

NEW ZEALAND'S REGULATORY AND PLANNING FRAMEWORK FOR CONVENTIONAL GEOTHERMAL RESOURCE USE

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ABSTRACT

In New Zealand, geothermal resources are treated as water resources, and their use is predominantly governed by broad environmental resource management legislation. Geothermal use and development projects are authorised by resource consents under the Resource Management Act by regional and district councils. Projects of this nature must also navigate a complex framework of interconnected legislation with implications at national, regional and district levels through policy documents and plans.

This paper summarises the current regulatory and planning frameworks that apply to the development and use of conventional geothermal resources in New Zealand. This review was undertaken to inform studies on the suitability of the existing planning framework for managing the potential future use of supercritical geothermal resources.

1. INTRODUCTION

A review of the planning and regulatory framework relating to the existing development and use of conventional geothermal resources in New Zealand has recently been completed (Kissick et al., 2020). This review was undertaken as a task in the 'Geothermal: The Next Generation' research programme (Chambefore, et al., 2019; GNS Science, 2020).

The review was undertaken to inform further research work, which will focus on future potential development and use of hotter, deeper supercritical geothermal resources, and the determination of an optimal planning framework to enable this development, while achieving sustainable resource management requirements.

In itself, the review of the planning and regulatory frameworks is a valuable resource for anyone in New Zealand seeking to navigate the interconnected framework of legislation, national, regional and district policies, plans and standards. This paper is a very brief summary of that review document, written from a planning and regulatory perspective and does not constitute legal advice. Interested parties are encouraged to read the full report (i.e. Kissick et al, 2020).

Authors Note: To avoid excessive citations, standard scientific referencing has not been undertaken throughout the body of this paper for all Acts, Policies, Plans and Standards mentioned. However, the [References Section](#) contains a comprehensive list and access information for each document referenced in this paper.

1.1 Geothermal Resources

For the purpose of this review, 'conventional' geothermal resources are those fluids found at well depths down to ~3.5 km and with reservoir temperatures <350°C. Supercritical geothermal fluids occur at depths beyond 5 km, and are expected to provide temperatures in excess of 400°C.

New Zealand's most abundant zone of geothermal activity, the Taupo Volcanic Zone (TVZ), is located in the central North Island and contains over twenty geothermal fields (Figure 1). Off-shore, this geothermally active region extends to the north-east of the TVZ along the sea bed in the Kermadec-Tonga trench, with volcanism found in and near the trench. There is also a high temperature geothermal field located in the Northland Region, at Ngāwhā (Figure 1).

The planning framework review focused on the three regions where large scale geothermal development has occurred (Bay of Plenty, Waikato and Northland; Figure 1),.

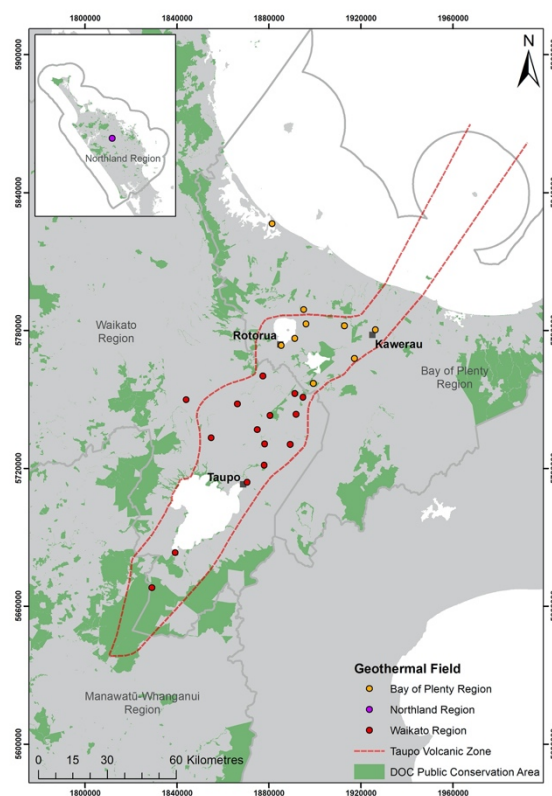


Figure 1: Extensively developed geothermal areas in Central and Northern North Island, including regional council boundaries and the Public Conservation Estate

