May 31, 2023

Electricity RMA Project Team
MBIE Energy & Resource Markets
25 The Terrace, Wellington 6011
ElectricityRMA@mbie.govt.nz

Submission on the Proposed National Policy Statement for Renewable Electricity Generation 2023

New Zealand Geothermal Association (NZGA)

1. The NZGA, incorporated in 1992, is a non-political, non-governmental and not-for-profit organisation, with a focus on fostering a sustainable future for Aotearoa New Zealand through the use, development or protection of geothermal resources. The NZGA is an affiliated member of the International Geothermal Association and the Royal Society of New Zealand. The NZGA connects with global geothermal communities and is well positioned to positively influence geothermal initiatives on the international stage.

2. NZGA membership comprises ca. 450 individuals, as well as corporate members, representing, research organisations, Māori trusts, geothermal electricity generators, engineering consultants, technology companies and planning consultants. This diverse and skilled network of people work and live with Aotearoa's geothermal resources.

3. This submission has been prepared by members of the New Zealand geothermal community. The submission was reviewed by a reference group comprising experienced practitioners in the consenting of geothermal projects (including scientists, engineers, Māori, planners, lawyers and others). This submission was approved for release by the NZGA Executive Board.

Background to Geothermal Electricity Generation in New Zealand

4. Geothermal is low-carbon renewable energy that New Zealand has been able to harness reliably as base load energy[1] (>95% availability) for over 60 years. The median lifecycle emissions intensity of geothermal in New Zealand is 62gCO_2e/kWh, higher than other renewables but an order of magnitude less than fossil fuel.

5. New Zealand's first geothermal power station at Wairākei, near Taupō, first contributed electricity to the national grid in 1958. By 2022, 18% of New Zealand's electricity generation came from geothermal power stations (refer Figure 1).

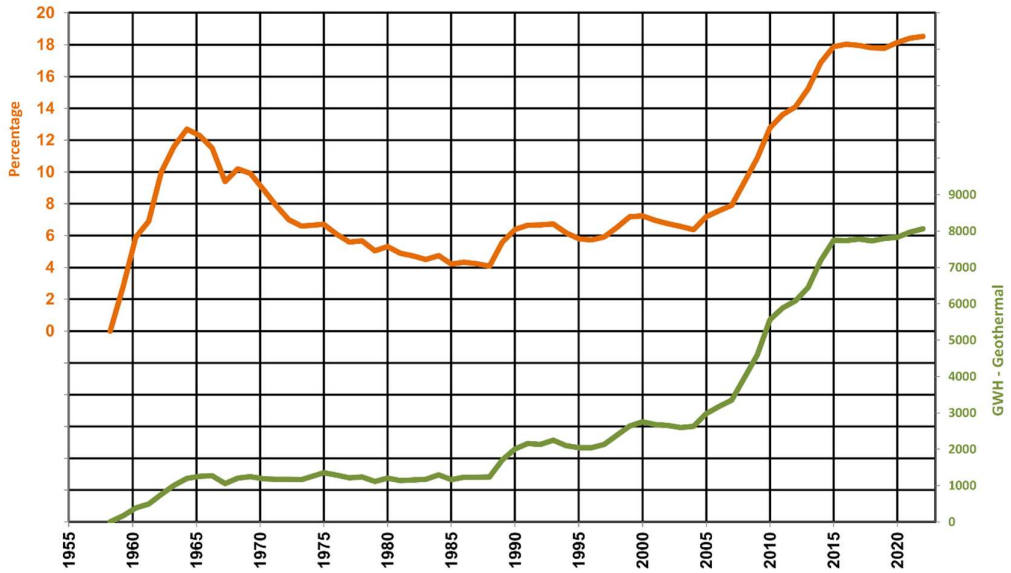

Figure 1 Geothermal generation GWh per annum (right axis; green) and geothermal percentage of total electricity generated in New Zealand (left axis; orange)[2].

6. A number of geothermal fields in the Taupō Volcanic Zone and at Ngāwhā (Te Tai Tokerau) are currently used to generate electricity. The deregulation of the electricity sector that commenced in 1987 has seen State Owned Enterprises, public companies, consumer trusts and Māori entities now involved in developing geothermal power generation facilities, with growth over time occurring particularly after 2005.

