1. Addressing information barriers

1.1 Require large energy users to publish Corporate Energy Transition Plans (including reporting emissions) and conduct energy audits

Q1.1 Do you support the proposal in whole or in part to require large energy users to report their emissions and energy use annually, publish Corporate Energy Transition Plans and conduct energy audits every four years? Why?

Transparency and nudge regulation are to be supported. However, careful consideration needs to be given to whether these additional reporting requirements will be effective. There also appears to be the risk of unnecessary duplication alongside requirements under TCFD, NZX reporting rules and the ETS. Imposing additional compliance costs for limited value would be counterproductive.

Corporate Energy Transition Plans (**CEPTs**) and regular energy audits have merit. If large energy users are to be required to meet this requirement, requiring a comprehensive review of CETPs every year would be excessive. Rather, an annual statement setting out any material changes to a plan would suffice. A comprehensive review of a CETP would be most appropriately conducted following an energy audit, which would provide meaningful insights into the success or otherwise of the plan.

Any proposal will need to take into account the resources available in New Zealand to carry out comprehensive energy audits, and the complexities involved.

Q1.2 Which parts (set out in Table 3) do you support or not? What public reporting requirements (listed in Table 3) should be disclosed?

No comment.

Q1.3 In your view, should the covered businesses include transport energy and emissions in these requirements?

No comment.

Q1.4 For manufacturers: what will be the impact on your business to comply with the requirements? Please provide specific cost estimates if possible.

No comment.

Q1.5 In your view, what would be an appropriate threshold to define 'large energy users'?

It is unclear why a $2 million-per-annum energy spend has been set as the threshold, rather than $1.5 million or $3 million, for example. If the measure is annual energy spend it is possible firms will be captured in some years and not others, which would make the data of limited use for comparison purposes. A more appropriate threshold may be units of energy used per annum (plus or minus a bracket for those that have been captured before).

Q1.6 Is there any potential for unnecessary duplication under these proposals and the TCFD disclosures proposed in the MBIE-MfE discussion document on Climate-related Financial Disclosures?

See the answer to Q1.1 above.

1.2 Develop an electrification information package for businesses looking to electrify process heat, and offer EECA's business partners co-funded low-emission heating feasibility studies

Q1.7 Do you support the proposal to develop an electrification information package? Do you support customised low-emission heating feasibility studies? Would this be of use to your business?

Improved availability of information on electrification options is a sensible and low-cost way of reducing barriers to large users making alternative energy choices.

New Zealand's current annual emissions profile comprises agriculture (48%), transport (20%), other (19%), process heat (8%), waste (5%) and electricity generation (4%)[1].

The Productivity Commission and the Interim Climate Change Committee (**ICCC**) both recognised the significant emission reductions to be made if emission-intensive industries such as transport and industrial heat processing used electricity rather than fossil fuel. The ICCC went on to recommend that New Zealand accelerate the electrification of these two sectors[2].

We share the view of the ICCC[3] that electricity will be a key enabler of decarbonising the economy. This appears to be a view shared by the general public. Our most recent public survey, conducted by UMR this year, found 52 per cent of the more than 1,000 respondents felt the priority should be to remain at about 85 per cent renewable electricity, while focusing on reducing emissions in more carbon-intense sectors. Thirty per cent prioritised a move to entirely renewable generation as soon as possible.

Feasibility studies could offer value where there is a genuine demonstrated appetite to invest in decarbonisation on the industrial user's part. Another option could see EECA conduct higher-level feasibility studies that could be broadly applied to a number of sites with similar characteristics (for example, milk processing plants in Southland). This would provide an indication of the scale of conversion and/or emission reductions available on something closer to a sector-wide basis. Information of this nature would be useful to users and electricity suppliers alike (including Transpower and distributors).

Q1.8 In your view, which of the components should be scaled and/or prioritised? Are there any components other than those identified that could be included in an information package?

Information on transmission and distribution network capacity would be valuable and would have multiple applications. There is a role for the Government in facilitating improved information sharing on demand, generation and network capacity. This is addressed in greater detail in response to questions in Section 10.

1.3 Provide benchmarking information for food processing industries

Q1.9 Do you support benchmarking in the food processing sector?

Benchmarking could save duplication of effort and result in the production of a single 'source of truth' for how individual sites within a sector perform relative to their peers. Providing a system is voluntary as the paper suggests, participants will be able to manage their own costs.

Q1.10 Would benchmarking be suited to, and useful for, other industries, such as wood processing?

