Earth Sciences New Zealand

Avalon Campus
1 Fairway Drive
Lower Hutt 5011
PO Box 30368
Lower Hutt 5040
New Zealand
T +64 4 570 1444
www.earthsciences.nz

12 September 2025

Resource Policy
Ministry of Business, Innovation and Employment
PO Box 1473
Wellington 6140

Earth Sciences New Zealand submission on a draft geothermal strategy

Dear Resource Policy Team,

Earth Sciences New Zealand (ESNZ) welcomes the opportunity to contribute to the Government's draft geothermal strategy - "From the Ground Up". ESNZ is a New Zealand Crown Research Institute, formed by the recent merger of NIWA and GNS Science and has expertise spanning geoscience, climate, freshwater, and marine systems. ESNZ endeavours to deliver innovative solutions to support New Zealand transition to a carbon zero energy future, ensuring a resilient and sustainable energy future for New Zealand. The GNS Science business unit of ESNZ has a long history of geothermal research, supporting development and management of geothermal systems, in New Zealand and abroad.

As a science organisation, ESNZ has an important role to provide expert scientific input into policy, regulation, strategy, and guidance. With decades of experience in geothermal research and innovation, reservoir and geological modelling, systems monitoring, and community resilience, we are well positioned to support government agencies in making informed, future-focused decisions on the future energy system.

Statements of support

The development of this strategy and action plan represents a significant and timely effort. We would like to acknowledge MBIE for progressing the work to this stage and initiating a national conversation on the future of geothermal energy in New Zealand. The inclusion of strategic outcomes focused on innovation, energy resilience, and regional and Māori economic development, provides a strong basis for future developments in the geothermal sector. We believe several amendments are needed to further strengthen the action plan to increase its effectiveness in delivering on the Government's ambitions.

We suggest that the Geothermal Strategy would benefit from sitting below an overarching Energy Strategy for New Zealand. New Zealand needs a clear and coordinated government energy strategy to guide its future energy generation, utilisation and storage needs. In the absence of a national framework, businesses and individuals lack the certainty needed to make long-term investment decisions around energy, use, infrastructure investment, and prioritisation of science and innovation focusses. A well-defined strategic framework would help align policy, funding, and regulatory settings, enabling geothermal and other energy sources to be developed at scale and integrated effectively into the national energy system. The geothermal strategy should articulate where geothermal energy fits within the broader national energy mix, including its comparative advantages in terms of energy security, reliability, sustainability, and baseload capability.

Overarching recommendations

The geothermal strategy must more clearly articulate the roles and responsibilities of government, industry, iwi, and other stakeholders. This includes establishing a well-resourced implementation plan, clarifying leadership across the actions, and ensuring government interventions are targeted and transparent. This will strenghtenen national and international potential investment supporting a national economic growth.

A stronger connection between the action plan goals and the strategic outcomes is suggested. This could be achieved through a strategic alignment matrix that maps actions to outcomes, helping stakeholders understand how each initiative contributes to the broader vision via a clear intervention logic plan. To enhance the strategy's effectiveness, it should explicitly address the environmental implications of geothermal development and the imperative for kaitiakitanga and sustainable resource management, continuing to build public confidence in geothermal energy.

To enable Māori and iwi to realise their aspirations for their geothermal resources, the strategy needs to provide clear pathways for Māori-led development. This includes addressing systemic barriers, developing education and training pathways, prioritising direct heat-use opportunities, and ensuring shared investment models are supported by government funding.

We feel this strategy could better emphasise geothermal's core role within the wider renewable build-out. Geothermal can provide firm baseload to balance hydro and intermittent wind and solar. Policies should prioritise integrated planning, streamlined grid connections, and market settings that reward geothermal's stabilising value—making it a backbone of a resilient, diversified energy system. It is important not to consider it in isolation.

The strategy should broaden its scope to clearly capture under-explored opportunities. Examples of these are commercial direct-use applications, urban heating and cooling, distributed generation, and regional tourism. In addition, there are opportunities for international collaboration and innovative geothermal technologies which New Zealand is yet to embrace, including enhanced geothermal systems, underground thermal energy storage and advanced closed loop geothermal. Further detail on our recommendations against each of the questions in the consultation document is provided in the Annex.

Concluding statement

Earth Sciences New Zealand supports the Government's efforts to develop a national geothermal strategy. Government support and participation is imperative in realising New Zealand's geothermal potential. We are committed to working in partnership with Government to ensure the strategy reflects best practice and enables resilient, sustainable, and inclusive development of geothermal resources across New Zealand.

Thank you for the opportunity to provide this submission. We welcome the opportunity for further discussion or clarification of any of the points raised. Should you wish to discuss the content in this submission, please contact Dr Isabelle Chambefort by email at i.chambefort@gns.cri.nz in the first instance.