7. Two technologies for geothermal electricity generation are in use in New Zealand:

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[1] Being energy that is less susceptible to external influence due to the consistency of supply, unlike wind energy for example, which is more variable with time.

[2] Updated and amended from Kissick, D., Climo, M., Carey, B., 2021 An Overview of New Zealand's Geothermal Planning and Regulatory Framework. Traverse Environmental Limited https://www.geothermalnextgeneration.com/knowledge/new-zealands-conventional-geothermal-planning-and-regulatory-framework

- **Condensing Steam Turbines (can be single-, double-, or triple-flash)**: steam produced from two phase geothermal fluids / produced directly from underground is supplied to steam turbine driven generators at one two, or potentially three different pressures, and

- **Binary Cycle:** heat is transferred from geothermal fluids to a secondary fluid, usually an organic fluid such as N-pentane or iso-pentane. The pentane fluids are in a closed loop. These fluids accept heat from the geothermal fluids, drive the turbines, release heat to the atmosphere and then are pumped back to be reheated again in the loop.

8. Renewable energy resources are an increasing component of New Zealand's 2050 "zero carbon" energy portfolio, but the nation has quite some distance to go to achieve this target, with all carbon-friendly energy sources needing to significantly increase their contribution.

9. Aotearoa New Zealand's geothermal resources are already widely used (currently 18% of all generation refer Figure 1) to generate low-carbon electricity to supply for national demand, and geothermal heat is used directly to support residential, recreational, tourism, commercial and industrial scale uses regionally.

10. NZGA is confident that there is much more that geothermal resources can contribute to New Zealand's renewable energy and carbon goals, with further exploration and development of existing resources and the potential for deeper superhot supercritical resources, particularly within the Taupō Volcanic Zone. The challenge for the geothermal sector is to sustainably use geothermal systems to the greatest possible extent, *and* then, where possible, investigating the potential to go deeper, tapping into superhot supercritical heat resources which are expected to offer substantial additional energy potential for the nation as the technology develops.

11. In addition to the existing baseload geothermal generation of 8,060 GWh/annum, the following is a summary of anticipated additional geothermal generation (plant capacity in brackets):

    a. Additional facilities at Tauhara (Tauhara II (184 MWe) expected to come online by the end of 2023 and Te Huka II (51 MWe) expected to come online by the end of 2024, anticipated to be producing an additional 1,932 GWh per annum of electricity by the end of 2024.

    b. Ngāwhā Generation are currently awaiting final approval for a 5th power plant, OEC 5 by the Northland Regional Council (NRC) under resource consents granted for generation facilities at Ngāwhā. OEC5 is expected to produce about 300 GWh per annum (35 MWe). This comes after three years of operation of OEC4, which commenced in December 2020.

    c. Consent applications are in process for an expansion at Ngātamariki producing about 350 GWh per annum (40 MWe).

d. Exploration activity is also underway at Taheke, north-east of Rotorua.

Role of geothermal in New Zealand's future

12. As is recognised in Ināia tonu nei: A low emissions future for Aotearoa[3] prepared by the Climate Change Commission ("CCC") as advice to the Government, a combination of "wind, geothermal and solar can meet the expected growth in demand of electricity from electrifying transport and heat to 2050 while keeping electricity affordable".

13. This is supported by the modelling completed by the CCC who have identified a 1TWh/annum increase in generation from wind, solar and geothermal beyond 2030.

14. NZGA acknowledges, as does the CCC, that some geothermal fields have higher emissions associated with their geothermal fluids. However, as also acknowledged by the CCC, these high emitting fields have naturally degassed in recent years. The CCC's assumption that a continued reduction in emissions intensity is also anticipated by NZGA. The 7-year trend of data from 2015 through to 2021 shows a decline rate of 6% per year in the overall emissions intensity of the industry. Also there will be step changes downwards, as geothermal operators have embarked upon projects/programmes to return the gases back underground to where they came from, dissolved in the reinjected geothermal water. Pilot trails are operational at three binary cycle geothermal power stations, operated by three different energy companies. These trials have been successful to date and are anticipated to continue into the future, where they will come to be reflected in the emissions intensity values for those power stations. Plans are underway for similar projects in more geothermal power stations.