[1] https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/nz-greenhouse-gas-inventory-2019.pdf
[2] Productivity Commission *Low-emissions Economy – Final Report* August 2018; Interim Climate Change Committee *Accelerated Electrification – Evidence, analysis and recommendations* April 2019.
[3] https://www.iccc.mfe.govt.nz/assets/PDF_Library/daed426432/FINAL-ICCC-Electricity-report.pdf

The value of benchmarking will vary by industry, but the information could be expected to be of some use regardless of the activity in question.

Q1.11 Do you believe government should have a role in facilitating this or should it entirely be led by industry?

Genesis believes the best outcome will arise if the Government sets the framework and allows industry to lead. Useful information will emerge organically if the proposal for industrial users to develop CETPs is adopted. Benchmarking could be achieved relatively simply with the insertion into the requirements for CETPs of a metric such as tons of CO2-e emitted per unit of production.

A more complete picture of sectoral performance can be expected to emerge anyway, as climate-conscious consumers increasingly demand to know the environmental impacts of their choices. Firms are already responding voluntarily and new regulations are on the way in line with the recommendations of the Productivity Commission's *Low-emissions Economy*[4] report.

2. Developing markets for bioenergy and direct geothermal use

Q2.1 Do you agree that councils have regional air quality rules that are barriers to wood energy? If so, can you point us to examples of those rules in particular councils' plans?

Q2.2 Do you agree that a NESAQ users' guide on the development and operation of the wood energy facilities will help to reduce regulatory barriers to the use of wood energy for process heat?

Q2.3 What do you consider a NESAQ users' guide should cover? Please provide an explanation if possible

Q2.4 Please describe any other options that you consider would be more effective at reducing regulatory barriers to the use of wood energy for process heat.

Q2.5 In your opinion, what technical rules relating to wood energy would be better addressed through the NESAQ than through the proposed users' guide (option 2.1)?

No comment.

Facilitating the development of bioenergy markets and industry clusters on a regional basis

Q2.6 In your view, could the Industry Transformation Plans stimulate sufficient supply and demand for bioenergy to achieve desired outcomes? What other options are worth considering?

Q2.7 Is Government best placed to provide market facilitation in bioenergy markets?

Q2.8 If so, how could Government best facilitate bioenergy markets? Please be as specific as possible, giving examples.

Q2.9 In your view, how can government best support direct use of geothermal heat? What other options are worth considering?

No comment.

3. Innovating and building capability

[4] https://www.productivity.govt.nz/assets/Documents/4e01d69a83/Productivity-Commission_Low-emissions-economy_Final-Report.pdf

3.1 Expand EECA's grants for technology diffusion and capability-building

Q3.1 Do you agree that de-risking and diffusing commercially viable low-emission technology should be a focus of government support on process heat? Is EECA grant funding to support technology diffusion the best vehicle for this?

Genesis does not dispute that, in principle, EECA grant funding is an appropriate mechanism for financing the diffusion of low-emission technologies that have been proven through the technology demonstration programme. However, the paper suggests a wide range of potential initiatives that will all carry costs that are likely ultimately to flow through to consumers as electricity retailers (among others) pass through levy costs.

Therefore, Genesis would encourage a thorough cost-benefit analysis of any proposal that could place upward pressure on consumers' power costs. Given electricity's crucial role in decarbonising the economy, disincentives to use the energy source risk slowing progress.

Q3.2 For manufacturers and energy service experts: would peer learning and on-site technology demonstration visits lead to reducing perceived technology risks? Is there a role for the Government in facilitating this?

No comment.

3.2 Collaborate with emissions intensive and highly integrated (EIHI) industry to foster knowledge sharing, develop sectoral low carbon roadmaps and build capability for the future using a Just Transitions approach

Q3.3 For EIHI stakeholders: What are your views on our proposal to collaborate to develop low carbon roadmaps? Would they assist in identifying feasible technological pathways for decarbonisation?

Q3.4 What are the most important issues that would benefit from a partnership and co-design approach?

Q3.5 What, in your view, is the scale of resourcing required to make this initiative successful?

No comment.

4. Phasing out fossil fuels in process heat

4.1 Introduce a ban on new coal-fired boilers for low and medium temperature requirements

Q4.1 Do you agree with the proposal to ban new coal-fired boilers for low and medium temperature requirements?

Q4.2 Do you agree with the proposal to require existing coal-fired process heat equipment for end use temperature requirements below 100 degrees Celsius to be phased out by 2030? Is this ambitious or is it not doing enough?