2. STATUTORY OVERVIEW

The primary legislation for the use and development of resources in New Zealand, including geothermal resources, is the Resource Management Act (1991). In addition, there are a number of other relevant pieces of legislation which also apply to the development and use of geothermal resources.

2.1 Resource Management

New Zealand has four primary Acts which provide environmental resource management direction to the use and development of geothermal resources, depending on the location of the resource being developed (Figure 2):

1. Resource Management Act (1991)
2. Marine and Coastal Area (Takutai Moana) Act (2011)
3. Conservation Act (1987)
4. Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act (2012)

The statutory framework that applies varies spatially, depending on whether the project is on land, in the coastal marine area (within 12 nautical miles of high tide) or beyond this, within New Zealand's Exclusive Economic Zone.

2.2 Treaty of Waitangi (Te Tiriti o Waitangi)

The Treaty of Waitangi is overarching direction, which is reflected through each piece of legislation (Figure 2).

Specific references to the Treaty include:

- Resource Management Act 1991 (RMA) – Section 8
- Conservation Act – Section 4
- Marine and Coastal Area (Takutai Moana) Act – Section 7

- Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 - Section 12.

2.3 Climate, Energy & Minerals

A number of other pieces of legislation are also relevant to the use of geothermal resources including:

1. Energy Efficiency and Conservation Act (2000)
2. Climate Change Response Act (2002)
3. Rotorua City Geothermal Energy Empowering Act (1967)
4. Crown Minerals Act (1991)

3. RESOURCE MANAGEMENT ACT (1991)

The RMA is the overarching legislation for the management of effects on the environment, with the concepts of sustainable management, integrated management of resources and public participation at its core. Its purpose is to promote the sustainable management of natural and physical resources. The RMA superseded a range of previous pieces of legislation relevant to geothermal resource use and development.

The RMA requires that no one may take, use, dam or divert water, heat or energy from the material surrounding geothermal water, unless expressly allowed by a national environmental standard, a rule in a regional plan or a resource consent. Provision is made for use in accordance with tikanga Māori for the communal benefit of the tangata whenua of the area where there are no adverse effects on the environment.

The RMA is enacted via a series of national, regional and district-level policy statements, plans, and standards. These 'layers' are discussed further in the following sections. The relationship between these layers is illustrated in Figure 3.