15. The CCC also recognise that "New generation will need to be built rapidly to meet this increase in electricity demand. However, many forms of renewable generation, especially hydropower, wind and geothermal, have the potential to come into conflict with the resource management system." The CCC go further to recommend that "to ensure the fast-paced and sustained build of low-emissions electricity, Resource Management Act (RMA) processes, other national and local government instruments, and settings for transmission and distribution investment decisions need to uphold Te Tiriti o Waitangi/The Treaty of Waitangi and be aligned with the required pace for build."

16. NZGA support the advice from the CCC and consider that the NPS REG and the future potential NES REG are essential tools for enabling the necessary transition from fossil fuels to renewable

[3] Climate Change Commission https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/

electricity generation. As identified by CCC, the geothermal sector has a significant ongoing role in contributing to New Zealand achieving a climate-resilient and low emissions future.

Existing planning framework application to geothermal resource use and management

17. As is acknowledged in the Consultation Document[4], New Zealand's current approach to geothermal resource use and development, including the classification of geothermal systems, is internationally recognised. Our global reputation for sound geothermal resource management is looked to by several other nations as a good practice example, and New Zealand is considered to be internationally leading in this space. While there is always room for improvement, the NZGA seeks that our good practice experience is not lost through the NPS REG review process. The Consultation Document also states that "*There are no specific changes proposed to the status quo for geothermal generation*." NZGA notes that with the current resource management framework reform, guidance at a national level through this NPS, on what is a significant topic for New Zealand, is highly beneficial.

18. However, as proposed, the direction in the NPS REG appears to favour wind and solar renewable electricity generation over geothermal. This is discussed and amendments recommendations included in Table 1 below. To achieve the stated objective of the NPS REG and achieve policies relating to recognising the national significance of REG activities, enabling them and avoiding the loss of renewable electricity generation output, the significant contribution of geothermal to electricity generation in New Zealand, now and into the future needs to be supported.

19. Experience of NZGA members in resource consent processes for large-scale renewable development proposals is that the current NPS REG often draws less focus in decision making (including consent decisions and the imposition of consent conditions) compared with, for example, the NPSFM. This review of the NPS REG provides an opportunity for clearer national direction on the importance of renewable electricity generation activities, including geothermal, in achieving the climate-resilient and low emissions future desired by New Zealanders, particularly in situations where those values impinge on the ability to achieve other environmental objectives and some prioritisation is required.

20. The Consultation Document[5] acknowledges historical cultural and environmental concerns associated with geothermal resource use and development. NZGA acknowledge that large-scale geothermal resource use for power and industrial purposes, which commenced in New Zealand

[4] Page 22
[5] ISBN 978-1-99-104123-4

in the mid 1950's, was undertaken in an era when energy production was the primary focus with cultural and environmental management aspects given a lower consideration. The geothermal sector has matured since these early developments, embracing methods that avoid, remedy or mitigate adverse effects as is now appropriate under the Resource Management Act 1991.

21. Today, a greater balance is achieved between environmental protection and resource use and development. In the Taupō Volcanic Zone, under the management of Waikato and Bay of Plenty Regional Councils, this is achieved through the classification of geothermal systems based on their values and characteristics. This system identifies through regional plans, whether a system has significant environmental or cultural values meaning it requires protection and preservation, compared with those systems identified as appropriate for potential resource use and development.

22. For large scale geothermal developments, the Assessments of Environmental Effects (AEE) lodged with consent applications under the current planning framework are substantial and comprehensive. The resulting activities permitted by the planning documents and consents are environmentally sustainable with appropriate monitoring and with an eye to longer term resource sustainability. Consent conditions require comprehensive monitoring and enable adaptive management to mitigate adverse effects. Expert Peer Review Panels assist the Councils in annual review and oversight of the consented operations. There is tangata whenua involvement through consenting processes; from preparation, hearings and ongoing through the operational life of the facilities. Māori Trusts are actively involved in geothermal projects with significant financial investment in large scale geothermal operations. A paper presented at the 2022 New Zealand Geothermal Workshop (Climo et al 2022[6]) details some of the entities involved.

23. The management of greenhouse gas emissions from geothermal electricity generation facilities is receiving substantial focus in New Zealand and around the world.

