate	D, F
EN11	Measure policy effectiveness	10=	Complex	All
EN12	Introduce cultural values census question	12=	Moderate	E
EN13	Identify best energy practice	12=	Moderate	D
EN14	Improve environment domain plan process	12=	Moderate	All