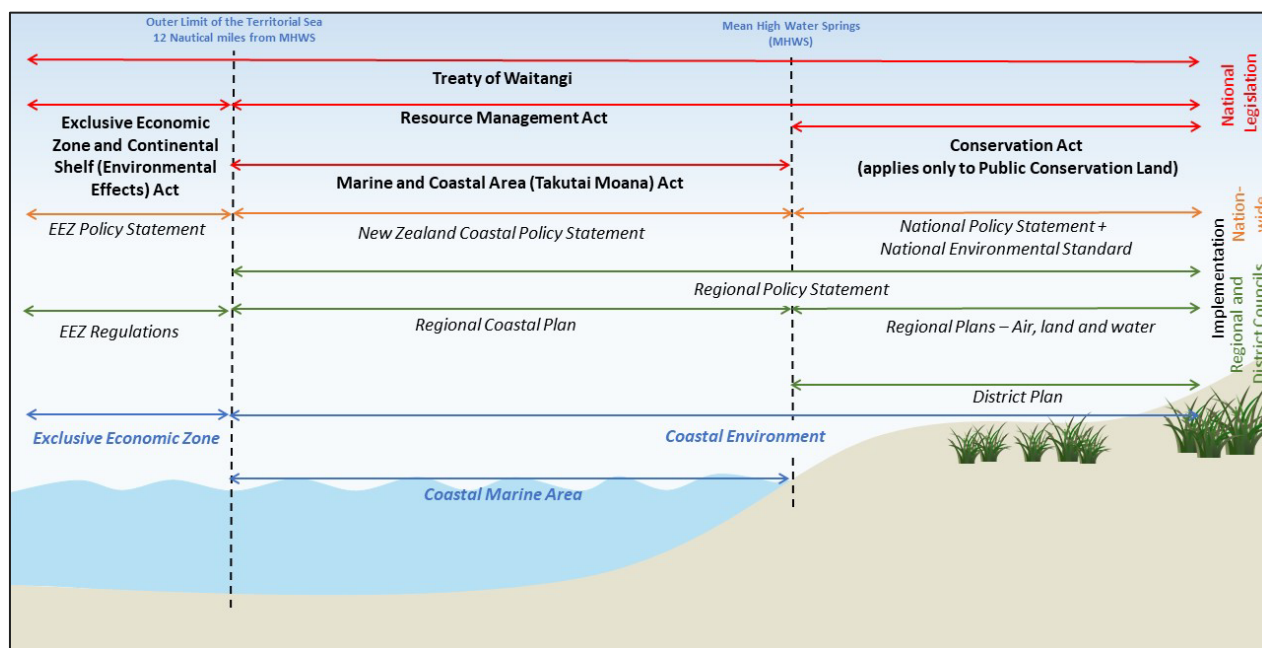


Figure 2: New Zealand's Environmental Statutory Framework

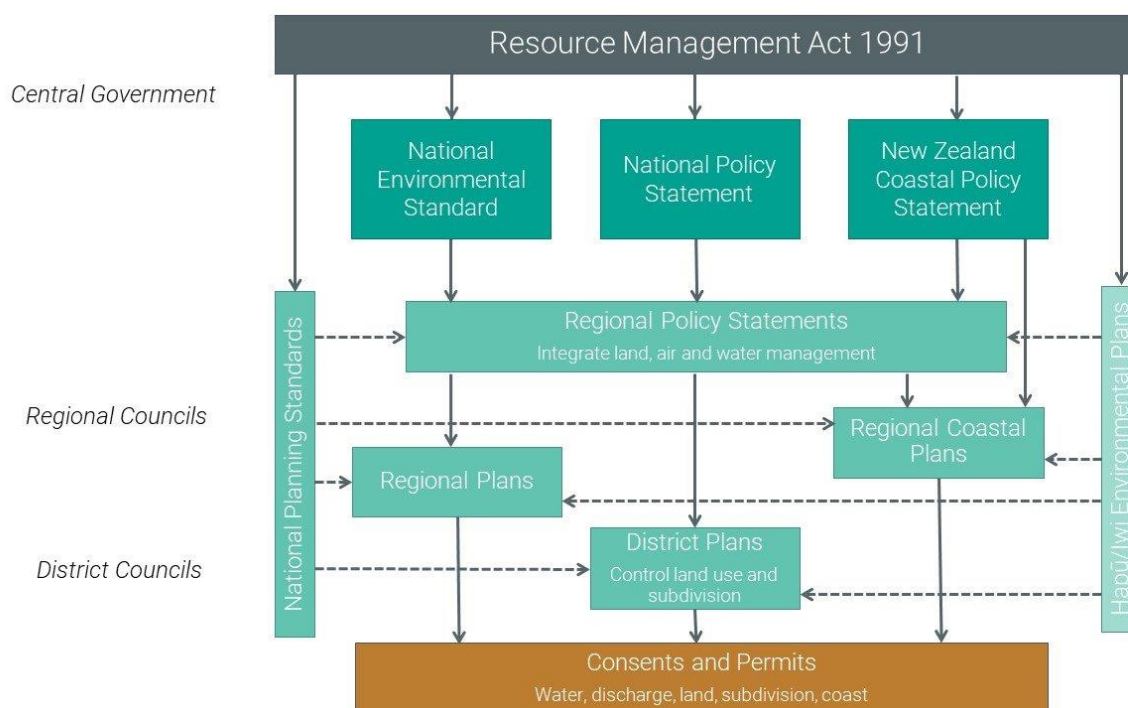


Figure 3: Resource Management Act document hierarchy

3.1 National Level Framework

3.1.1 National Policy Statements

A National Policy Statement (NPS) provides direction to local authorities and other decision-makers under the RMA on matters of national significance relevant to achieving the purpose of the RMA.

Currently New Zealand has NPSs in place for the following environmental matters:

- Urban Development Capacity
- Freshwater Management
- Renewable Electricity Generation
- Electricity Transmission
- New Zealand Coastal Policy Statement

There is also a proposed NPS for Indigenous Biodiversity, which the government is currently consulting on and a decision is likely sometime in 2020. This proposed NPS has been in development since 2007.

The NPS most relevant to current geothermal resource use and development is the National Policy Statement for Renewable Electricity Generation (2011) (NPSREG). This NPS provides national consistency in addressing competing values (environmental, cultural, economic) associated with the development of renewable energy resources, to provide greater certainty to decision makers, applicants and the wider community.

The objective of the NPSREG is to ensure the proportion of New Zealand's electricity generated from renewable energy sources increases to a level that meets or exceeds the New Zealand Government's national target for renewable electricity generation.

The NESREG contains specific requirements in relation to geothermal resources and requirements that Regional Policy Statements, together with regional and district plans, include rules to provide for the development, operation, maintenance and upgrading of new and existing electricity generation activities using geothermal resources to the extent applicable to the region or district.

3.1.2 National Environmental Standards

National Environmental Standards (NES) prescribe standards for environmental matters set by the Government to ensure a consistent standard for an activity or resource use.

Currently New Zealand has national environmental standards for the following environmental matters:

- air quality;
