

KAITIAKITANGA AND THE NEXT 10,000 MEGAWATTS

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ABSTRACT

Geothermal energy is a taonga, with intrinsic value in the traditional Māori world, and economic and sociological value to contemporary Māori. Utilisation of geothermal energy has potential to provide a range of commercial and non-commercial benefits at local, regional and national levels. Māori retain customs and tikanga concerning surficial thermal features, and provide kaitiakitanga and recognition of their geothermal environment.

In the past, development has adversely affected some thermal areas and resulted in irreparable damage to surface features buildings etc. Regional Councils are responsible for monitoring geothermal resource development through the Resource Management Act (1991), so Māori must balance their commercial aspirations with a realistic assessment of the capacity of the geothermal resource to support sustainable development.

Confidence in geothermal resource characterisation, identifying connection between geothermal systems and understanding the short and long-term physical and chemical effects of development are essential aspects of the sound and sustainable utilisation of New Zealand's geothermal resources. Development of new or improved geophysical, chemical and numerical reservoir modelling tools and techniques provide reassurance to iwi, developers and regulatory authorities, who have essential roles in defining how developments should proceed.

This paper provides guidelines for sustainable use of Māori geothermal resources, in order for interested groups to develop realistic development scenarios that balance kaitiakitanga and what hurdles need to be overcome to initiate the appropriate type and scale of resource utilisation.

1. INTRODUCTION

1.1 Introduction – Proverb

Ka tangi te tītī — The migratory bird that searches the globe for economic opportunities, it is connected to the home, but with a global view.

Ka tangi te kākā — The bird of the forest resources the domestic market.

2. ONGOING CONNECTEDNESS WITH GEOTHERMAL

2.1 He Whakatau tēnei o Ngātoroirangi.

Ka moe a Rūaumoko, ka puta ko Rurangi, nāna ko Runuku, nāna ko Rurutu, nāna ko Parawhenua, nāna ko Moremore o te Rangi, na Ngātoroirangi.

Development has much to offer Māori that fulfil a crucial role in New Zealand communities. Te Pūngao Ngāwhā (Geothermal Energy) in all its forms a considered taonga tuku iho (cultural heirlooms). They have been utilised and cared for by our ancestors who have endowed them to us as in perpetuity. We in turn repeat this practice maintaining the Tikanga (right practice) which guarantees its sustainability and availability of these taonga for generations to come. Intrinsic and central to supporting this Tikanga is the practice of being active Kaitiaki.

Since the earliest Māori settlement in the district (1350s) geothermal waters have provided tangata whenua (local Māori) with both domestic and economic benefits. Drawn to the naturally heated waters, Māori quickly discovered the different uses for the many varieties of Ngāwhā (hot pools) available to them and were quick to assert mana (authority) over them.

As a result of the New Zealand Resource Management Act (1991), regional councils are now responsible for the management of geothermal resources in their administrative area. Environment Bay of Plenty (EBoP) has developed a regional geothermal plan, in response to the possibility of damage to natural thermal features in the Rotorua Geothermal Field (Figure 1) as a consequence of development. The geothermal system is important to Rotorua City and its people, in terms of economic health and growth, recreational activity, history, prestige and culture, potential energy generation and scientific value.

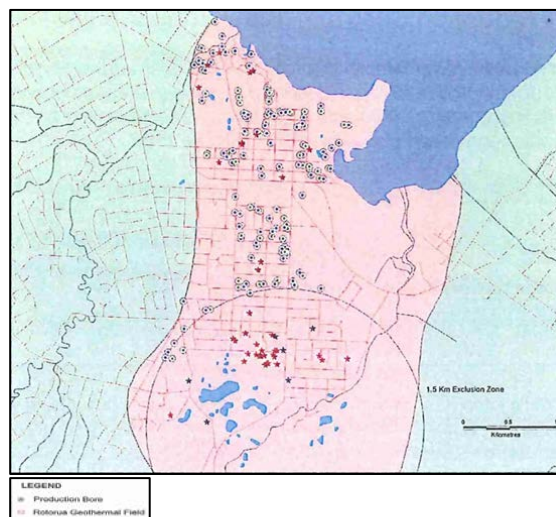


Figure 1: Rotorua Geothermal Field. Extent of the system shown in pink. Exclusion zone around Pohutu Geyser and major named thermal areas mentioned in this paper.

