Te Uru Kahika Regional and Unitary Councils Aotearoa

9 September 2025

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Tēnā koe

Draft New Zealand Geothermal Strategy

Thank you for the opportunity to provide feedback on the Draft New Zealand Geothermal Strategy.

The intent of the Draft Strategy, to present a cohesive nationwide vision for geothermal resources in New Zealand, is supported by Te Uru Kahika Geothermal Working Group. The Strategy elevates the role of geothermal in the transition to a low carbon economy, and in building energy resilience to address climate change challenges. The strategy also points to wider socio-economic benefits of geothermal, including tourism, and developing New Zealand's role as a leader in sustainable resource management, science, research and innovation.

The communities that regional councils represent have a strong interest in the outcomes and actions of the Strategy. Nearly 90% of New Zealand's high temperature resources are in the Bay of Plenty and Waikato Regions, with the remaining high temperature system in Northland at Ngāwha. Geothermal contributes substantially to the economy and community wellbeing in our regions, as a source of renewable energy and as a taonga with high natural and cultural values. Elsewhere in New Zealand, existing direct heat uses of geothermal (e.g. bathing) also contribute to the local economy, with future potential for lower temperature resource use to grow.

We have provided high level feedback on the Draft Strategy, but our staff are available to provide further detail and assistance if needed.

Should you have any queries regarding the content of this document please contact Penny Doorman (Geothermal Programme Leader) at penny.doorman@boprc.govt.nz, or Katherine Luketina (Geothermal Scientist) at Katherine.Luketina@waikatoregion.govt.nz.

Ngā mihi nui

Namouta Poutasi

Te Uru Kahika Resource Managers Group Co-Convenor

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Overall comments				
	Scope		• The Draft Strategy is primarily focussed on energy goals, leaving a fundamental gap in non-energy related geothermal matters (ie. tourism, environmental outcomes, cultural and natural values of the geothermal taonga). We seek greater recognition of the non- energy and non-extractive values of geothermal, and the need for its sustainable and integrated management. For geothermal opportunities to benefit future generations, it must not be at the expense of our environment. An integrated sustainable lens is needed, including embedding these principles in the Vision, the Outcomes and the Actions of the Strategy. If however, the Strategy's scope is intentionally narrow, to focus mainly on energy, then this should be explicit stated and the Strategy renamed to "Geothermal Energy Strategy" and the need to operate within sustainable limits highlighted.	• Greater recognition of the full range of values and uses of geothermal, and the contribution that non-extractive values of geothermal make to social, cultural and economic wellbeing on communities. • Embedding sustainability through the outcomes and action plan goals is detailed further in the submission.
	Ownership		• While the Draft Strategy has primarily been developed by MBIE, the long-term ownership and oversight of the strategy is unclear. The Draft Strategy is largely silent on who will contribute or lead the delivery of actions or tracking and reporting. We note that regional councils (and to a lesser extent district councils) are the likely lead agency for many of the actions. Implementation will require enduring commitment from stakeholders and Government, so clarity around roles and responsibilities is essential.	• Reference to the role of regional councils in enabling geothermal use, development and protection, and their likely lead role in the delivery of the many of Outcomes and Actions.
	Resourcing		• Regional councils will play a central role in the delivery of the Strategy actions and outcomes - they are key enablers. While some of actions in the Strategy are already underway, and provided for in Long Term Plans, many will only be possible with either funding support from Central Government, or increased rating of our regional communities. While all councils need to consider the implications of continued rates increases on their communities, fiscal constraints are especially an issue for smaller regional councils outside of the TVZ. We therefore think that the costs and benefits of the Actions need to be more	• Clarify how these actions in the strategy are to be delivered, by whom, and at what cost. • Identify likely funding structures and entities. • Further engagement with regional councils on funding

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			carefully considered, and an indication of the likely funding structures and entities for each included in the Strategy. Without this information, the Strategy amounts to an aspirational document or 'wish list', rather than an agreed 'call to action'. • One suggestion is a central government dedicated fund to support regional councils in delivering geothermal planning and development (similar to the Aquaculture Planning Fund), to support TVZ initiatives. A small fund could also support non-TVZ councils engage in the process. We note reference to System Based Funding Mechanisms in Horizon 3 and seek clarification about the intent, and the scope of this funding.	structures and the financial implications for regional councils.
Questions				
Question 1		Are the three outcomes adequate or do we need to consider more (innovation, energy resilience, regional economies)	• The intent of three outcomes is supported. However, the opportunities that arise from sustainable management and in some cases protection of the taonga (i.e. not only development), are not fully addressed in the outcomes. In the Bay of Plenty and Waikato Regions, geothermal tourism is a significant contributor to domestic and international tourism, and it also plays a part in other areas, including Gisborne, Auckland, Northland and Otago. Our geothermal features and geothermal biodiversity are also widely studied, are highly valued taonga, and many of their natural properties are largely untapped. • By way of example, Rotorua Geothermal System's surface features were nearly destroyed as a result of overuse. It's recovery has only been possible through careful management over four decades. This is a practical example, within living memory, of the need to operate within sustainable limits, and the economic, environmental, social and cultural benefits to be gained in doing so.	• Include a new outcome: *recognise and protect the natural values of geothermal, and find ways to leverage opportunities through its sustainable management, including protection of geothermal features, biodiversity, health and wellbeing, research and innovation, Mātauranga Māori, and knowledge sharing,* (or something to that effect)
Question 2		Do action plan goals capture the most	• We recommend the inclusion of a new goal focussing on non-extractive uses, and the opportunities this presents. Some possible Actions to achieve those Outcomes include: positioning NZ geothermal as a global tourism destination on the international stage	• Include a new Goal focussing on non-extractive