- sources of drinking water;
- telecommunication facilities;
- electricity transmission activities;
- assessing and managing contaminants in soil to protect human health; and
- plantation forestry.

None of the existing NES have a direct relationship to the use and development of geothermal resources.

3.1.3 National Planning Standards

National Planning Standards were introduced in November 2019 to improve the consistency of council plans and policy statements, through standardised document structure, chapters, mapping and formatting as well as definitions.

A first set of national planning standards include direction for councils about how certain matters, including the management and use of geothermal resources, should be included in planning documents. The first set of National

Planning Standards are not yet implemented, but all Councils are required to do so by 2029 at the latest.

3.2 Regional Frameworks

Regional policy statements and plans seek to enact the applicable national frameworks, and apply them in practice. This sub-section gives an overview of the regional and district policy and planning requirements.

Regional Councils overarching role is to achieve the integrated management of natural and physical resources in the region. Regional Councils play a vital role in managing effects on the environment, including the use and development of geothermal resources, through the management of:

- Taking of water including geothermal water
- Taking or use of geothermal energy
- Taking or use of heat or energy from the material surrounding geothermal water
- Discharges of steam, stormwater, contaminated water (containing minerals and chemicals) and cooling water
- Use of land to construct geothermal wells and bores

3.2.1 Regional Policy Statements

Regional Councils are required, by the RMA, to prepare a Regional Policy Statement (RPS) to provide an overview of resource management issues in the region and provide a policy framework to achieve the integrated management of natural and physical resources.

An RPS must contain objectives, policies and non-regulatory methods. An RPS cannot contain rules and must give effect to any National Policy Statement, the New Zealand Coastal Policy Statement, and any National Planning Standard.