Encouraging electrification, or the selection of other fuels, is a lower-risk option than banning certain fuels. Policy settings that ensure an affordable and reliable electricity supply will drive electrification and decarbonisation in a more rational and predictable way.

Genesis understands the need to decarbonise the economy rapidly, and we are working hard to reduce our own impacts. For example, we have taken on the challenge of measuring and disclosing our Scope One, Two and Three emissions. As discussed in relation to CETPs, we believe transparency is key to emission reductions. We are also working to reduce carbon emissions

resulting from our operations, such as through contracting new renewable electricity. Most recently this has seen us secure a PPA for supply from the Waipipi wind farm, equivalent to about 20 per cent of our current thermal baseload generation.

Genesis understands why, on the face of it, banning new coal-fired boilers for low- and medium-temperature requirements seems attractive. Likewise, the logic of supporting a phase-out of existing coal boilers is simple and the benefits (reduced domestic emissions) clear.

However, Genesis urges officials to be mindful of the potential for unpredictable behaviour among participants who react adversely to being forced to change their processes at relatively short notice. Forcing an industrial user's hand could result in sub-optimal choices of fuel and technology, likely to be locked in for years to come, and could result in a gradual de-industrialisation of New Zealand if other jurisdictions are seen as offering more favourable operating environments.

Q4.3 For manufacturers: referring to each specific proposal, what would be the likely impacts or compliance costs on your business?

N/A.

Q4.4 Could the Corporate Energy Transition Plans (Option 1.1) help to design a more informed phase out of fossil fuels in process heat? Would a timetabled phase out of fossil fuels in process heat be necessary alongside the Corporate Energy Transition Plans?

No comment.

Q4.5 In your view, could national direction under the RMA be an effective tool to support clean and low GHG-emitting methods of industrial production? If so, how?

Yes, if it were used to support new grid connections for businesses wanting to transition to electricity.

Q4.6 In your view, could adoption of best available technologies be introduced via a mechanism other than the RMA?

No comment.

5. Boosting investment in energy efficiency and renewable energy technologies

Regulating clean energy spend and/or - incentives for specified low emissions heat technologies

Q5.1 Do you agree that complementary measures to the NZ-ETS should be considered to accelerate the uptake of cost-effective clean energy projects?

MBIE does not recommend regulation to drive clean-energy spend. Genesis agrees with this approach. As we note throughout this submission, a significant investment in large- and small-scale renewable generation is taking place now because the economics are appealing. It is taking place without incentives or significant penalties beyond the addition of a price on carbon and without commercial risk to the Crown. However, subsidies and incentives for clean-energy projects should not be ruled out if they drive a lower cost of electricity for consumers and speed up electrification.

It is our view that the Crown's most appropriate role in overseeing the energy sector is ensuring that policy and market settings are appropriate to encourage development in renewables, while ensuring a secure supply of electricity is available at low cost. It is on this second point that the

interaction between the current market design, the Emissions Trading Scheme and policy direction could potentially be improved. This is discussed in detail later in this submission.

Incentives to drive faster uptake of renewable generation or clean energy may lead to lower system emissions and lower-cost electricity, so are worthy of further consideration. As the paper notes, incentives could carry significant risks and costs, so interventions should be carefully considered and subjected to rigorous cost/benefit analyses. Genesis urges the Government to work alongside large users (that know best their own business needs), generators, Transpower and technology developers to design a system that will deliver genuine environmental benefits. As a general point, consumers' confidence in the reliability and affordability of electricity supply will be a key factor in their energy choices regardless of incentives.

Q5.2 If so, do you favour regulation, financial incentives or both? Why?

See answer to Q5.1 above.

Q5.3 In your view what is a bigger barrier to investment in clean energy technologies, internal competition for capital or access to capital?

This will vary on a case-by-case basis; however, there is evidence emerging that cost certainty and the 'first-mover disadvantage' for customers connected to the national grid are barriers. The first user/causer of a transmission investment currently has to pay for that asset, and subsequent users gain the benefits. These transmission investments are often very significant, which increases the amount of capital required to progress projects.

Q5.4 If you favour financial support, what sort of incentives could be considered? What are the benefits, costs and the risks of these incentives?

A variety of options could be considered. As stated earlier, these would be best designed in partnership with consumers and suppliers, and thoroughly tested for expected costs and benefits. Large users often cite the cost of connecting to distribution or transmission networks as a barrier to electrification, so targeting incentives to soften this cost and remove the first-mover disadvantage would be sensible.