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		important areas to meet vision?	(alongside the likes of Yellowstone, Iceland); new opportunities for spa and wellness developments; working with economic development agencies to market geothermal tourism; partnering with Māori to build capacity and capability in geothermal (training, resourcing, joint ventures, research, Mātauranga Māori); Partnerships to explore new and emerging biotechnological possibilities/applications. • We agree with Goal 2 that regulatory settings need to be fit for purpose, and support inclusion of a wide range of regulation impacting geothermal development. Regional councils have operated under the Resource Management Act 1991 for over 30 years, over which time geothermal use and development has been strongly enabled, while successfully managing adverse effects. The resource management reforms are outside the scope of the Strategy. However, we acknowledge the likely implications for geothermal. A challenge for all stakeholder, including regional councils, will be to ensure a smooth transition as possible. • We support the intent of Goal 4 but this is an action that should sit under Goal 3 (advancing uptake). • While we support Goal 5, this is focused on Supercritical. Supercritical is likely decades away from realisation, if proved viable, and its contribution to increased electricity generation is not likely to be realised by 2040. While important, we recommend additional non-supercritical focussed Actions under this Goal.	uses, and include specific Actions. • Delete Goal 4 and include as an action under Goal 3. • Amend Goal 5 to delete '<u>including super critical geothermal technology</u>', and include super critical in the actions only. Include a comprehensive set of actions around science, research and innovation for geothermal in the final strategy. • Measures of success should be included at the end of the Strategy.
Question 3		Are the government intervention and priorities accurately captured?	• The intent to provide direction and identify priorities is supported and will help leverage resources. The Strategy could include stronger links to other Central Government initiatives that impact geothermal. Examples include the New Zealand Energy Strategy and the Energy Efficiency and Conservation Authority (EECA), the Regional Energy Transition Accelerator programme, the Endeavour Fund, resource management reforms, National Policy Statements, biodiversity strategies, Tourism New Zealand initiatives, other climate change/renewable energy initiatives (noting synergies between geothermal and other renewables).	• Include greater integration with other Central Government initiatives that impact geothermal • Clarify that delivery will often be though local place-based solutions, driven by the community, and industry and local Government.

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			• We also note that local place-based solutions are likely to be driven by landowners, the regional sector and industry, rather than Central Government. It is not always clear in the Strategy, how the high-level outcomes and goals will be delivered, and by whom. The role of regional councils (as resource manager) in influencing priorities and outcomes should be clearly reflected.	
Question 4		Is the role of the sector clear? Are there actions the sector can own?	• It is unclear what the term 'sector' refers to, noting the broad range of entities involved in geothermal (e.g. multiple Central Government entities, education providers, CRI, regional councils, district councils, geothermal electricity providers, direct heat users, spa and wellness industry, economic development entities, consent holders, consultants, landowners, iwi, hapū, ahu whenua trusts and hau kainga, and others). These entities have different drivers, statutory responsibilities and governance structures and are already delivering many of the actions listed in the strategy. The Strategy can signal intent, and direct Government actions to influence outcomes, but it should not direct the functions or expenditure within the entire 'sector'. For example, regional council functions are given effect to through regional policies, with legal effect. The Strategy does not and should not override policy developed through statutory processes. Clarifying these distinct roles would be helpful, without being overly prescriptive or directive. Furthermore, the role of "sector strategy implementation group" outlined in the draft document action plan goals is unclear.	• The Strategy could signal where there is likely to be a lead agency for a specific action, or where a collaborative approach is needed.
Question 5		Does the strategy and actions enable tangata whenua to realise aspirations?	• Māori are best placed to respond to this question. However, most regional councils work closely with Iwi and hapū in geothermal management and in our experience, capacity and capability of tangata whenua is one of the biggest impediments to enabling tangata whenua's aspirations in geothermal management (protection or development). Central Government funding to support capacity and capability for tangata whenua would therefore be supported. • We also note the diverse interests of tangata whenua and that it is not possible to generate a singular Māori view to inform the strategy. For	• Include specific Actions about capacity and capability building for tangata whenua, and participation in decision making • Include reference to the full range of Māori interests.