3. TREATY OF WAITANGI OBLIGATIONS

The Treaty of Waitangi provides for the exercise of *kawanatanga* (the right of the Crown to govern) while actively protecting *tino rangatiratanga* (self determination) of *tangata whenua* with respect to their natural, physical and spiritual resources.

'*Tangata whenua*' refers to the *iwi* (tribe) or *hapu* (sub-tribe) who hold *mana whenua* (the traditional status, rights and responsibilities over a particular area in respect of their natural, physical and spiritual resources).

3.1 Resource Management Act 1991 (RMA)

All persons acting under the RMA (including applicants, councils and *tangata whenua*) must take into account the principles of the Treaty of Waitangi. Part II of the RMA contains a number of specific provisions relating to *tangata whenua* that must be considered in RMA processes:

- Sections 6(e) and 6(f) require that "the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, *wahi tapu* (sacred grounds) and other *taonga* (treasures)" and "the protection of historic heritage from inappropriate subdivision, use and development" is recognised and provided for.
- Section 7(a) requires that '*kaitiakitanga*' (guardianship) is paid particular regard to.
- Section 8 requires that the principles of the Treaty of Waitangi are taken into account.

All project activities will therefore take into account both the Crown's need to adhere to the principles of the Treaty of Waitangi, and also the requirements of the RMA with respect to *tangata whenua*.

4. KAITIAKITANGA FRAMEWORK

The concept of exploring the expressions of the earth arises from a recognition that many Māori communities are seeking to restore their traditional knowledge bases as a dimension of protection and enhancement.

This is particularly the case in relation to contemporary issues, such as those relating to the environment and future management of natural (e.g. geothermal) resources. This approach is founded on traditional concepts of Māori knowledge, new technology applications, environmental planning and monitoring where indigenous approaches and perspectives are fundamental. (Neilson G. et al 2010).

4.1 Desired outcomes of iwi engagement strategy

The desired outcomes of the *iwi* engagement strategy are as follows:

- A focus on *whanaungatanga* (relationship building) with *iwi* so a strong bond exists between the project teams and *iwi*.
- Opportunities provided for *iwi* to participate in the project planning and development process.

- Increased awareness of *tangata whenua* values and concerns in the project teams so such values and concerns are given due and appropriate consideration in project planning and development work.
- Enhanced understanding amongst *iwi* as to the rationale and reasons for the projects.
- *Iwi* kept continually and expeditiously informed on new developments on the projects.
- Agreed methodology of engagement with *iwi* at the appropriate levels on project matters.
- *Iwi* engage with the same personnel, as best as possible, during the duration of the project.

4.2 Principles and process of iwi engagement

Iwi engagement will be conducted at all times in a manner which is respectful and meets Maori cultural protocols. The principles to be adopted are as follows:

- *Kanohi ki te kanohi*: Face-to-face engagement as much as possible.
- *Kanohi kitea*: Be seen to be participating alongside *iwi*.
- Adherence to *kawa* (protocols), *tikanga* (customs) and in turn, *kapapapa* (underlying philosophy on which *tikanga* is based).
- Focus on *korero* (the spoken word).

4.3 Relationship agreement with iwi

As part of *whanaungatanga* (relationship building) with *iwi*, a Relationship Agreement will be entered into by the project teams with such groups. The Relationship Agreement will incorporate the following:

- Purpose and background to the agreement.
- Goals and roles of the parties in the agreement.
- Recognition of the Treaty of Waitangi, statutory obligations and the values and principles of the parties concerned.
- Principles to guide the relationship, processes for consultation and information sharing, the obligations and expectations of both parties, protection of sensitive information, and processes to resolve conflict.
- The procedures for involving *iwi* in the planning process.
- Procedures that will be followed when expert advice is required from *iwi* (such as a cultural impact assessment).
- The nature of resource consent applications that *iwi* can expect to be consulted on.
- Procedures for recognising *kaitiakitanga* (guardianship) in the monitoring of consent conditions.