Q5.5 What measures other than those identified above could be effective at accelerating investment in clean energy technologies?

No further comment.

6. Cost recovery mechanisms

6.1 Introduce a levy on consumers of coal to fund process heat activities

Q6.1 What is your view on whether cost recovery mechanisms should be adopted to fund policy proposals in Part A of this document?

Introducing a levy on coal to fund carbon-reduction programmes is consistent with EECA's existing funding framework, to the extent that levy payers have the opportunity to benefit from funded programmes.

Q6.2 What are the advantages and disadvantages of introducing a levy on consumers of coal to fund process heat activities?

It is crucial that any cost introduced is proportionate to the benefits available to levy payers via the new programmes.

Any levy should only apply to users who benefit from funded programmes, or have the opportunity to. Applying a levy to the use of coal in electricity generation would simply increase wholesale costs, which would in turn flow through to consumers. As we set out in detail later in this submission, thermal generation is currently the only economically viable technology available to provide the volume of stored energy required to support New Zealand's electricity system during winter and in dry years. Imposing an additional unavoidable cost on this generation, without any commensurate benefit, would increase costs to consumers and risk delaying the electrification of greenhouse gas-emitting parts of the economy.

It is unclear whether this proposal is intended to apply to schools and hospitals. As predominantly state-funded entities, it is not efficient to levy these organisations to fund another branch of the state to pay for efficiency programmes. That is not to say these and similar organisations should not prioritise decarbonisation – they absolutely should. But a more efficient solution would see the state fund those programmes likely to offer the most impact in the first instance. Recent examples of these include the Government's announcement of $200 million in funding to decarbonise the public service[5].

7. Enabling development of renewable energy under the Resource Management Act 1991

7.1 Amend the National Policy Statement for Renewable Electricity Generation (NPSREG), including potential expansion of its scope to cover a broader range of renewable energy activities

Q7.1 Do you consider that the current NPSREG gives sufficient weight and direction to the importance of renewable energy?

Genesis feels that the current NPSREG does not provide sufficient weight or clear direction on the importance of renewable electricity generation, resulting in local plans not giving meaningful effect to the NPSREG. When compared to other national policy statements, such as the New Zealand Coastal Policy Statement (**NZCPS**), the National Policy Statement for Freshwater Management (**NPSFM**) and the Proposed National Policy Statement for Indigenous Biodiversity (**PNPSIB**), the language used in the NPSREG is comparatively weak and non-directive.

For example, the NPSREG objective states:

"*To recognise the national significance of renewable electricity generation activities by providing for the development, operation, maintenance and upgrading of new and existing renewable electricity generation activities…*" (emphasis added).

In comparison, the NPSFM objectives include:

- "*To safeguard…*" (Objective A1).
- "*The overall quality of fresh water… is maintained or improved while…*" (Objective A2).
- "*The quality of fresh water… is improved so…*" (Objective A3).
- "*To enable communities to provide…*" (Objective A4) (emphasis added).

[5] https://www.beehive.govt.nz/release/flicking-switch-clean-powered-public-service

Similarly, in the policies the NPSREG requires decision-makers to "recognise and provide" or have "particular regard", whereas the NPSFM and NZCPS require them to "avoid" or "protect".

Genesis recommends amendments to the NPSREG to recognise clearly and provide for the importance of renewable electricity generation and supporting infrastructure in New Zealand, not only to ensure electricity capacity but to reduce greenhouse gas emissions. We believe environmental reform policies should be more closely scrutinised as to their broader impacts, and consistency with the RMA's broad sustainable management purpose.

Genesis draws attention to the Draft National Policy Statement for Freshwater Management (**DNPSFM**, released in September 2019 as part of the Action for Healthy Waterways review), and the PNPSIB (released in November 2019). Whilst Genesis supports initiatives to improve the management of freshwater and indigenous biodiversity, the changes proposed by both policies will have significant consequences for existing and future renewable electricity-generation activities, including adverse impacts on generation capacity, output and flexibility.

In particular, both the freshwater and indigenous biodiversity reform packages seek the ultimate protection of resources by avoiding adverse effects and maintaining, improving and restoring resources in accordance with predetermined classification systems. The classification systems are environment focused, and a low bar is set assigning the highest level of protection to the majority of the resources. In the context of renewable energy generation, the reform packages will likely affect all existing hydro-generation sites, and significantly impact on the ability to establish new sites where site clearing (often in remote areas) is necessary for construction activities, and water take (albeit non-consumptive) will be required.