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			example, the views of small communities in Whakarewarewa village where sustainable customary practice is a part of daily life, will likely differ to those at Taheke, Wairakei, or Tauhara, or iwi and hapū in Te Wai Pounamu. The focus of the strategy on Māori owned commercial entities, rather than iwi or hapū or hau kainga means that these wider interests and values may not be represented.	
Question 6		Other opportunities?	• The actions in the strategy are broad and could be further developed, as per specific suggestions below.	• Include additional actions to cover non-extractive opportunities, such as partnering in protection and restoration opportunities.
Question 7		Other challenges?	• The regional sector is closely connected to the community and consider that a positive outcome of the strategy is consistent and accurate nationwide messaging about geothermal, not just as an energy resource, but as a taonga. Inconsistent, sometimes inaccurate messaging can lead to confusion about geothermal opportunities and constraints. Geothermal opportunities are diverse, at different scales, with different effects, different communities of interest, using different technology, sometimes under competing legislative settings. In geothermal, one size does not fit all, and messaging should be accurate and appropriate to place. The Strategy can play an important role in this. • There is a strong focus on Supercritical in the Strategy. However, arguably more gains can be made through realisation of proven direct use technologies. The uptake of those technologies themselves could potentially reduce electricity demand by more than the amount projected to be generated from supercritical electricity generation, with less risk and expense.	• Accurate and responsible messaging about geothermal opportunities. • Increased focus on direct heat opportunities, including accurate accounting of direct use opportunities as an Action in the strategy (e.g. how much electricity demand can be offset by direct use uptake?)
Introductory sections				
Page 5 - 7	Importance of geothermal		• The background narrative is helpful but could benefit from greater acknowledgement of the full range of geothermal values, not only those considered important by large industry players. For example, Te	• Amend the narrative of the strategy to include a balanced account of the

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			Ao Māori perspectives on management are missing, and only a cursory mention is made of the relationship of tangata whenua with their taonga. Also, while the purpose of the strategy is sustainable growth of the geothermal sector, opportunity lies not only in 'harnessing natural resource' but in protecting the natural and cultural values, noting early innovation in tourism. • Another exclusion is geothermal ecosystems, which are rare and vulnerable and impacted by geothermal and land use development. Apart from their biodiversity and cultural values, these sites provide important for ecosystem services, have potential for food and medicinal technology (not only the example provided in the text). • While CO_2 reinjection is referred to, this is not a proven technology and there are limits to how much CO_2 can be sustainably dissolved prior to reinjection and in which types of power plants this can occur. Currently, this is only feasible for binary units, which altogether provide less than 10% of the electricity generated in New Zealand, highlighting the constraints.	values of geothermal, including cultural values, biodiversity values • Amend text to state that CO_2 'can be returned and used <u>in some cases'</u>, and to refer to research and innovation space, including secondary uses of CO_2 (eg food grade, greenhouses CO_2).
Page 8-11	Geothermal activity in Taupō Volcanic Zone		• The full reference for Kirkby et al (2024) should be included - Kirkby, A., Funnell, R., Scadden, P., Seward, A., Sagar, M., Mortimer, N., & Sanders, F. (2024). Towards a New Zealand Heat Flow Model. In Proceedings, 49th Workshop on Geothermal Reservoir Engineering. Stanford, California. • The Rotorua example should include Wai Ariki, QE Hospital and Polynesian spa developments which is a key part of Rotorua's economy (note the Rotorua Hospital also uses direct heat, but is different to QE Hospital). • On page 10 against number 6 amend 'attractions in Rotorua" to "attractions in the Rotorua district". • The TVZ map provided by ESNZ has now been amended in partnership with WRC and BOPRC. The updated map should be included. We understand this will supplied by ESNZ.	• Minor changes as indicated