Geothermal Consenting Renewals: 2045 to 2055

24. In late 2022, geothermal electricity generation activities at Wairākei/ Te Mihi/ Poihipi was reconsented until 2057, including the expansion of the generation (from ~320 MW to ~400MW, enough electricity for 70,000 more homes).

[6] The paper is downloadable from https://assets.website-files.com/5ee80754caf15981698cc972/637a818ecd58e421576e173d_NZGW22%20Paper%2021%20Commercial%20Arrangements%20(18Nov2022).pdf

25. However, eight out of 14 of the larger geothermal operational resource consents will expire during the period between 2045 to 2055[7]. This includes consents for the facilities at Ngāwhā, Rotokawa, Ngātamariki, Kawerau, Ohaaki and Tauhara. This represents a substantial portion of renewable geothermal electricity generation right at that time that the net-zero carbon target for 2050 from the Climate Change Response (Zero Carbon) Amendment Act 2019 comes into force.

Submission overview

26. This submission has been prepared to ensure that the Proposed National Policy Statement for Renewable Electricity Generation (NPS REG), and any subsequent National Environmental Standard for Renewable Electricity Generation (NES REG), reflects and continues to support the important role of geothermal electricity (geothermal energy) in New Zealand's energy future while recognising the complexity and uncertainty associated with geothermal resources and their use and development.

27. In Table 1 (**attached**), we offer comment on specific provisions within the Proposed NPS REG.

I welcome the opportunity to present to the Select Committee regarding this submission and can provide additional and supporting information on request.

Nāku noa, nā,

Kennie Tsui
Chief Executive – New Zealand Geothermal Association
E. ce@nzgeothermal.org.nz

[7] Table 2 from Climo et al, 2022. *Commercial Arrangements Underpinning Aotearoa New Zealand's Industrial Scale Geothermal Operations.* http://www.geothermal-energy.org/pdf/IGAstandard/NZGW/2022/021.pdf

Table 1 *NZGA comments on the proposed provisions of the NPS REG*

Section	*NZGA Position*	*NZGA Reasons*	*NZGA Relief Sought*
Part 1: Preliminary provisions			
1.3 Interpretation Definition of Areas with significant environment values	Support with clarification	***areas with significant environment values*** *means any or all of the following:* *(a) areas with natural character in the coastal environment:* *(b) outstanding natural features and landscapes, both within and outside the coastal environment:* *(c) areas with historic heritage, including sites of significance to Māori and wahi tapu:* *(d) significant natural areas* In relation to (d), and as outlined in relation to the definition of 'significant natural areas' below, clarity is needed on the criteria being used to identify these areas.	Clarification is needed over the criteria to be used to identify 'significant natural areas' i.e. whether this is as directed in the NPS Indigenous Biodiversity, or some other criteria and how this is intended to apply to the NPS REG.
1.3 Interpretation Definition of significant natural area	Support with amendment	The identification of 'significant natural areas' in the NPS REG appears to be relying on mechanism for identifying these areas in regional policy statements or plans and district plans without clarity around what this identification process requires and therefore, the nature and extent of areas that could potentially be identified as 'significant natural areas' through the use of 'ecological significance criteria'. Clarification is required to inform the application of 'significant natural areas' in the NPS REG. There has been significant work by Regional Councils in the Taupō Volcanic Zone (TVZ) to identify geothermal systems that should be protected from geothermal resource use and development (e.g. because of significant cultural or natural values). It is not clear how, or whether, the drafting in the proposed NPS REG works alongside these existing frameworks. Greater clarity on the definition of 'significant natural areas' (and how these are to be identified) will likely assist in clarifying this.	Clarification is needed over the criteria to be used to identify 'significant natural areas' i.e. whether this is as directed in the NPS Indigenous Biodiversity, or some other criteria and how this is intended to apply to the NPS REG.
1.3 Interpretation	Support	NZGA is supportive of the inclusion of continued geothermal within the definition of renewable electricity generation	Retain definition as proposed