In addition, an "effects management hierarchy" is embedded in the avoidance policy. This sets out that environmental effects should first be avoided then, if that is not possible, remediated, then mitigated and then offset, then finally compensation is considered. Notwithstanding that the RMA does not set any priority for the use, development and protection of resources, the ability to compensate for effects is enshrined in section 104(1)(ab) of the RMA. In the context of renewable electricity generation activities, the NPSREG also provides for compensation measures to manage residual environmental effects.

The benefits of offsetting and compensation can be significant. In the context of freshwater and indigenous biodiversity management, offsetting benefits have not been thoroughly tested across New Zealand, particularly given that measurable offsets are difficult to utilise, and achieve, in practice. It would be remiss to limit the effects' management hierarchy to only offsetting, as compensation has a proven positive track record and has made significant improvements to freshwater ecology and indigenous biodiversity in general. Genesis can cite numerous examples of environmental compensation measures, such as the Whio (Blue Duck) mitigation project and Project River Recovery, that have had (and continue to have) significant positive environmental and ecological outcomes.

When compared to the enabling policy framework of the NPSREG, consenting authorities typically take a conservative approach and consider the NPSREG as secondary behind an avoidance policy framework such as the NPSFM or the PNPSIB. Genesis has concerns that the application of the avoidance policies and the newly introduced "effects management hierarchy" hamper delivery of projects where wider social benefits or positive effects will be provided, even while appropriately managing adverse effects. Genesis does not dispute the importance of appropriate policies to carefully manage New Zealand's natural and physical environment, but recent blanket

environmental protection policies have the potential to hinder the continued operation and development of renewable generation activities. Any loss of generation capacity from renewable sources could be replaced by thermal generation, increasing greenhouse gas emissions.

Q7.2 What changes to the NPSREG would facilitate future development of renewable energy? In particular, what policies could be introduced or amended to provide sufficient direction to councils regarding the matters listed in points a-i mentioned on page 59 of the discussion document?

To facilitate the future development of renewable energy, Genesis considers a full review of the NPSREG is required, rather than amendments to some of the existing policies or the introduction of new policies. In addition, as noted in Q7.1 above, the use of directive language in the NPSREG is necessary to replace the current passive language.

Genesis considers changes to the NPSREG should include:

- A requirement for a broader application of the NPSREG in resource consent processes, not just policy statements and plans, to ensure due consideration at every stage.
- Recognition within the preamble of the climate change impacts on every aspect of our environment and economy and the need to transition to an electrified economy based on renewable electricity generation. Policy A should be amended to protect existing renewable electricity generation activities, and to enable the development of new generation activities, recognising the benefits renewable generation activities create.
- An amendment to Policy C, providing guidance on how to address the effects of renewable electricity generation, recognising it cannot be achieved without some adverse effects.
- A new policy to address the relationship with other national policy statements. In addition, existing statements in the preamble referring to the allocation/prioritisation of freshwater being subject to NPSFM should be deleted or at least reconsidered. The nationally significant benefits of renewable energy infrastructure in addressing climate change effects must be elevated and prioritised.
- Revisions to Policies E1 to E4 to address matters including:
    - That resource consent pathways for new and existing renewable energy facilities should be clarified, including the provision of Permitted, Controlled and Restricted Discretionary Activity status (but nothing higher), and provide for flexibility in timeframe and scope.
    - That consent durations for regional matters (such as freshwater take for hydro schemes), which currently are a maximum of 35 years under the RMA, should be extended to align with the expected life spans of the infrastructure/investments.
    - That consent lapse periods (albeit not currently restricted under the RMA) should be extended to take into account the potentially long lead times of renewable electricity generation projects, and facilitate scope changes for new technologies.
    - That existing renewal/reconsenting requirements should be completely removed, or as a minimum significantly reduced to Controlled Activity status. Assessments should be limited to additional effects likely to result from the continued operation of the activities.
- New policy to include stronger direction to address electricity transmission. The current National Policy Statement for Electricity Transmission (and its associated National Environmental Standard) only deals with the national grid – it does not deal with high voltage lines operated by the electricity generators.
- Amendments to Policy F so that it is more directive to enable small, community-scale renewable electricity generation, including an enabling consenting pathway such as Permitted Activity or Controlled Activity.