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			• The strategy refers to geothermal fields in relation to system classification. The correct term is 'system'. A field is an integrated part of a system, so needs to have the same classification as the overall system. • Supercritical is a thermodynamic state of the geothermal fluid at depth. Once at surface, this fluid will only be superhot – providing for significantly less energy. The term 'superhot' or supercritical / superhot may be more appropriate.	
Page 12-13	What is our opportunity		• The focus on opportunity, not barriers is supported. As above we seek inclusion of a wider range of opportunities, not only those related to electricity production and industrial-scale direct use.	• Inclusion of other opportunities, including small locally driven opportunities.
Page 14-15	Building momentum		• The focus on gaining momentum and building on. Significant momentum has also been gained in the resource management space, including research carried out by regional councils, industry, tertiary and Crown Research Institutes (e.g. system characterisation, SOE monitoring to build understanding of resource and effects of its use on the environment, system management plans, adaptive management, supporting Māori engagement etc). Much of this work is also carried out by smaller players and innovators. Collectively it is these initiatives that keep things moving and allow adaptive management.	• Acknowledge gains made in resource management practices, which in turn allows enabling consenting pathways (e.g. system management plans, adaptive management strategies, modelling, monitoring etc).
Vision and outcomes				
Page 16-17	Vision	New Zealand is a global leader in sustainable geothermal development…	• We support the inclusion of a vision that encapsulates the concept of sustainability and inclusivity, and global leadership. New Zealand has been the global leader in development of geothermal resources since the 1960s, and since the 1990's New Zealand's sustainable management framework has been highly regarded internationally. We aim to build on an already positive global reputation, and upholding our reputation is important. • For this reason, we suggest the vision encapsulate wider values and protection (matters that could be further highlighted in the Outcomes and Actions). The narrative should acknowledge the effects of	• The term 'development' could be replaced with management, or the vision could be amended to read '… *development <u>and protection</u>…'* • Include a discussion on management of adverse effects from geothermal

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			unfettered pre-RMA development, such as loss of taonga (geysers in Wairakei, Rotorua), and damage to district and national infrastructure from subsidence (e.g. Ohaaki). Other potential effects include premature cooling, discharge of contaminants to land and water, hydrothermal eruptions, and discharges to air.	development in the Strategy to provide context.
	Strategic outcomes 1	Growing NZ as leader in innovation	• We support the intent of this outcome and seek amendment to broaden the scope, recognising New Zealand's global influence.	• Amend Outcome 1: Extend New Zealand's position as a world leader in geothermal innovation*, <u>science, training and sustainable management</u>'*
	Strategic outcomes 2	Energy resilience, energy security	• The numerical goal (doubling energy use) included in outcome 2 is misleading and limiting (i.e. are we doubling electricity generation or direct heat use, or both). This concept may have been carried over from the Castalia report (2023) that assessed the potential of supercritical, but this is not universally applicable. For example, it does not include adequate reference to sustainable limits, or spatial constraints. Also, geothermal direct heat use could be doubled very quickly, especially outside of the TVZ where there has been little uptake of low temperature opportunities. • If a numerical goal is needed, we suggest this should instead be included as one measure of success included in the action plan. Other measures of success could also be included, broadening the scope. For example, e.g. x new joint ventures on Māori owned land; New Zealand's remaining geysers are protected; a tourism venture is developed by x date etc.	• Amend reference to doubling energy use to remove numerical goal. Include as a measure of success.
	Strategic outcomes 3	Strengthen regional economic and Ohanga Māori	• This outcome is supported, however outcomes related to Ohanga Māori are not reflected in the specific actions of the strategy, so it is unclear how it will be achieved, or what the measures of success are. Nor does it include Te Ao Māori concepts, particularly the connection between the health of the environment, and the health of people.	• Retain the outcome but amend outcomes and actions to specifically refer to opportunities provided through building capacity

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			Protection of the mauri of the taonga, and intergenerational customary uses, is central to wellbeing of Māori.	and capability, protection and enhancement of the taonga, its role in wellness, customary uses etc. Include measures of success that reflect a Mātauranga Māori perspective on wellbeing.
Draft Action Plan				
Horizon 1	Improving access to data	Baseline of publicly available data and a data insights report	• We support improved access to data and a baseline of publicly available data is appropriate. Regional councils are a key stakeholder in this action, and we seek adequate resourcing to ensure council involvement, particularly for regional councils outside of the TVZ with less of a focus on geothermal management	• Amend to ensure that regional councils are properly engaged in the development of baseline reports
	Regulatory settings	Crown Minerals Act	• Support clarification of the application of the Crown Minerals Act to geothermal fluid.	• Amend action to include consideration of this matter in relation to Māori Rights and Interests in Geothermal, Wai 2358l.
		Planning and environment legislation	• The impact of legislative reform on geothermal management is still unclear, however Waikato and Bay of Plenty Regional Council policies already have a strong spatial component, through system classification, and this is likely to be 'fit for purpose'. However, it will be important that the overall intent of a protection-development continuum is not undermined (ie. Protection Systems reclassified to meet energy goals), and balanced outcomes are achieved. • Any legislative review should also consider the integrated management of resources, in particular the interface between geothermal and freshwater management. For example, geothermal development relies on the availability of freshwater especially for supercritical drilling. In many regions water is already over-allocated. Early consideration of water availability will be crucial and embedded in spatial planning frameworks.	• Include an action that signals how MBIE and MfE will support the geothermal industry and stakeholders navigate new legislation to avoid uncertainty. • Amend the action "*Ensure that the new planning and environment legislation enables the integrated and sustainable use of geothermal resources, including carbon capture utilisation and storage,*