Section	*NZGA Position*	*NZGA Reasons*	*NZGA Relief Sought*
Definition of renewable electricity generation			
1.3 Interpretation Definition of repowering	Amendment required	NZGA seeks that the definition of repowering is amended to include specific reference to geothermal REG assets, alongside solar and wind. This definition is important in the NPS REG as it provides for comprehensive replacement and upgrading within an existing site and currently omits reference to geothermal, which has potential implications in relation to reconsenting these activities in future. Recent reconsenting processes on the Wairākei Geothermal Field show that modern technology can be employed in the replacement or upgrading of existing assets to significantly increase generation outputs. In that example, new technologies are proposed to generate 20% more electricity while only increasing the take of geothermal fluid by 2%.	Amendment to the definition of repowering is required to make specific mention of geothermal REG asset renewal as outlined below (additions underlined): ***"repowering,** in relation to <u>geothermal</u> wind and solar REG assets, means their comprehensive replacement or upgrade, within an existing site, at the end of the asset's operational life or when it becomes cost-effective to replace the existing technology to increase generation output"*
Part 2 Objective and Policies			
2.1 Objective	Support	NZGA is supportive of the focus of the single objective of the NPS REG to significantly increase the electricity generated from renewable resources to achieve New Zealand's commitments to emissions reduction and energy targets.	Retain objective as proposed
2.2 Policies Policy 1	Support	NZGA is supportive of the multi-level and broad scale recognition of the benefits of increased renewable electricity generation proposed through Policy 1.	Retain policy as proposed
Policy 2	Support	NZGA is supportive of the stronger focus on enabling decision making in relation to renewable electricity generation activities as proposed through Policy 2.	Retain policy as proposed
Policy 3	Support with amendment	NZGA is supportive of the recognition and provision for Māori interests in relation to all renewable electricity generation activities. Geothermal electricity generation activities at Mokai, Kawerau, Rotokawa, Ngāwhā all have significant if not complete	Amend Policy 3 to reflect the importance of Māori values for all scales are REG activities (deletions strikethrough): ***Policy 3:** Māori interests in relation to REG activities are recognised and provided for, including through early*

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		ownership/involvement by Māori-owned enterprises (as described in relation to Clause 3.5 below). As such, NZGA considers that this recognition and provision for Māori interests should extend to all REG activities and not simply those at a small or community-scale as could be interpreted through the current wording in Policy 3.	*engagement, protection of sites of significance, and through enabling ~~small and community-scale~~ REG activities.*
Policy 4		The Taupō Volcanic Zone (TVZ) area covers over twenty defined geothermal systems. These systems are classified for a range of purposes (including protection, research and use/development at different scales) in the existing Regional Plans for Waikato and Bay of Plenty Regions. Despite recognition of the classification of geothermal systems in the Consultation Document[8], it is unclear whether and how, the direction in Policy 4 as proposed, is intended to apply to geothermal systems in the TVZ, particularly those that are classified specifically for protection due to their significant natural features and cultural values. While the policy does apply the effects management hierarchy for management of actual and potential adverse effects, NZGA is mindful that this proposed national level direction may have adverse implications for the existing classification framework employed successfully by regional councils within the TVZ. In particular, as proposed, the direction in Policy 4 which provides for REG activities in areas with "significant environmental values", could enable geothermal resource use and development in areas previously identified for protection should the requirements of the effects management hierarchy be satisfied. This approach would require significant changes to the direction set in existing regional plans, removing the quid pro quo for an enabling approach to development in Development Geothermal Systems and has the potential to result in a	NZGA seek that the proposed NPS REG recognise and provide for the existing approach to the management of geothermal resources, through geothermal system classification through an amendment to Policy 4, and/or other such relief that would recognise the existing management approach. NZGA welcomes the opportunity to work alongside and/or provide feedback to the Government in the development of provisions in the Proposed NPS REG to provide for this.