3.2.2 Statutory Acknowledgements

A Statutory Acknowledgement is a formal acknowledgement by the Crown that recognises the particular cultural, spiritual, historical and traditional association of iwi with a site of significance or resource identified as a statutory area. Statutory Areas relate to Crown-owned land and include areas of land, geographic features, lakes, rivers, wetlands and coastal marine areas. With respect to lakes, rivers and wetlands, a Statutory Acknowledgement excludes any part of the bed not owned or controlled by the Crown.

The RMA requires that Statutory Acknowledgements be included in relevant regional and district statutory planning documents and that regard is had to them in resource consent decision making. Statutory acknowledgements relevant to current geothermal resources are in place in the Bay of Plenty and Waikato regions. There are no Statutory Acknowledgements at the time of writing relevant to the Northland region as Treaty settlement processes are still underway.

3.2.3 Hapū/Iwi Environmental Management Plans

Hapū/Iwi Environmental Management Plans are a key document to record hapū/iwi aspirations for the environment within their rohe. They provide background understanding

for regional and district authorities in achieving the purposes of the RMA.

Hapū/Iwi Environmental Management Plans record hapū/iwi values and interests in the natural and physical resources in a particular area. They also identify key issues of the hapū/iwi and potential ways to resolve those issues.

The RMA is silent on how Hapū/Iwi Environmental Management Plans are developed. This enables unique structure and content that can be tailored to the specific needs of the hapū/iwi.

3.2.4 Regional Plans

The purpose of a Regional Plan, including a regional coastal plan, is to assist a regional council to carry out its functions in order to achieve the purpose of the RMA. A Regional Coastal Plan is a Regional Plan that applies specifically to the Coastal Marine Area in a region.

A Regional Plan must give effect to any National Policy Statement; New Zealand Coastal Policy Statement; National Planning Standard; and the relevant Regional Policy Statement. A Regional Plan must not be inconsistent with a water conservation order or any other Regional Plan for the region and must take into account Statutory Acknowledgements and Hapū/Iwi Management Plans.

A Regional Plan contains rules, including those relating to maximum or minimum levels or flows or rates of use of water, or minimum standards of water quality or air quality, or ranges of temperature or pressure of geothermal water.

In both the Waikato and Bay of Plenty Regional Plans, geothermal systems are classified into management groups, as a way of directing the type of development allowed within a particular geothermal system. These classifications range from high and limited capacity development systems to systems that are protected from development. Policies and rules in the Regional Plans outline resource consenting requirements under each management group classification. In Northland, the framework in the regional plan for the management of geothermal resources is more limited than in the Waikato or Bay of Plenty. This is likely to be reflective of the more discrete nature of geothermal resources in the region.

3.3 District Frameworks

District Councils' (territorial authorities) role under the RMA is primarily focused on the control of actual and potential effects on the environment from the use and development of land. In relation to geothermal resources, District Councils play a key role in managing the effects of built structures and physical infrastructure, contamination, and protection of significant sites.

District Plans cover issues related to the functions of territorial authorities. District Plans are required to give effect to any National Policy Statement; New Zealand Coastal Policy Statement; National Planning Standard; and Regional Policy Statement. District Plans must not be inconsistent with a Regional Plan and must take into account Hapū/Iwi Environmental Management Plans.

3.4 Resource Consents and Permits

A resource consent is the legal mechanism for allowing an activity to be undertaken that would otherwise contravene a rule in a Regional Plan, District Plan or in a National Environmental Standard.

Where a resource consent is required, the relevant Regional Plan, Regional Coastal Plan, District Plan or NES will direct the status of the activity as a controlled, restricted discretionary, discretionary and non-complying activity. The different activity statuses outline what will be considered when deciding on a resource consent application, and whether the resource consent must, can or cannot be granted. Sometimes (as is often the case of larger scale geothermal development) resource consents will be required under more than one statutory document.

Resource consents may be required at district level under the relevant District Plan or regional level under the relevant Regional Plans depending on the nature of the proposed activity. Once granted, a resource consent may have an expiry date applied to it, after which time the activity must cease or a new application sought to provide for the activity to continue. This is particularly relevant in the case of a permit to take or discharge water or contaminants where the maximum term of any resource consent is 35 years.