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			• Finally, uncertainty associated with new legislation and new policy settings will be challenging for councils and industry. New legislation is often not supported with clear operational guidance from Government, slowing transition and leading to loss of confidence, and litigation. We suggest that the Strategy could include some actions to streamline the transition.	*while also ensuring protection of the mauri of the taonga and protection of geothermal features".*
		Wai 2358	• The cursory reference to Wai2358 misrepresents its critical importance to the success of the Strategy. Outstanding Treaty claims (of which Wai 2358 is only one) are a significant barrier to investment in geothermal. Ownership and proprietary rights over the resource are a key consideration for development (e.g. access, royalties, consenting processes), and there are also significant implications for future governance structures. The timeframes assigned by the Government to progress Treaty claims exacerbates this issue, noting the lack of resourcing and slow progress. For example, it is unclear who will consider and respond to the Tribunal's findings, noting that resource management reforms will be completed by the time the Tribunal makes its recommendations. It is also unclear what actions will be taken, and the extent to which the Government is committed to meaningful change.	• Clarify that Wai 2358 is not the only live Treaty claim impacting geothermal development. • Include a new action clarifying who and how the Tribunal's findings will be addressed, and according to what timeframes.
		Sector Strategy Implementation Group	• The purpose of this Sector implementation group is unclear, and it is not supported. There are diverse interests in geothermal, all with different drivers, and accountability to their own Governance structures. It is not appropriate that their operations are 'overseen' by a sector implementation group. • Regional councils currently manage the geothermal resource, and either already are, or will be leading many of the actions in the strategy. They have specific functions and responsibilities delivered through democratically elected Governance structures under the Local Government Act. They are accountable to the Crown, not to a sector group which is likely to be heavily influenced by industry. We also do not think a group of this nature can fairly represent Māori interests,	• Amend the strategy to remove reference to the Sector Implementation Group, or clarify its scope and function, including meaningful representation of regional councils.

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			noting the complexity and challenges of iwi, hapū and ahu whenua interests in geothermal, nor the interests of the community in general that value the geothermal resource. • Instead, Crown entities such as MBIE and MfE should have oversight of deliverables. For specific actions, locally led, topic-based and solutions focussed oversight is preferred, rather than high level group which will create administrative burden on the entities involved. • We note that the NZGA has endorsed the Strategy. We would not support the NZGA having a 'Governance' role over the implementation of the Strategy or leading the 'sector group'. While the NZGA provides leadership and advocacy on behalf of the geothermal industry and some stakeholders, it does not (and cannot) represent Māori or Local Government, both of which are key partners in the delivery of the Strategy's Actions. • If a Sector Implementation Group is established, it should only be a vehicle to build and strengthen relationships and collectively report on progress (ie. a defined scope and limited reach). It should not replace direct engagement with the regional sector, and should have meaningful representation from regional councils.	
		Well maintenance	• We support a review of the legislation relating to well construction, maintenance and abandonment, addressing the overlapping functions for well safety between regional council functions, and WorkSafe NZ. The focus should not only be on industrial scale wells, but on small domestic wells, where construction costs are a significant barrier to geothermal uptake.	• Include regional councils (and district councils) in any review, reflecting their experience in managing wells through consenting processes.
	Advancing knowledge and uptake	Promote role of geothermal	• We support promoting the role of geothermal and advancing knowledge and uptake, but more detail is needed e.g. actions to share and develop expertise through international research and collaboration, adequate resourcing of CRIs, tertiary institutes, study exchange, international conferences and symposia staged in New Zealand, training courses etc. We also think that the strategy should leverage off work that regional councils already deliver, including deep	• Include a commitment by Central Government to provide funding support for education and information packages delivered locally (ie. place based and solution focussed)

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			engagement with their community, engagement through consenting processes, and outreach. • Any national messaging should be consistent and accurate, and present a united voice for sustainable management of the resource, not only development. Inaccurate representation of regulatory barriers can create perverse outcomes for the industry (ie. perception of difficult consenting processes), when New Zealand Consent processes are highly regarded internationally.	
		Development of geoheat information package	• While the intent of this action is supported, we are unclear if this has already been actioned through the completion of the GeoHeat business guide.	• Clarify what the information package will entail, and who is to lead the delivery of that package.
	Enabling place based geothermal clusters	Work with developer, investors etc to grow opportunities	• The outcomes focus heavily on supply of geothermal energy, and do not address demand for low carbon renewable energy, and opportunities to grow that demand and streamline transition. • Another option is a government-led Geothermal Development Initiator (GDI) to facilitate access to geothermal resources for uses beyond electricity generation. Current models focus narrowly on energy. A GDI could unlock broader applications such as mineral extraction, tourism and research by proving resource viability, unitising access rights and enabling a “fluid-as-a-service" market.	• Includes specific actions to grow demand, as well as supply.
		Zoning provisions	• We support the development of place-based clusters. These already exist at Kawerau Tauhara and Ngawha, and there is considerable opportunity to leverage new opportunities in these areas. We also support the intent of zoning to enable place-based clusters, noting that this practice is already used both by regional councils and district councils (e.g. Taheke 8C). The Geothermal System classifications approach used in the TVZ is another example of spatial planning, and should be retained in future spatial planning documents.	• Clarify the likely new focus areas for place-based clusters. • Amend to make specific reference to opportunities for local place based clusters on Māori land.