5. CURRENT GEOTHERMAL ENVIRONMENT AND THE NEXT 10,000 MWE

New Zealand is endowed with large resources of 'conventional' high temperature, renewable geothermal energy, from 1-3 km deep, >240°C reservoirs. Compared to other renewable or fossil-fuelled energy options, the ease of development of geothermal resources in the Taupo Volcanic Zone has resulted in electricity generation facilities that are low cost to construct and operate (on an energy unit cost basis). Although current generation is sufficient for existing demand, due to flat electricity demand growth, increased use of indigenous geothermal resources will be a major factor in meeting New Zealand's future electricity demand, using an economically-viable resource that has low greenhouse gas emissions. Māori will have a large and expanding role in this undertaking.

Since 2010 there has been ~270 MWe of new geothermal electricity generation capacity constructed in New Zealand (Carey et al., 2015), including commissioning of the 23 MWe TOPP 1 plant at Kawerau (operational since early 2013), 82 MWe Ngatamariki geothermal plant (operational from June 2013) and 166 MWe Te Mihi station at Wairakei (which opened in August 2014). These plants contributed to the 1500 GWh per annum increase in geothermal electricity production in the last 4-5 years. There is now >1000 MWe of installed geothermal electricity generation capacity in New Zealand...

Although geothermal operators currently focus on sustaining and maintaining conventional electricity generation developments, there is a possibility of expansion by the development of hotter and deeper geothermal resources in the TVZ. The energy contained in hot rocks and fluids at 3-6 km depth in the TVZ has been estimated to be >500 times the total gas field generation potential of New Zealand (Bignall, 2010). However, whilst temperatures (and available energy) increase with depth, ease of extraction decreases, since rocks at high pressures and temperatures become less porous, reducing fluid flow. A number of technical issues need to be addressed to delineate and develop deep-seated geothermal resources in the TVZ, which will require large investment, and consequently a range of research projects have been initiated, with encouragement and support from Māori, to reduce risk ahead of any future commercial exploration initiatives.

There are numerous examples of direct use of geothermal energy in New Zealand for commercial purposes. Clearly, bathing and swimming is New Zealand's largest geothermal direct use by total number of operations. New Zealand has a rich heritage of balneology. Māori who settled near active geothermal areas used geothermal hot springs for bathing, cooking and other uses, whilst early tourists came for the health benefits of geothermal waters and iconic sights, such as the Pink and White Terraces (which were destroyed by a volcanic eruption in 1886). Today, the industrial sector is the largest direct heat use consumer of geothermal energy, with the Norske Skog Tasman paper and pulp facility in Kawerau the greatest consumer of direct use geothermal energy. Other uses of direct geothermal include timber drying, space heating and cooling, food processing, milk drying, greenhouse heating, aquaculture and bathing.

6. FUTURE GEOTHERMAL INNOVATION AND USE

Many processes that require heat can take advantage of geothermal energy, and this provides Māori with an opportunity for a range of innovation and uses, depending on the temperature and sustainable extraction of the available geothermal fluid. Installations can be stand-alone, clustered or arranged in a cascading arrangement (e.g. a direct use application, after high temperature use for electric power generation), although developments may conversely cascade power generation off the direct use.

Geothermal resources are a key component of New Zealand's energy scene, currently providing ~16% of the nation's electricity supply. Whilst renewable electricity generation accounts for ~75% of New Zealand's supply, geothermal energy is expected to make an increasingly large contribution to base-load electricity generation, and achieving New Zealand's 90% renewable electricity target by 2025.

The New Zealand Government envisages geothermal resources will also contribute to a direct use target of an additional 9.5PJ/year from biomass and geothermal energy above 2005 levels by 2020. Indeed, geothermal sources have the capability to provide a sustainable heat source for the industrial, commercial and residential sectors. Examples of industries that can take advantage of geothermal heat include the metals industry, chemical and related products, mining and wood processing. Geothermal energy cannot be directly used for transportation, but it could play a role in biofuel production, agricultural industry and residential sector.

New Zealand has few examples of geothermally-supplied industrial heat parks, where a distribution infrastructure services multiple users, but the potential exists for such parks to be developed in the future. An existing example occurs at Kawerau, where several wells supply a range of applications, including electricity power generation, timber drying and paper production. The concept may be expanded to a number of other locations in the TVZ, and presents an opportunity for Māori to initiate and/or meld a range of collaborative, complementary and mutually beneficial interests. Indeed, Tuaropaki Trust's operations at Mokai already provide an example where a geothermal power station shares wells with greenhouses and milk drying facility. There is potential for Māori to develop other geothermal hubs in the future, to create new businesses and/or relocate existing commercial activities that will benefit from an available renewable heat energy supply. There is also potential to convert industries, especially wood processing and paper production, from a fossil fuel-based energy supply.