[8] Part B Page 22

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		significant change to the current, successful geothermal classification system approach that is internationally recognised. NZGA seeks that consideration and recognition is given the current successful management approach employed for geothermal resource use and development in the Waikato and Bay of Plenty Regions through the proposed NPS REG. This approach would require separate provision including at Policy 4, to recognise this existing approach to ensure that existing areas identified for protection continue to be offered this protection while provision is made in development systems for future use and development. It is noted that the Consultation Document, at Page 22, references the National Policy Statement for Indigenous Biodiversity (NPSIB) and its role in enabling existing geothermal system classifications to continue. However, the NPSIB has not yet been gazetted and its final content has not yet been released so NZGA is reluctant to rely on its contents for the purpose of this NPS.	
Policy 5	Support with clarification	NZGA is supportive of the direction in Policy 5 to enable REG activities, for areas that are not identified as having significant environmental values, while requiring adverse effects on the values of the area be avoided, remedied or mitigated to the extent practicable. What is not clear from either Policy 5 or Clause 3.7 is how it is proposed that the values of these areas will be identified in order for any adverse effects on these values to be identified, and then appropriately avoided, remedied or mitigated. NZGA considers it would be useful for the NPS REG to provide guidance on how it is intended that the values of areas are identified, and the criteria that this values assessment should be based on.	Clarity is needed on how it is intended that the NPS REG will require the identification of values for those areas identified as being not areas of significant environment value.
Policy 7	Amendment required	Reverse sensitivity relates to effects from new activities on permitted or lawfully established activities. Reverse sensitivity effects have the potential to significantly impact on the ability of existing, lawfully established REG activities to operate. Given the identified importance of REG activities in New Zealand, NZGA	Amendment to Policy 7 is required to strengthen the policy direction in relation to reverse sensitivity effects on REG activities as outlined below (deletions strikethrough): ***Policy 7:*** *Reverse sensitivity effects on REG activities are avoided or mitigated as far as ~~where~~ practicable.*

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		consider that the policy needs to send a strong signal that reverse sensitivity effects on REG activities are avoided or mitigated as far as practicable.	
Policy 8	Support	Policy 8 recognises the importance of renewable electricity generation outputs and the consistency of these outputs in achieving New Zealand's emission reduction and energy targets.	Retain Policy 8 as proposed.
Policy 9	Amendment required	The focus of Policy 9, as proposed, is on the timely and efficient upgrade and repowering of existing wind and solar energy generation activities. Geothermal is not included in this policy and as outlined above, geothermal makes a significant contribution to New Zealand's baseload renewable electricity generation ability. The ability to upgrade and replace existing geothermal generation facilities is critical to ensure that these facilities can continue to provide REG for New Zealand. NZGA seeks to have Policy 9 updated to specifically recognise geothermal REG assets, their contribution of geothermal to New Zealand's overall electricity generation.	Amendment to Policy 9 is required to make specific mention of geothermal REG asset renewal as outlined below (additions underlined): ***Policy 9:*** *The timely and efficient upgrade and repowering of existing wind, geothermal and solar REG assets is enabled.*
Part 3 - Subpart 1: Approaches to implementing this National Policy Statement			
Clause 3.2 Consideration of national significance and benefits of renewable electricity generation	Support	NZGA supports the requirement for Councils to include a policy which recognises and provides for the national significance of renewable electricity generation and the need to increase renewable electricity generation. As outlined below in relation to Clause 4.1, clarity is needed within the NPS REG about the process to include this policy in planning documents and whether the first schedule process must be followed.	Retain Clause 3.2 as proposed
Clause 3.3 Consideration of cumulative increases and losses in generation output	Support	NZGA is supportive of the direction in Clause 3.3 in relation to consideration of the cumulative increase in renewable electricity generation output. This includes the contribution that geothermal makes to New Zealand's overall renewable electricity generation.	Retain Clause 3.3 as proposed