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			• At a smaller scale, ahu whenua trusts present a unique opportunity for geothermal clusters, to provide energy security, heating for Papakāinga and direct use of food production for the wellbeing of whānau.	• Include Local Government as key drivers of place-based clusters.
		Geothermal centre of excellence	• A Geothermal Centre of Excellence is supported. This could include a hub of geothermal research, geothermal expertise, innovation and commercialisation. A dedicated hub would support commercialisation, innovation, export of geothermal services, workforce development and cross-sector collaboration. The Taupō Volcanic Zone, particularly Taupō, would be a logical location for this.	• Retain
		Geothermal tourism opportunities	• Identifying geothermal tourism opportunities is strongly supported. However, the Strategy only makes cursory reference to tourism opportunities in the Action Plan. More detail is needed to signal how the Government and industry will grow geothermal tourism opportunities (e.g. spa and wellness, research into the health giving properties of geothermal, supporting local communities expand existing bathing facilities, working with existing providers to promote geothermal experiences domestically and internationally, embedding geothermal tourism into international marketing, and developing geothermal walking trails supporting interpretation material to build awareness etc). • Most geothermal tourism depends on the protection of New Zealand's remaining taonga, and the sustainable management of the resource, especially in places like Rotorua, Waimangu, Waiōtapu, Taupō, Ngawha, Hanmer, and Auckland. In these systems protection should be prioritised over development, and extractive uses should be limited for low impacts tourism experiences (e.g. bathing).	• Amend the strategy to include specific actions relating to geothermal tourism and the protection of geothermal taonga, including natural features, as a specific action to enable and promote geothermal tourism. • Amend to enable identification of tourism opportunities in other areas along with Taupō and Tarawera regions.
	Driving Science, Research and Innovation	Supercritical	• While we support work towards proving the Supercritical resource, science research and innovation should not be limited to supercritical geothermal but should include technologies that improve extraction from existing reservoirs (e.g. enhancing permeability in hot rock zones) and reduce the need for new developments in sensitive areas.	• Include additional actions to signal how science, research and innovation will be advanced.

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			• There is also a lot to gain in indigenous knowledge, and an action should be included to recognise and promote the use of Mātauranga Māori in geothermal innovation. • We seek an additional action for the research into the restoration and enhancement of degraded geothermal features and ecosystems.	
Horizon 2	Improving access to data	Ongoing provision of data to a central repository	• Is unclear what this action refers to, including what data a centralised repository would include, who would be providing that data, or who would be responsible to host, update and manage this repository. Careful consideration of regional council contribution to, and resourcing of this action is needed. and we seek further clarification and engagement with the regional sector via the **Te Uru Kahika Geothermal Working Group**, and the **Te Uru Kahika Data Management System** Special Interest Group. • We agree that inaccessibility to data by central government, local government, industry and stakeholders is an issue for geothermal development. There is a huge amount of data held by central and local government, research institutions (including the CRIs and universities) industry, iwi and hapū, often in disparate data sets. For example, the Crown holds data from historical exploration, much of which is not in the public forum, or must be purchased. Regional councils hold information collected for different purposes, such as state of the environment monitoring, consent assessments, incident responses, and compliance monitoring. Much, but not all of the data held by regional councils is already in the public forum (e.g. data portals). • We agree that there are benefits to standardising the way data is collected and shared, and to collectively making this freely available - the New Zealand Wells Data base, and LAWA are good examples of this. However, we think that what is needed is not centralisation of that data, but the ability to easily and quickly draw from those datasets. The Parliamentary Commissioner for the Environment specifically considered this issue and recently made specific recommendations to multiple Ministers about 'federated systems' to manage environmental	• Close collaboration with the regional sector to clarify the intent and scope of this action, prior to finalisation of the strategy and adequate resourcing of regional councils to contribute. • A new action: *National direction and agreed protocols around the release of commercially sensitive data, according to certain timeframes (e.g. 5 year withholding period)* • Include a new Action: *Support for tangata whenua led solutions to managing geothermal data on their whenua (e.g. sensitive data cultural values associated with geothermal sites)* • Include a new Action: *The Crown will make publicly and freely available all geothermal information it*