Resource consent applications deemed to be of National Significance can be referred directly to a Board of Enquiry or the Environment Court for a Decision.

4. OTHER LEGISLATION

4.1 Other Environmental Legislation

In addition to the RMA, other pieces of environmental legislation are relevant when considering the use and development of geothermal resources.

4.1.1 Conservation Act (1987)

The Conservation Act (1987) provides for the protection of natural and historic resources and promotes the conservation of natural and historic resources for present and future generations. This Act is relevant to land held within the Public Conservation Estate managed by the Department of Conservation (see Figure 1). The Public Conservation Estate includes crown-owned land held in National Parks, forest

parks, conservation areas, conservation parks and marine reserves/sanctuaries.

Statutory documents applicable to the Public Conservation Estate include the following, and their hierarchy is shown in Figure 4.

- Conservation General Policy – reflects the wide range of conservation areas and conservation tasks.
- Conservation Management Strategies – provide an overview of conservation issues and a direction for managing public conservation land in a region.
- Conservation Management Plans – establish detailed objectives for the integrated management of natural and physical resources and a greater role for iwi/hapū/whanau.
- National Park Management Plans – provide National Park-specific management objectives.

The use of geothermal resources within the Public Conservation Estate requires consideration and approval under both the Resource Management Act and the Conservation Act. Authorisations under the Conservation Act, are via concessions (Figure 4), which enable private or commercial activities to occur on conservation lands.

4.1.2 Marine and Coastal Area (Takutai Moana) Act (2011)

While the RMA manages activities in the coastal marine area, the Marine and Coastal Area (Takutai Moana) Act (2011) (MCA) also applies (Figure 2).

The MCA applies between Mean High Water Spring (MHWS) (effectively the high tide line) and the outer limit of the territorial sea, 12 Nautical Miles from MHWS (Figure 2). It excludes existing private titles, the bed of Te Whaanga Lagoon in the Chatham Islands and certain conservation areas.