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
Clause 3.4 Consideration of operational and functional needs of REG assets	Support with amendment	NZGA is supportive of the requirement to include policy at a regional and district level to recognise and provide for the need to consider operational and functional needs of renewable electricity generation activities. Operational and functional requirements apply to solar, wind and geothermal electricity generation activities. However, exploration and identification of geothermal resources require exploratory well drilling in order for the nature and extent of the resource to be fully understood. NZGA considers that it would be beneficial if the policy required by Clause 3.4 made specific provision for the exploratory investigation and testing required for identifying geothermal resource potential. As outlined below in relation to Clause 4.1, clarity is needed within the NPS REG about the process to include this policy in planning documents and whether the first schedule process must be followed.	Retain Clause 3.4 as proposed with an amendment to include the exploration of geothermal resources as outlined below, or similar relief to achieve the same outcome (additions underlined): *(1) When considering the operational and functional needs of specific REG assets to be in a particular location, recognise and provide for the need for REG assets:* *(a) to be located where a renewable resource is located and available; and* *(b) to be accessible to electricity transmission or distribution networks; and* *(c) to have sufficient land to support all associated current and future REG activities* *<u>(d) to undertake exploratory investigations including drilling in order to determine the nature and extent of any geothermal resource.</u>*
Clause 3.5 the requirement for consideration of operational and functional needs of renewable electricity generation activities and Recognising and providing for Māori interests in relation to REG activities	Support with amendments	NZGA is supportive of the requirement to include policy at a regional and district level to recognise and provide for Māori interests in relation to geothermal REG activities, as outlined above in relation to Policy 3. As one example, Stokes (2000)[9] identified that, "*Geothermal activity has always been regarded as a significant traditional resource among Māori communities of the Bay of Plenty, Rotorua and Taupō district".* "*The Geothermal resources were used in various ways. Hot pools (ngawha, 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 which was endemic in the Taupo district. Many hot pools had well-known therapeutic qualities … some had other qualities and were known as wahi tapu…".*	Retain Clause 3.5 with amendments to reflect the importance of Māori values for all scales are REG activities (deletions strikethrough): *"(1) When making decisions about REG activities, recognise and provide for Māori interests, including through:* *(a) early engagement with tangata whenua in a way that is meaningful and, as far as practicable, in accordance with tikanga Māori; and* *(b) ensuring that REG activities on or near sites of significance to tangata whenua (including wahi tapu) are undertaken in a way that provides for the significance of the sites; and* *(c) supporting tangata whenua to realise their aspirations by enabling ~~small and community scale~~ REG activities."*

[9] Stokes, E., 2000. The Legacy of Ngātoroirangi - Māori Customary Use of Geothermal Resources, October 2000, Department of Geography, University of Waikato, Private Bag 3105, Hamilton, New Zealand. https://researchcommons.waikato.ac.nz/bitstream/handle/10289/6323/Legacy-Ngatoroirangi.pdf?sequence=1&isAllowed=y

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		McLoughlin et al (2010)[10] provides an overview of the wide spectrum of involvement of Māori landowners in the geothermal projects development on their lands including the following geothermal electricity developments: • 35MWe Rotokawa A – landowners Ngāti Tahu, Tauhara North No. 2 Trust with steamfield owned by Rotokawa Joint Venture (50:50 Tauhara North No.2 Trust and Mercury) and Rotokawa Generation (owned by Mercury) as owner of the generation plant, • 60MWe Mokai I & 40 MWe Mokai II – Māori landowners and development through the Māori-owned Tuaropaki Power Company, • Geothermal wells at Kawerau – lands owned, in the majority by Ngāti Tūwharetoa Geothermal Assets Ltd; a subsidiary of Ngāti Tūwharetoa (Bay of Plenty) Settlement Trust, Putauaki Trust and Norske Skog Tasman and wells owned by Ngāti Tūwharetoa Geothermal Assets Ltd • Ngāwhā Power Station – jointly run between Tai Tokerau Māori Trust and Top Energy and owned by the Top Energy Consumer Trust.	
Part 3 - Subpart 2: Managing effects on the environment			
Clause 3.6 Areas with significant environment values	Support with amendment	On its face, it appears that Option 2B is more closely aligned to the current framework for managing geothermal resource use and development. In its application under 2B, the requirement to avoid REG activities would apply where there are significant residual adverse effects in 'significant natural areas'. This would appear to align with the current management of geothermal systems by classification. Option 2B also aligns with the direction of Policy 4, earlier in the NPS REG where REG activities are enabled if the national significance and benefits of the REG activities outweigh remaining adverse effects.	As noted in relation to Policy 4 above, it is NZGA's preference that specific allowance is made in the proposed NPS REG recognise and provide for the existing approach to the management of geothermal resources, through geothermal system classification. NZGA welcomes the opportunity to work alongside and/or provide feedback to the Government in the development of provisions in the Proposed NPS REG to provide for this.