Climo et al (2015) considered the relative cost of process heat supply from geothermal energy versus coal, wood and gas energy, and outlined there is a demand threshold above which geothermal is competitive against other fuel options. Other studies have identified large-scale commercial and industrial projects can be very attractive and can readily compete with fossil fuels.

Current low electricity demand is driving geothermal electricity generators to consider diversification into a range of other commercial opportunities. Māori are major

stakeholders and contributors to economic growth in the regions, particularly in the central North Island, and the Māori economy has significant interests in many geothermal resources. Government targets pursue increased use of renewables and direct use of geothermal energy, as do local and regional economic development agencies. Māori is well-placed to meet some of these aspirations.

7. STATUTORY ACKNOWLEDGEMENTS FOR ROTORUA REGIONAL GEOTHERMAL SYSTEM

Affiliate Te Arawa Iwi and Hapu Statutory Acknowledgments

In accordance with section 32 of the Affiliate Te Arawa Iwi and Hapū Claims Settlement Act 2008, Information regarding statutory acknowledgment is hereby attached to the Bay of Plenty Regional Policy Statement. This information includes the relevant provisions from the schedules to the Affiliate Te Arawa Iwi and Hapu Claims Settlement Act 2008 in full, the description of the statutory area and the statement of association as recorded in the statutory acknowledgment.

The Affiliate Te Arawa Iwi and Hapū means Te Arawa Iwi and Hapu comprising of the following 11 collective groups.

Ngāti Ngararanui (including Ngāti Tamahika and Ngāti Tuteaiti)

Ngāti Kearoa Ngāti Tuara

Ngāti Tura Ngāti Te Ngakau

Ngāti Te Roro-o-te-rangi

Ngāti Tuteniu

Ngāti Uenukukopako

Tuhourangi Ngāti Wahiao

Ngāti Tahu Ngāti Whaoa

Ngāti Pikiao

Ngāti Rongomai

Ngāti Tarawhai

Affiliate Te Arawa Iwi and Hapu have statutory acknowledgment over the Rotorua Region Geothermal system, which includes the following areas.

Statutory Area	As shown on SO 364723
Rotorua Geothermal Field	As shown on SO 364723
Taheke Tikitere Geothermal Field	As shown on SO 364723
Horohoro Geothermal Field	As shown on SO 364723
Waikite – Waiotapu Geothermal Field	As shown on SO 364723
Reporoa Geothermal Field	As shown on SO 364723
Atiamuri Geothermal Field	As shown on SO 364723
Te Kopia Geothermal Field	As shown on SO 364723
Orakei Korako Geothermal Field	As shown on SO 364723
Ohaaki Broadlands Geothermal Field	As shown on SO 364723

Ngatamariki Geothermal Field	As shown on SO 364723
Rotokawa Geothermal Field	As shown on SO 364723

Statutory Acknowledgement for the Rotorua Region Geothermal System 6.8.1 Statutory Area.