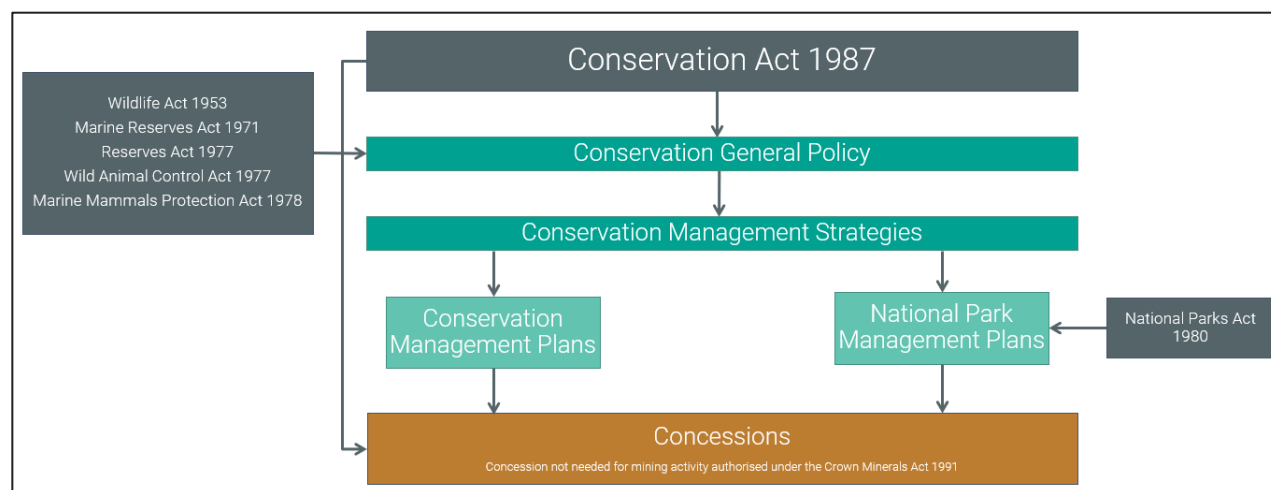


Figure 4: Conservation Act document hierarchy

The MCA creates special rules for people applying for resource consent in areas where there are customary interests, such as protected customary rights and customary marine title. Any resource consent applicant seeking to undertake activities within the coastal marine area will need to consider whether any customary interests exist and where they do, ensure that consultation is undertaken with the relevant group to consider adverse effects on any protected customary rights or marine titles.

There are currently no extractive geothermal activities being undertaken within the area covered by the MCA.

4.1.3 Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act (2012)

The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act (2012) (EEZ Act) applies to the sea, seabed and subsoil between 12 - 200 Nautical miles from MHWS (Figure 2).

An EEZ policy statement may apply to all or part of the EEZ and the continental shelf and provides national direction for decision makers, and is effectively equivalent to a National Policy Statement under the RMA. There are currently no EEZ Policy Statements in place but these could be produced in future.

The Environmental Protection Agency (EPA) is responsible for deciding on applications for marine consents and monitoring and enforcing compliance with the EEZ Act. Where an activity crosses the boundary between the jurisdictions of the RMA and the EEZ Act, there is the option to either apply as a single application under the requirements of both Acts, or to apply for a marine consent and a resource consent separately. This process is administered by the EPA, but separate decisions under the relevant criteria of the EEZ Act and the RMA must be made.

There are currently no extractive geothermal activities being undertaken within the area covered by the EEZ Act, however geothermal resources do exist offshore.

4.2 Climate, Energy & Minerals

Legislation related to climate, energy and minerals are also potentially relevant to the use of geothermal resources.

4.2.1 Energy Efficiency and Conservation Act (2000)

The purpose of the Energy Efficiency and Conservation Act (2000) (EEC Act) is to promote energy efficiency, energy conservation, and the use of renewable sources of energy.

The New Zealand Energy Efficiency and Conservation Strategy 2017-2022 (EECA, 2017) developed under the EEC Act is the overarching policy direction for the promotion of energy efficiency, energy conservation and the use of renewable sources of energy. The goal of the strategy is for New Zealand to have an energy-productive and low-emissions economy.

Three priority areas are:

1. Renewable and efficient use of process heat
2. Efficient and low-emissions transport
3. Innovative and efficient use of electricity

Geothermal activity currently contributes to the outcomes of the EEC Act through the generation of renewable electricity and in the direct use of geothermal heat.

4.2.2 Climate Change Response Act (2002)

The Climate Change Response Act (2002) (CCR Act) puts in place a legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change 1992 (the Convention) and the Kyoto Protocol 1997 (the Protocol).

The CCR Act provides for the implementation and operation of the Emissions Trading Scheme (NZETS) and the establishment of the Climate Change Commission. This Act also requires a greenhouse gas inventory to record and report information relating to New Zealand's human-induced greenhouse gas emissions and reporting on New Zealand's obligations in accordance with international requirements.

In 2019, the CCR Act was amended through the Climate Change Response (Zero Carbon) Amendment Act. These amendments provide a framework for New Zealand's development and implementation of clear and stable climate change policies. These contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels, and allow New Zealand to prepare for, and adapt to, the effects of climate change.

While operational geothermal CO₂ emissions are much lower than fossil fuel plants, users of geothermal fluid are required to participate in the NZETS.

The Climate Change (Stationary Energy and Industrial Processes) Regulations 2009 govern this reporting. The Ministry for the Environment provides a "Guide to reporting for geothermal fluid activities under the New Zealand Emissions Trading Scheme" for people who use geothermal fluid to generate electricity or industrial heat on their requirements under the NZETS.