Yours sincerely,

Chelydra Percy
Acting Transition Chief Executive

Annex one: Detail on recommendations against each of the questions in the consultation document

1. Are the three strategic outcomes of the strategy, centred around world-leading geothermal innovation, accelerating energy resilience and strengthening regional economies and te Ōhanga Māori, suitable, or is there more we need to consider?

Broadly, the three strategic outcomes are relevant and well-aligned with national priorities, with the overarching goal of advancing sustainable geothermal development. However, there are several areas where the strategy could be strengthened to ensure it is comprehensive.

- While innovation is highlighted, the role of research should also be explicitly mentioned. Today's innovation is built on yesterday's scientific research and this connection should be made clear. We suggest adding science and technology to the first outcome – 'Extend New Zealand's position as a world-leader in geothermal *science, technology and* innovation'
- ESNZ endorses the ambitious goal to double the use of geothermal energy in 15 years, cognisant that significant resourcing and funding will be demanded to achieve this.
- The third outcome should be clarified to ensure it explicitly supports both regional economic development and te Ōhanga Māori. While collaboration with iwi is mentioned, systemic barriers such as access to resources, technical expertise and water take rights might usefully be addressed.
- The concept of sustainable use is central to geothermal resource development and management. This is identified in the Vision (page 4). We suggest considering a fourth strategic outcome focussed on environmental stewardship and sustainability of geothermal resource utilisation.
- The strategy should clearly encompass all forms of geothermal use not just direct-use applications. Conventional electricity generation, industrial processes, community heating and cooling, indirect or cascade uses, distributed generation, hybrid technologies, and even recreational uses like bathing and tourism should be acknowledged.
- How you are measuring against the goal of doubling geothermal energy use needs clearer definition. Establishing a consistent framework for measurement and accounting for downstream uses is essential for tracking progress.

2. Do the five overarching action plan goals capture the areas that are most important for achieving the vision, strategic outcomes and energy goal?

Overall, the five action plan goals are broadly supported, and reflect key areas necessary for advancing geothermal development. However, there are several opportunities to refine and strengthen the goals to ensure they are comprehensive and aligned with the strategy's ambitions.

General:

- One of the biggest challenges in growing geothermal generation is the high capital cost and associated risks. The strategy should place greater emphasis on de-risking mechanisms, including government support through research, purposeful exploration, innovation, financial instruments, and project facilitation and efficiencies. This could be integrated into Horizon 1 or 2 actions.
- Support for te Ōhanga Māori does not come through strongly in the current action plan. Geothermal projects offer significant potential for Māori development. The strategy should include targeted support for Māori-led projects, including shared investment models between government and trusts. These would also be beneficial to other small to medium heat users.

- There is a need for a communication work stream to help New Zealand adopt the Vision and realise greater benefits from our geothermal resources.
- The time horizons of the proposed actions should be reviewed. Some goals and actions may require longer timeframes than currently indicated. Similarly, some actions within Horizons 2 and 3 could be moved forward. The strategy should provide flexibility where needed to ensure long-term success and longevity of the Action Plan Goals.

Action Plan Goal 1 – Improving Access to geothermal data and insights:

- Could be taken up a level to a broader action of **Derisking access to geothermal energy**. This could include:
  - High level identification of geothermal potential in all regions of NZ.
  - Development of mechanisms that can derisk identified geothermal potential.
  - Improved access to geothermal data (which is the current focus of this Action Plan goal). There is additional commentary on this later in this submission.

- Publicly available data is critical for informed decision-making, and we acknowledge on-going conversations regarding this issue. There are current issues around data ownership and a lack of clarity on where data are held. Horizon 1 actions should address this by improving data systems and accessibility for all stakeholders, including Māori.

Action Plan Goal 2: Ensuring regulatory and system setting are fit for purpose:

- The strategy should include clearer pathways to train geothermal scientists, engineers and technicians, including support for international collaborations and domestic technical training through universities and polytechnics (or a centre of excellence). This will help build a robust workforce and support project flow.

Action Plan Goal 3: Advancing knowledge and uptake of geothermal technologies:

- Much of New Zealand's geothermal sector relies on methodologies developed decades ago. There are opportunities to learn from advances in international drilling technologies – including technologies from the oil and gas sector - and alternative geothermal developments. While some technologies may not be immediately applicable, New Zealand should remain engaged to future-proof its capabilities and leadership. Technologies to explore include enhanced geothermal systems, underground thermal energy storage, superhot rock geothermal and advanced closed loop geothermal systems, as well as advance methods for experimental simulation and data interpretation and modelling (including AI and ML techniques).

Action Plan Goal 4: Enabling place-based geothermal clusters

- There is a gap in how geothermal research is currently conducted with earth sciences and engineering research often working separately. A coordinated approach is necessary to achieve the fast deployment of geothermal technologies in New Zealand. A well-funded geothermal centre of excellence could break silos and help accelerate innovation.