- A new policy direction on managing the environmental effects of renewable electricity generation, including:
    - Policies requiring decision-makers to consider whether the avoidance, remediation or mitigation of adverse effects is constrained by the functional and operational needs of renewable electricity generation, and the need to ensure a resilient, secure and reliable electricity supply.
    - Direction on the need for flexibility in using adaptive management, particularly as it relates to geothermal electricity generation. Adaptive management is essential in any geothermal power development; it is common practice in geothermal development for there to be a progressive drilling programme to revise the locations of production and reinjection wells during the life of a geothermal power station. This can involve adjusting the locations of pipelines and making various adjustments to operational plant. Resource consents accommodate adaptive management through system management plans, discharge strategies, system monitoring and peer-review panels.
    - Direction on the use and application of New Zealand Standard NZS 6808:2010 for managing wind farm noise. Despite the existence of this standard, wind farm noise is frequently a point of debate between witnesses in consent hearings. Wind farm noise could be addressed by a National Environmental Standard to ensure consistency and efficiency.
- Amendments to Policy D to provide direction on managing the effects on renewable electricity generation, not only reverse sensitivity effects. For example, some key issues for renewable electricity generation can be explicitly referenced. A known issue is the siting of new sensitive activities close to wind farms.

Q7.3 How should the NPSREG address the balancing of local environmental effects and the national benefits of renewable energy development in RMA decisions?

Genesis considers the focus should be on climate change effects, rather than a comparison (and therefore associated balance) of potential local environmental effects and national benefits. Addressing climate change effects requires a collective effort across all sectors, industry, government and local authorities. The development of renewable electricity generation remains subject to an appropriate environmental assessment framework dictated under the RMA, and the same consideration to avoid, remedy or mitigate (without an effects management hierarchy) adverse effects on the environment. It is important to remember the RMA's fundamental framework being "sustainable management"; it is not an environmental protection principle.

Q7.4 What are your views on the interaction and relative priority of the NPSREG with other existing or pending national direction instruments?

As outlined in our response to Q7.1 above, we consider the NPSREG is a lot weaker in the use of language than other planning instruments, resulting in the benefits of renewable energy receiving lower priority than factors covered by other national policy statements.

Q7.5 Do you have any suggestions for how changes to the NPSREG could help achieve the right balance between renewable energy development and environmental outcomes?

We believe there is a need to strengthen significantly the direction on addressing climate change, elevating it to a key priority. Also, and to this end, renewable generation must be elevated so it is considered a matter of national importance.

Q7.6 What objectives or policies could be included in the NPSREG regarding councils' role in locating and planning strategically for renewable energy resources?

While Genesis appreciates councils have a broad range of expertise, we do not consider it is necessary (or appropriate) for councils to determine key renewable energy resources as they typically do not have the specific skills and experience required. Furthermore, Genesis considers it is not appropriate for councils/ratepayers to incur these costs, as often it is the smaller councils that have the best natural resources for renewable energy. However, better spatial planning to identify areas for development and areas for conservation would help developers to determine the most suitable sites.

Q7.7 Can you identify any particular consenting barriers to development of other types of renewable energy than REG, such as green hydrogen, bioenergy and waste-to-energy facilities? Can any specific policies be included in a national policy statement to address these barriers?

Consenting barriers for the development of other types of renewable energy (e.g. new technology) will likely result from the extensive assessment process that will be required by councils.

For existing renewable electricity generation, consent barriers include: consents that are not flexible to changing technology; very short lapse timeframes that do not reflect the lead times of major infrastructure projects; short durations for regional consent matters that do not align with the operating lives of infrastructure; inconsistent planning rules around the country; excessive assessments and further information requirements resulting in significant time delays and costs; and re-litigation through consent renewals.

Q7.8 What specific policies could be included in the NPSREG for small-scale renewable energy projects?

Small-scale and community projects could be considered as Permitted Activities, providing an appropriate set of standards could be designed.

Q7.9 The NPSREG currently does not provide any definition or threshold for "small and community-scale renewable electricity generation activities". Do you have any view on the definition or threshold for these activities?

Small and community-scale generation could reasonably be defined as generation that is directly connected to a distribution network or supplies a single site.

Q7.10 What specific policies could be included to facilitate re-consenting consented but unbuilt wind farms, where consent variations are needed to allow the use of the latest technology?

Consent authorities often use the renewal process to relitigate matters, which risks the continued operation of renewable generation assets. Genesis would support a fast-track consenting process that reviews only the effects of changes to a consent (for example, to provide for larger wind turbines than originally consented) rather than relitigates the entire process.