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			data. This is a way of organising autonomous databases into a universal system for sharing data, while each database remains independent, and managed by the appropriate organisation. He provided the example of the Integrated Data Infrastructure (IDI) system led by Stats NZ. • While we support the intent to ensure data is accessible, we also wish to raise the resourcing implications for regional councils in providing data to a central repository (or working towards a 'federated system'. Avoiding duplication, would be front of mind, and councils would require clear automated processes to 'pull in' our data, and resourcing of this functionality to ensure that the costs of centralisation are not entirely carried by our communities. • Data sensitivity is also an issue of concern for regional councils. In a few cases data may be withheld from wider public release (as per provisions of the RMA, or Local Government Official Information and Meetings Act). Some national policy guidance on how to manage commercially sensitive geothermal data would be useful. • Also, data collected by regional councils on private land, can sometimes have caveats on its wider use (e.g. protecting some information, or approval prior to release). Regional councils are only able to collect this information in partnership, and with cooperation of landowners. We would seek assurance that restrictions/approval processes were put in place for this data. • Centralisation of data is not always appropriate for iwi and hapū, and often they seek resourcing of their own bespoke databases, where they can manage and protect information sensitive to them. Local Māori led solutions to data management, in partnership with regional councils, can contribute to growing capacity and capability of Māori in geothermal development. Finally, the management of any repository needs to be enduring (i.e. not reliant on individual staff relationships, political cycles, or discretionary funding). Consistency and standardisation need to be maintained, both spatially and temporally.	*currently holds as a commercial asset.*

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		Crown involvement in further exploration and modelling	• Crown involvement in exploration and modelling is supported. The action could be expanded to include involvement and funding of system characterisation research and data, such as thermal infrared, chemistry, baseline surface feature assessment and monitoring, metalotellurics, conceptual. Funding could also include support for the development of whole system management plans, and iwi engagement for conditional development systems etc	• Expand action to include a wider range of research to support system characterisation, and system management plans for systems involving multiple landowners, iwi and ahu whenua trusts.
		Low heat geothermal mapping	• The intent of this action is supported, noting current work of the regional sector, and the need for this at an appropriate scale for local place-based solutions. The Strategy could provide pathways to unlock low temperature opportunities. Some ideas include undertaking detailed remote-sensing and on-the-ground surveys to delineate and assess low-temperature geothermal systems.	• Include actions to support local place-based mapping (e.g. by regional councils).
	Regulatory settings	Review Geothermal Regulations	• The Geothermal Regulations 1961 are now nearly 70 years old and are no longer fit for purpose. We support a review of the regulations. The regional sector will make a strong contribution to this review, given our experience in managing wells through our consenting processes.	• Amend the strategy to bring the review of the Geothermal Regulations 1991 forward to Horizon 1.
		Exploration of role of policy direction	• There is support for some national policy direction around spatial planning, integrated management with groundwater, Māori rights and interests, system characterisation and centralised data management. • For example, we seek specific reference to and endorsement of the United Nations Framework Classification (UNFC) of Resources. The framework provides transparency and consistency, helping investors and planners assess project viability. Since 2016, the geothermal sector has had a dedicated UNFC specification, and its use is gaining international momentum across renewable energy projects. • We also suggest a new action under Horizon 2 to identify consistent and enabling consenting pathways for small low temperature uses. Waikato Regional Council already has enabling policy, including	• Include new actions under Horizon 2 to: *identify consistent and enabling consenting pathways for small low temperature uses; endorse the UNFC; and national standards for geothermal bonds.* • Amend: Explore the role of policy direction for *sustainably* managing and enabling geothermal

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			permitted activity standards for some low temperature takes, but this could apply more widely, supported by the Government and regional councils. • We also recommend national standardisation of bond requirements to ensure adequate financial provisions for well closure and abandonment.	resource use (e.g. national direction)
		Strengthening of career paths	• This action is supported. Regional councils play a strong role in supported the development of geothermal career pathways, both through the support of students, and internships. Councils are well placed to support this action, in collaboration with tertiary institutes.	• Retain
		Strengthen bilateral relations	• Seek clarification of what is intended for this action.	• Clarify intent
	Advancing knowledge and uptake	Mechanisms to pilot technology for domestic and commercial uses	• The intent is supported, noting that further detail would be helpful. In our experience aging housing stock and costly geothermal infrastructure make domestic (and commercial) heating schemes cost prohibitive. Opportunities for shared schemes, or cascade uses, are therefore hugely important for regional economies and community wellbeing. For example, funding structures to support small community projects, such as Papakāinga would be supported. These are not limited to the TVZ and extend to low temperature resources found throughout New Zealand.	• Include additional actions or examples: *pilot low temperature technologies for Papakāinga housing; improved information to end users (such as industry hubs); Government investment into feasibility studies for businesses to transition to geothermal technologies; Government investment into new heat pump technology.*
	Enabling place based geothermal clusters	Opportunities and incentives to cluster	• The Action is supported as it aligns with climate change and efficiency goals, and system classification. The concept should not be limited to industrial hubs. We also suggest that an action could consider spa and wellness clustering around tourism hot spots to leverage international visitors. Papakāinga development is another opportunity to partner with Māori. We note that the Rotorua-Taupo Regional Deal proposal	• Expand this action to clarify that this does not only apply to industrial or commercial hubs. Include some specific examples.