Action Plan Goal 5: Driving Science, research and innovation:

- The current focus on supercritical geothermal in Goal 5 is too narrow. This goal should be broadened to include other advancing geothermal technologies (some being noted earlier in this submission). Supercritical should be reframed as one part of a wider innovation agenda.

3. Does the proposed action plan correctly capture the necessary government interventions and priorities?

The proposed action plan outlines a range of activities that are broadly relevant, but it lacks clarity and specificity around the role of government and how its interventions will directly support the strategy's outcomes. We recommend the following clarifications:

- It's not clear what the government is intervening on, or how its actions will directly address the barriers to geothermal development. The plan would benefit from explicitly designating which actions are government-led, industry-led, iwi-led, or shared.
- The strategy does not specify what resources will be provided to support government interventions. Clear guidance on how resources will be allocated to support priorities is essential for implementation and accountability.
- The action plan goals can be better connected to the strategic outcomes. It is unclear how the actions will lead to tangible progress on energy resilience, innovation and technology development, and regional/Māori economic development.
- The energy resilience strategic outcome is underdeveloped. It is unclear how the proposed actions help build a more resilient energy system. More targeted interventions such as infrastructure investment, diversification of geothermal applications including cascade energy use, and support for distributed energy systems could help strengthen this link.
- An intervention logic plan that maps each action plan goal to the relevant strategic outcomes would help stakeholders understand how activities contribute to the broader vision and identify any gaps or overlaps.

4. Is the role for the sector clear? How can the wider geothermal sector play a role (e.g. are there specific actions that the sector could own)?

The role of the geothermal sector in implementing the strategy is not clearly defined. While there is strong interest and willingness from the sector to contribute, several areas require their engagement and ownership:

- It is unclear who is considered the "geothermal sector" and who will sit on the sector strategy implementation group. We recommend this group include representatives from across the sector, including government agencies such as MBIE and Ministry for the Environment, Public Research Organisation and Tertiary education, to ensure coordination and visibility of activities across different domains. For the strategy to succeed the geothermal sector must have genuine ownership of its implementation. Without this, the strategy risks being ineffective. The sector including industry, iwi, researchers, and regulators needs to be actively involved in delivering against the action plan.
- The sector is keen to support the government but need adequate resourcing to do so. The strategy should include mechanisms to support sector participation, such as funding, coordination support, and access to data and tools.

5. Does the strategy and proposed action plan create the right settings to enable tāngata whenua to realise their aspirations for geothermal resources in their rohe?

The draft strategy could be strengthened to fully enable tāngata whenua aspirations. While there are references to Māori involvement, several gaps remain:

- There is no clear plan for how the strategy will be resourced or structured to support iwi /Māori participation. Without dedicated funding and systems, progress will be limited.
- Long-standing barriers (access to water rights, technical expertise, regulatory complexity, and lack of capacity) remain unaddressed.
- Direct-use geothermal projects offer one accessible pathway for Māori development across the Regions. The strategy could prioritise shared investment models between government and iwi/hapū/Māori trusts.

6. Are there opportunities for our geothermal sector that we haven't considered?

- We highlighted a need for geothermal resource derisking mechanisms earlier in the submission but reiterate this aspect here.
- More emphasis could be placed on direct-use applications and technical advances. These activities are suitable for several commercial entities and small communities and can provide efficient energy solutions in line with the New Zealand's net zero 2050 aims, but they require greater public awareness and support.
- Geothermal tourism is understated in the document, with opportunities available nationwide, not just Taupo and Tarawera. A focus on understanding the worth of these applications, beyond economics could provide valuable insight into social and cultural opportunities.
- Coproduction or co-use of energy resource. There is opportunity to look beyond electricity generation and direct heat from New Zealand's geothermal resources. Value can be added through cascaded use of fluids, heat, minerals, hydrogen production and industrial processes. There is a potential for innovation through cross-sector incentives to work together.

7. Are there challenges for our geothermal sector that we haven't considered?

- To maintain global leadership in geothermal science and innovation requires active support through research, international collaboration, and strategic positioning. Opportunities that support global partnerships and knowledge exchange should be more prominent.
- To activate innovation requires investment.
- Doubling geothermal use will also require upgrades to electricity grid infrastructure and strategic planning for co-location of heat and industry.

8. Are there any other things that the strategy should include or exclude?

- We must be careful to ensure that supercritical geothermal does not overshadow other viable opportunities. Emphasis on options across the entire temperature range, from ambient to superhot, is suggested.
- Environmental impacts and public understanding are critical. The strategy should include a strong communication effort to bring New Zealanders along on the journey.
- A fourth strategic outcome focussed on environmental stewardship and sustainability of geothermal resource utilisation could be considered.