

Submission for New Zealand's Geothermal Strategy Draft

<https://www.mbie.govt.nz/have-your-say/consultation-on-a-draft-geothermal-strategy-for-new-zealand>

Thank you for the opportunity to respond to this draft. Please find my research and submission below.

Overview

I support this draft looking to invest in future geothermal capacities and becoming a leading nation in geothermal innovation and technology. There are 5 action plan goals identified in this draft and I will be focusing on and responding to the fifth: Driving science, research and innovation, including supercritical geothermal technology.

Explanation and Evidence

New Zealand currently has 20 operating geothermal power plants, generating approximately 18% of our electricity (New Zealand Geothermal Association, 2022). However, it is likely we are under utilising the potential capacity. Geothermal energy is derived from heat stored in rocks deep underground that are heated by magma (Wright, 2024). New Zealand has a high level of geothermal energy due to our location between two tectonic plates (EECA, 2021). This is a reliable and sustainable renewable energy so transitioning more to geothermal energy will mean reducing reliance on non-renewable energy sources like oil and gas. This will be critical in meeting our goal of net zero greenhouse gas emissions by 2050 (GNS Science, n.d.). Furthermore, geothermal energy is a valuable energy source due to its confident availability unlike wind and solar that have more variability.

Supercritical geothermal is a huge opportunity for New Zealand. It is a geothermal resource located deeper in the earth's crust than we've been before, where temperatures reach over 374°C. Currently, most geothermal systems reach temperatures of 150°C to 300°C. Many countries, including the USA, Japan, Italy, and Iceland, are researching and beginning to pilot projects that explore the potential of supercritical geothermal resources found in hotter, energy-abundant depths (Reinsch et al., 2017). In order to remain a leading country in geothermal energy we must follow these countries' lead in investigating this under-explored resource.

New Zealand's current geothermal wells drill to a maximum of 3.5 km deep, but it is thought that drilling to around 6 km, where supercritical geothermal resources are found, could provide up to three times more energy (Reti & Jones, 2025). A prime location for this exploration is the Taupo Volcanic Zone (TVZ). TVZ sits on the boundary of the Pacific and Australian tectonic plates resulting in active volcanism and high heat flow. Furthermore, the crust in this area is relatively thin, meaning the hot magma is closer to the surface (Kissling & Weir, 2005). This means the drills do not need to attempt to go as deep as they would in other locations, increasing the likelihood for success. The current Government has reserved \$60 million from the Regional Infrastructure Fund to invest in this project. Although this may seem like a large contribution, it is an ambitious task and this funding will be essential.

Challenges and risks

Despite the proven benefits of expanding geothermal energy in New Zealand, there are potential challenges and risks that must be considered

- 1. Environmental impacts:** Geothermal energy is a renewable energy source as the hot reservoirs in the earth are naturally replenished, so depletion is not a risk. Geothermal energy releases a small amount of carbon dioxide, but this tends to be more than 95% lower than that of fossil fuel power plants. Furthermore, geothermal plants can use scrubbers to catch the emissions and discharge and reinject it back into the earth, renewing the geothermal resource (U.S. Energy Information Administration, 2020). Thus Geothermal energy proves to be an environmentally friendly and sustainable practice.
- 2. Loss of Taonga:** For hundreds of years, geothermal resources have played a significant cultural, spiritual and practical role for Māori, making them a taonga (treasure) (*Māori & Geothermal*, 2017). As geothermal power development increases, there is a risk that these culturally significant areas could be impacted or lost. Therefore, it is essential to involve Maori in discussions about supercritical geothermal exploration. Currently, the Resources and Regional Development Minister Shane Jones is working with iwi to to highlight the potential benefits of geothermal energy on Māori land. While it is true development could bring economic advantages, it must not be at the expense of this taonga. Although it is positive that these discussions are taking place, it remains crucial to ensure the protection of taonga and cultural heritage.

This draft does acknowledge the importance of tangata whenua involvement, but unfortunately without identifying specific iwi or hapū organisations, or explicitly outlining how they will be involved, it cannot be guaranteed these promises will be upheld.

3. Harm to Tourism: Geothermal attractions are key to New Zealand's tourism industry. In 2023, domestic and international tourists to Rotorua geothermal spa and wellness sector introduced \$277.6 million into the local economy (Destination Rotorua, 2024), while in Waikato the geothermal attraction industry is worth about \$206 million to the regional economy (Waikato Regional Council, 2025). If geothermal energy systems are not managed carefully they can damage these attractions. For example, when the Wairākei geothermal field was built in 1958 it began to have long term impacts on the Geysers Valley and Karapiti blowhole (New Zealand Ministry for Culture and Heritage Te Manatu Taonga, 2009). The ground dropped up to 3 meters in some places and caused hot springs and geysers to start dying.

However, by learning from this history, these consequences can be avoided by prohibiting drilling near tourist attractions and instead focus on energy in deeper and less visible geothermal areas.

It is understandable that many may not agree with this large investment due to the risk it involves. However, due to the current environmental state of the world it is essential we take risks like this. If we are successful, it will not only reduce harmful environmental impacts of nonrenewable energy sources by transforming the energy sector, but also lead to economic growth and industry expansion (GNS Science, n.d.-b). These impacts would bring about a higher and more sustainable standard of living for all New Zealanders.

Recommendations

1. Investment

It is important to continue investing in research and development to improve drilling technology and develop local expertise. To ensure long-term progress, investment plans should remain stable and not be reevaluated and altered with each change of the government.

2. Trial deep wells

Although New Zealand has never drilled to these depths and outcomes remain uncertain, testing is the only path to success. According to Reti and Jones (2025), drilling is expected to begin within a year and they are close to identifying a suitable location. This progress is promising, but it is crucial to recognize that if the initial trial fails, reflection and repeated attempts are necessary. Testing and perseverance are key for innovation to be successful and achieve the goal.

3. International collaboration

Currently, New Zealand has partnered with Japan's Obayashi corporation to manufacture our first geothermal run hydrogen fast refuelling station (MobilityPlaza, 2024). The New Zealand Government is also working with the Indonesian Government to aid and accelerate their transition to geothermal energy (Benardy Ferdiansyah, Resinta S, 2023). Both these collaborations have proved beneficial and encourage the continuation of global partnership for geothermal innovation. This would accelerate the progress in multiple countries especially when tackling the unexplored field of supercritical geothermal energy.

4. Provide information

Information about geothermal energy plans and outcomes must be easily accessible and understandable for the public. This is vital not only because it involves a significant amount of taxpayer money, but also because it will transform the energy sector. Such changes will affect New Zealanders' everyday lives through energy prices, the growth of new industries, and the decline of non-renewable sectors that currently provide jobs. People have the right to know and understand what is being done, and clear communication will help build trust and support for geothermal development.

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