4.2.3 Rotorua City Geothermal Energy Empowering Act (1967)

This Act enables the Rotorua City Council to supply geothermal energy for the industrial, commercial and domestic use in Rotorua. It provides for the sinking of bores and the take, tap or use of geothermal energy from them and the prospecting for geothermal energy by bore or any other method.

This Act delegates the power to issue licenses and make bylaws for geothermal bores to the Rotorua City Council and any geothermal works under this Act are to be vested in the Corporation of the city.

The requirements of this Act apply in addition to the requirements of the Resource Management Act, as well as Regional and District Policies and Plans.

4.2.4 Crown Minerals Act (1991)

The purpose of the Crown Minerals Act is to promote prospecting for, exploration for, and mining of, Crown-owned minerals for the benefit of New Zealand. Under this Act, the Crown owns all petroleum, gold, silver and uranium resources, as well as all minerals on or under Crown land.

The Crown Minerals Act controls the issuing of minerals programmes which allocate the right to prospect, explore or mine Crown-owned mineral resources. There are separate programmes for petroleum and other minerals which set out policies and procedures for allocating minerals and also include specific requirements for consultation with iwi and hapū.

The extraction of minerals from geothermal fluid can be an ancillary activity to geothermal energy projects. The position of the Crown Minerals Act on these activities has not yet been resolved (Barton, 2015).

5. SUMMARY & NEXT STEPS

In New Zealand, geothermal resources are treated as water resources, and their use is predominantly governed by broad environmental resource management legislation, in particular the Resource Management Act. However, geothermal projects are required to navigate a complex framework of interconnected national, regional and district policy statements and plans and other legislation.

A regulatory and planning frameworks review was undertaken to inform future study on the utility of the existing policy frameworks for managing the potential future use of supercritical geothermal resources.

Supercritical resources offer significant reserves of sustainable, indigenous energy aligned with New Zealand's goal for being "carbon zero" by 2050, but there are many scientific, technical and societal challenges to resolve.

There is an opportunity to identify and design a policy and planning approach which is optimised for the use and development of supercritical resources to ensure the resource is managed in a sustainable and nationally consistent way, while enabling a potentially game-changing contribution to New Zealand's clean energy future.

6. ACKNOWLEDGEMENTS

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The authors thank Nick MacDonald (GNS Science) for his stellar preparation of detailed maps for this study.

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- Climate Change Response Act (2002)
- Climate Change (Stationary Energy and Industrial Processes) Regulations (2009)
- Conservation Act (1987)
- Crown Minerals Act (1991)
- Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act (2012)
- Energy Efficiency and Conservation Act (2000)
- Marine and Coastal Area (Takutai Moana) Act (2011)

- Resource Management Act (1991)

7.2 National Policy Statements, Environmental Standards & Guidelines

The following National Policy Statements can be accessed from: www.mfe.govt.nz/rma/rma-legislative-tools/national-policy-statements

- National Policy Statement on Urban Development Capacity
- National Policy Statement for Freshwater Management
- National Policy Statement for Renewable Electricity Generation
- National Policy Statement on Electricity Transmission

The New Zealand Coastal Policy Statement can be accessed from: www.doc.govt.nz/about-us/science-publications/conservation-publications/marine-and-coastal/new-zealand-coastal-policy-statement/

The National Environmental Standards can be accessed from: www.mfe.govt.nz/rma/rma-legislative-tools/national-environmental-standards

The National Planning Standards can be accessed from: www.mfe.govt.nz/rma/national-direction/national-planning-standards

The guide to reporting for geothermal fluid activities under the New Zealand Emissions Trading Scheme can be accessed from: www.mfe.govt.nz/publications/climate-change/guide-reporting-geothermal-fluid-activities-under-new-zealand-emission-3

7.3 Conservation Policies and Plans

Conservation policies and plans can be accessed from: www.doc.govt.nz/about-us/our-policies-and-plans/

7.4 Regional Plans & Policies

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