[10] McLoughlin, K. Campbell, A., Ussher, G. 2010 The Ngā Awa Purua Geothermal Project, Rotokawa, New Zealand, April 2010, World Geothermal Congress 2010, Bali Indonesia. https://www.geothermal-energy.org/pdf/IGAstandard/WGC/2010/0227.pdf

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		As outlined below in relation to Clause 4.1, clarity is needed within the NPS REG about the process to include this policy in planning documents and whether the first schedule process must be followed.	
Clause 3.7 Areas that are not areas with significant environment values	Support with clarification	NZGA considers that the direction provided through Clause 3.7 is consistent with the earlier direction in Policy 5 where REG activities are enabled if the national significance and benefits of REG activities outweigh adverse effects remaining after the effects management hierarchy is applied. What is not clear from either Policy 5 or Clause 3.7 is how it is proposed that the values of these areas will be identified in order for any adverse effects on these values to be identified, and then appropriately avoided, remedied or mitigated. NZGA considers it would be useful for the NPS REG to provide guidance on how it is intended that the values of areas are identified, and the criteria that this values assessment should be based on. As outlined below in relation to Clause 4.1, clarity is needed within the NPS REG about the process to include this policy in planning documents and whether the first schedule process must be followed.	As outlined above in relation to Policy 5, clarity is needed on how it is intended that the NPS REG will require the identification of values for those areas identified as being not areas of significant environment value.
Part 3 – Subpart 3: Maintaining and increasing generation output			
Clause 3.9 Maintaining and increasing generation output	Amendment required	NZGA is generally supportive of strengthened policy direction in the NPS REG for the upgrading of existing renewable electricity generation. However, the focus of Clause 3.9 is solely on the upgrading and repowering of solar and wind REG assets and does not provide for the upgrading or repowering of geothermal REG. As outlined in the Consultation Document[11], "*… there is an opportunity now to provide for upgrades that are expected to be needed during the RM reform transition and that will support increased generation with lesser environmental effects than would result from new developments.*"	NZGA seeks amendment to Clause 3.9 to specifically reference geothermal REG assets alongside wind and solar as outlined below (additions underlined) *(1) Decision-makers must enable the timely and efficient upgrade and repowering of <u>geothermal,</u> solar and wind-powered REG assets.* *(2) When making decisions relating to the upgrade or repowering of <u>geothermal,</u> solar and wind-powered REG assets, decision-makers must:*

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Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		However, there appears to be no clear reason in the Consultation Document to specifically exclude geothermal from this clause. As outlined above, recent reconsenting processes on the Wairākei Geothermal Field show that modern technology can be employed in the replacement or upgrading of existing assets to significantly increase generation outputs from geothermal resources without significantly increasing the take of geothermal fluid. Further, a significant number of existing geothermal REG assets will require reconsenting between now and 2050. The resource consenting requirements to enable the repowering and upgrading of these geothermal REG assets would benefit from similar national level direction to that provided for wind and solar REG through Clause 3.9 of the NPS REG as proposed. NZGA is concerned that the omission of geothermal from specific reference in the NPS REG for repowering and upgrading may have implications for the reconsenting of geothermal electricity generation activities, which is against the stated intent of the broader changes to the NPE REG. In addition to the considerations of the efficiencies and environmental benefits of increasing renewable electricity output, the clause also requires the consideration of additional adverse effects as a result of the upgrading or repowering, over and above those considered through the existing consent application. These considerations can equally apply to geothermal REG assets and appropriately provide recognition for this electricity source, alongside solar and wind, while also ensuring that appropriate consideration is given to any additional adverse effects that may arise.	*(a) have particular regard to the efficiencies and environmental benefits of increasing renewable electricity output within the same or a similar environmental footprint; and* *(b) consider only the additional adverse effects on the environment of the upgrade or repowering (and not any adverse effects from the existing consented activities).*
Part 4: Timing			
Clause 4.1 Time by which National Policy Statement to be implemented	Amendment required	Subclause 2 of the identifies that the provisions required by the NPS REG are to be inserted within six months of gazettal however it is unclear whether these changes must follow the existing first schedule	NZGA seeks that clarity is included in the NPS REG to clarity what is intended in relation to changes to regional policy statement and plans and district plans as a result of changes required as follows:

Section	NZGA Position	NZGA Reasons	NZGA Relief Sought
		process specified in the RMA or whether these can be inserted without the requirements of that process. It is recommended that the following statement, taken from the NPS Freshwater 2020 be inserted into the NPS REG to provide necessary clarity: *Local authorities must publicly notify any changes to their regional policy statements, regional plans, and district plans that are necessary to give effect to this National Policy Statement as required under the Act.*	*Local authorities must publicly notify any changes to their regional policy statements, regional plans, and district plans that are necessary to give effect to this National Policy Statement as required under the Act.*