The area to which this statutory acknowledgement applies is the Rotorua Geothermal System, as shown on SO 364723. 6.8.2 Statement of Association Geothermal resources are regarded as taonga - resources that are inherited from the ancestors and highly-prized. Among the first voyagers who came from Hawaiiki to Aotearoa on the Arawa waka was the tohunga, Ngātoroirangi. On his travels around the district, Ngātoroirangi climbed Tongariro in order to survey the whole country from its summit. As he climbed the slopes of the mountain, the cold became unbearable, almost freezing him. He called on his sisters in Hawaiiki to send him fire. On hearing his call, his sisters sent two taniwha underground, Pupu and Te Haeta, to bring him fire. The passage the two taniwha took, and the places where they surfaced became the connecting route of the geothermal system – from Whakāri (White Island), via Kawerau, Rotorua and Taupō and on to Tongariro, distributing geothermal resources in the Rotorua districts including Rotoma, Taheke-Tikitere, Waikite-Waiotapu-Waimangu, Ohaaki and Orakei-Korako. Places where surface geothermal activity was present were highly-favoured as places for settlement. All geothermal areas have traditional cultural and spiritual associations for the affiliate Te Arawa Iwi/Hapū. There was considerable mana associated with iwi whose lands included geothermal resources. Geothermal resources were used in various ways. Hot pools (Ngāwhā, puia, waiariki) provided hot water for cooking and bathing. Hot ground was used for cooking holes and ovens. Mud from some pools had medicinal properties, especially in the treatment of skin infections such as ngerengere. Paint and dyestuffs such as kōkōwai (red ochre) were obtained from hydro-thermally altered ground. Many hot pools had well-known therapeutic qualities in the treatment of muscular disorders, rheumatic and arthritic ailments, as well as skin conditions. Some had other qualities and were known as wāhi tapu, for example, a place for ritual cleansing after battle, or other spiritual qualities linked to medicinal or therapeutic use, or incidents of the past. Some had a particular tohunga associated with them. Some were burial places. Many hot pools are still regarded as wāhi tapu, or sacred places. In the 19th Century there was a hive of tourism activity in and around Lake Tarawera and Lake Rotomahana. The people of Tuhourangi had seen the potential in geothermal activity in and around the lakes and at Te Wairoa as an economic bastion. Bay of Plenty Regional Council – Statutory Acknowledgements Addendum 267 The beauty of the Pink and White Terraces caused hordes of tourists to flock to Rotomahana from all over the world to see what was considered to be the eighth natural wonder of the world. Even after the eruption of the three peaks - Tarawera, Ruawāhia and Wāhanga on 10 June 1886 when the Pink & White Terraces were destroyed - Affiliate Te Arawa Iwi/Hapū continued to utilise the geothermal resources around the Rotorua Region.

Purposes of geothermal statutory acknowledgement Under section 37, and without limiting the rest of this schedule, the only purposes of the geothermal statutory acknowledgement are to: (a) require consent authorities and the Environment Court to have regard to the geothermal statutory acknowledgement, as provided for in sections 38 and 39; (b) require relevant consent authorities to forward summaries of certain kinds of resource consent applications to the trustees, as provided for in section 41; and (c) enable the trustees and a member of the Affiliate to cite the geothermal statutory acknowledgement as evidence of the association of the Affiliate with the relevant geothermal resource, as provided for in section 42.

6.8.4 Limitations on the Effect of Geothermal Statutory Acknowledgement Except as expressly provided in sections 44 to 46: (a) this geothermal statutory acknowledgement does not affect, and may not be taken into account by, any person exercising a power or performing a function or duty under legislation or a bylaw (b) no person, in considering a matter or making a decision or recommendation under legislation or a bylaw, may give greater or lesser weight to the association of the Affiliate with a the Rotorua Geothermal System than that person would give under the relevant legislation or bylaw if no geothermal statutory acknowledgement, existed in respect of the Rotorua Geothermal System. Except as expressly provided in subpart 2 of Part 2, this geothermal statutory acknowledgement, does not affect the lawful rights or interests of any person who is not a party to the deed of settlement. Except as expressly provided in subpart 2 of Part 2, this geothermal statutory acknowledgement, does not have the effect of granting, creating, or providing evidence of an estate or interest in, or rights relating to, the Rotorua Geothermal System.

6.8.5 No Limitation on the Crown. This geothermal statutory acknowledgement does not prevent the Crown from providing a geothermal statutory acknowledgement of the association of persons other than Affiliate Te Arawa Iwi and Hapū in relation to Rotorua Geothermal System.

8. CONCLUSIONS

8.1 Creating new economic opportunities

There are significant economic growth opportunities for both Māori and the wider New Zealand economy to work constructively together to realise the potential of natural resources. Taking a constructive and open approach to discussions on the use and development of these resources would lead to economic growth outcomes that are mutually beneficial for Māori and all New Zealanders. Māori are interested in economic development opportunities, and support a constructive discussion about the sustainable utilisation of natural resources.

The Waiariki Māori Geothermal Advisory Group enables the ethic of kaitiakitanga through working with other industry groups and Māori to develop sector strategies. In order to overcome the existing barriers we need to understand the costs and benefits that can be realised. Māori can participate in a productive conversation about the benefits and opportunities of sustainable development and use of these resources with all New Zealanders.

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2015.

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