Genesis's submission on the RMA Issues & Options paper has sought a range of changes to remove, or simplify, unnecessary reconsenting processes. These changes include:

- Longer consent lapse periods that better reflect the long lead times these significant projects require.
- Longer consent durations (on regional matters that currently are limited to 35 years) to better reflect the long-term investment and the operational life of renewable generation infrastructure.
- Providing flexibility to allow consents to cater for potential technology change.

- Simplifying the consent requirements and activity status of renewal applications to consider only changes or additional effects that were not previously considered.

Q7.11 Are there any downsides or risks to amending the NPSREG?

We do not see any downside or adverse risks to amending the NPSREG. As stated previously, the existing NPSREG does not enable the development of renewable electricity generation and associated greenhouse gas reductions.

7.2 A: Scope National Environmental Standards for Renewable Energy Facilities and Activities (NESREFA)

7.2 B: Scope additional renewable-energy-related content for inclusion in the National Planning Standards

Q7.12 Do you think National Environmental Standards (NES) would be an effective and appropriate tool to accelerate the development of new renewables and streamline re-consenting? What are the pros and cons?

Yes, we consider an appropriately worded NES that fully encapsulates the need to address climate change and move to a low-emissions economy would be an effective tool to assess new and existing renewable electricity infrastructure. Genesis considers NES should set clear consenting processes and assessment criteria. We support the list included on page 62 of the MBIE document of potential matters to be developed, particularly those items relating to the standardising of renewable electricity generation consent processes. We consider and agree with MBIE that NES would significantly and directly reduce the costs of and uncertainty in the consenting process. We acknowledge that developing NES will cost the Government and may take years. However, we consider both amending the existing NPSREG to provide a strong policy framework and the development of NES are necessary to ensure a consistent approach is adopted across the country when dealing with renewable electricity generation projects.

Q7.13 What do you see as the relative merits and priorities of changes to the NPSREG compared with work on NES?

NPSREG changes must be progressed with urgency to set a strong and clear policy direction. This sets the framework for NES.

Q7.14 What are the downsides and risks to developing NES?

One size does not fit all, so there is a risk that overly prescriptive NES could create unnecessary barriers to developing renewable electricity. It is important that NES provide for flexibility to cater for new technology and developments. The Government has to set NES and not rely on councils to amend local plans. While NES are a cost to the Government, the alternative is a cost to ratepayers. In the case of renewable energy, these costs often fall across small rural rate bases.

Q7.15 What renewables activities (including both REG activities and other types of renewable energy) would best be suited to NES? For example:

- **What technical issues could best be dealt with under a standardised national approach?**
- **Would it be practical for NES to set different types of activity status for activities with certain effects, for consenting or re-consenting? For example, are there any aspects of renewable**

activities that would have low environmental effects and would be suitable for having the status of permitted or controlled activities under the RMA?

NES should be flexible enough to cover all renewable activities and allow for future technology. They should set the matters to be assessed.

Technical issues to standardise may include offset/compensation and relationships with other national policy statements where competing interests may arise.

NES should set activity status. Reconsenting should be avoided or made Controlled Activities with only the 'additional' effects to be assessed. Other new developments should be Controlled or Restricted Discretionary with a clear set of assessment matters.

Q7.16 Do you have any suggestions for what rules or standards could be included in NES or National Planning Standards to help achieve the right balance between renewable energy development and environmental outcomes?

The focus should be on recognising the effects of climate change. Renewable electricity development is a key part of New Zealand's response to the problem, and we consider that NES or National Planning Standards (if required) should recognise this. A failure to recognise the importance of renewables to decarbonisation risks delaying action on climate change at a time when urgent action is required.

Q7.17 Would National Planning Standards or any other RMA tools be more suitable for providing councils with national direction on renewables than the NPSREG or NES?

Genesis considers amendments to the RMA are urgently required to elevate the national significance of existing and new renewable energy and supporting infrastructure in further decarbonising our economy. The key RMA tool will be the use of NPSREG and NES as previously stated. We consider National Planning Standards are unlikely to be required once there is a clear NPSREG and NES.

A stronger approach to spatial planning (considered but not proposed for development)

Q7.18 Are there opportunities for non-statutory spatial planning techniques to help identify suitable areas for renewables development (or no go areas)?