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			included some mechanisms/incentives to attract investment, which we can provide more detail on.	
	Driving Science, Research and Innovation	Role of reformed science system	• This is generally supported.	• Include a new action: *Central Government support to increase New Zealand science system connectivity and participation in international science funds (eg. EU Horizon).*
		Secure funding for second super critical well	• As above, we think the focus on super critical should be balanced with opportunities to secure funding to develop proven technologies and build on existing opportunities, for example, greater investment of smaller scale opportunities more aligned with regional and Māori economic development opportunities (e.g. Papakāinga housing schemes, covered crops, geothermal tourism). • We also recommend the strategy acknowledge the high-risk nature of geothermal innovation and include mechanisms to support early-stage research and development by industry. Transformative technologies often involve long timeframes and significant financial risk, which may deter private investment without government support. In addition to regulatory and data improvements, public-private partnerships and targeted incentives are essential to encourage innovation and uptake.	• Include actions to secure funding for smaller place based opportunities using proven technology. • include mechanisms to support early-stage research and development by industry
Horizon 3	Geothermal data and insights	Crown led exploration	• Crown led exploration is supported, but the action should clarify that this extends to exploration in a broad sense (ie. not just drilling). • Improved access to data and insights should also extend beyond 'exploration' and include Crown investment in the full range of assessment that is required to promote development e.g. Māori engagement processes, support for the development of SMPs, other resource assessment tools etc.	• Include a new action: *Government include Crown investment in the full range of assessment, including engagement processes, Treaty settings, system management plans*

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	Regulatory settings	Appropriateness of field classification following further investigation	• System classification is an enabling spatial planning and management framework and we support acknowledgement of this in the Strategy. We also support the Strategy signalling that any changes should be evidence-based and supported by investment in resource characterisation and system delineation. • System classification is a regional council policy tool that has been developed through statutory processes. While pathways for reclassification are included in policy documents, changes to the classification system will likely be driven by new legislation and planning processes. Timeframes for the reclassification of systems will be determined by the reform and transitional provisions. We expect this to happen more quickly than is indicated in Horizon 3, led by regional councils. • We also stress that system classification depends not only on a system's physical characteristics or energy potential, but also on an assessment of the effects likely as a result of development, other spatial constraints (e.g. neighbouring systems) and landowner and community aspirations.	• Delete this action from Horizon 1 and include as an example of fit for purpose regulatory frameworks under Horizon 2. • Clarify the lead role of regional councils and policy processes in system classification • Clarify that system classification is not only determined by system characterisation and energy potential
		System wide funding mechanisms	• We are unclear what this refers to, but in principle support a place based, whole system approach to development, and opportunities to streamline and facilitate this would be supported. In our experience, funding mechanisms could enable Māori entities to engage in system management plan processes, and funding whole system characterisation (e.g. at Tikitere). • We also recommend that the strategy includes opportunities for public-private partnerships to support geothermal development. Collaborative investment between government and industry can reduce risk for early-stage projects, encourage innovation and unlock complex infrastructure. Including this model would strengthen the strategy's delivery potential.	• Include new action: *System wide funding mechanisms, <u>including the development of system management plans for conditional development systems, supporting Māori engagement in geothermal planning processes; public and private partnerships.</u>*

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	Advancing knowledge and uptake	Transition government users to geothermal	• This is supported, but only where this is the most appropriate source of renewable energy, where this use is sustainable, and where Māori uses for customary and cultural purposes are not disadvantaged. In Rotorua for example, the resource is vulnerable to overextraction, and the limited resource is prioritised for the protection of the taonga and customary practices. In the past Māori were alienated from this resource, while Government entities enjoyed the benefit of geothermal resources. The Rotorua System Management Plan aims to correct this imbalance.	• Amend to read: *Transition government users to geothermal <u>where this is the most efficient, equitable and sustainable source of energy available.</u>* • Include a new action: *<u>prioritise the delivery of geothermal for communal use by tangata whenua, for cultural uses, such as Papakāinga and marae heating</u>*
	Driving Science, Research and Innovation	Geothermal technology to support and install super critical power station and connect successful well sites	• As above, we suggest that driving science research and innovation should also include investment in low temperature technology, drilling practices, improved efficiency for direct heat uses, CO_2 injection, managing scaling, understanding and managing surface effects. We also recommend the strategy acknowledge the high-risk nature of geothermal innovation and include mechanisms to support early-stage research and development by industry. Transformative technologies often involve long timeframes and significant financial risk, which may deter private investment without government support. In addition to regulatory and data improvements, public-private partnerships and targeted incentives are essential to de-risk innovation and encourage uptake.	• Amend the Strategy to include other examples of research and innovation