Good-quality spatial planning has a role in guiding land-use development, and we support the approach in principle. However, effective spatial planning is resource and time intensive and benefits must be carefully weighed against these costs.

Pre-approval of new renewables developments, by applying 'relatively permissive' consenting rules for certain areas or the Crown acquiring consents for transfer to developers

Q7.19 Do you have any comments on potential options for pre-approval of renewable developments?

Generally, we consider that identifying certain aspects of renewable electricity development as a Permitted Activity would meet many of the objectives the pre-approval proposals seem to target, as levels of effects are pre-considered and certainty on obtaining approval is created.

We support Option A, which would see planning approaches with "relatively permissive" consenting rules for renewables in defined areas.

Option B, in which the Crown would obtain consents to transfer to developers, is unnecessary. If there is clear policy direction and the consenting process is appropriate, developers would have no difficulty obtaining consents themselves. Having multiple developers determining where the most appropriate sites are and the ways in which to develop them also encourages innovation.

Option C, which would introduce a new statutory allocation process outside the RMA, is also unnecessary. The RMA framework is enabling, but the difficulty presently lies in implementation. Amendments to the RMA that facilitate development would be adequate without the need for new processes. Introducing new processes also introduces risks.

Amend other RMA instruments like the National Policy Statement on Electricity Transmission (NPSET) and the National Environmental Standards for Electricity Transmission Activities (NESETA).

Q7.20 Are the current NPSET and NESETA fit-for-purpose to enable accelerated development of renewable energy? Why?

Q7.21 What changes (if any) would you suggest for the NPSET and NESETA to accelerate the development of renewable energy?

Q7.22 Can you suggest any other options (statutory or non-statutory) that would help accelerate the future development of renewable energy?

As set out elsewhere in this submission, the development of renewable electricity generation is taking place now. However, barriers remain. Improvements to the cost allocation of new transmission infrastructure, and improvements to statutory processes as set out in this section, are two key areas for attention.

8. Supporting renewable electricity generation investment

8.1 Introduce a Power Purchase Agreement (PPA) platform

Q8.1 Do you agree there is a role for government to provide information, facilitate match-making and/or assume some financial risk for PPAs?

PPAs will play an increasingly important role in the electrification of New Zealand's energy sector. Our extensive experience on both sides of these agreements is unique in New Zealand. Genesis has executed a long-term agreement with Tilt Renewables to underpin the 133 MW Waipipi wind farm in South Taranaki[6], which will displace about 20 per cent of our remaining baseload thermal generation. Genesis has also agreed key terms for a 300 MW solar farm in the upper North Island to generate a further 550 GWh per annum of electricity. This would be the largest project of its type in New Zealand by an order of magnitude, and together the two plants would enable a reduction of 550,000 tonnes of carbon emissions per annum.

Deals are already being struck without intervention, but the paper correctly identifies a lack of expertise and resources (particularly among smaller organisations) as barriers to uptake.

However, our experience in negotiating PPAs suggests that duration and price are the main barriers to striking deals. End users tend to want shorter-term deals due to the flexibility they provide, while developers tend to want the certainty provided by longer-term arrangements. Match-making and

[6] https://www.genesisenergy.co.nz/about/media/news/genesis-and-tilt-renewables-move-forward-with-the

the provision of information would help get parties 'around the table', but they would not solve issues in relation to price and/or duration.

Q8.2 Would support for PPAs effectively encourage electrification and new renewable generation investment?

If support results in more participants seeking to contract electricity or monetise new plant via PPAs it could encourage electrification and new renewable generation investment. However, it is difficult to address the price and duration challenges without the Crown taking on some financial risk. Given the nature of these deals, and the presence of private-sector participants prepared to sign deals on acceptable terms, the potential reward from the Crown becoming commercially involved in PPAs does not appear to offer sufficient value to outweigh the risk to public funds. The main priority for the Government should be ensuring that policy and market settings provide for a reliable and low-cost supply of electricity. We discuss how these settings could be improved in response to Option 8.6.

Q8.3 How could any potential mismatch between generation and demand profiles be managed by the Platform and/or counterparties?

It would be very difficult to manage differences between the shape of demand and supply without some form of reliable dispatchable generation that can be made available to 'smooth' the 'peaks and valleys' that occur as a result of fluctuating demand and changes in available supply. In the context of a PPA underpinning renewable generation, these supply variations will occur as a result of changing weather conditions as they affect wind and solar generation.

Hydro plant will often be able to manage these variable demand/supply separations, but this technology too is subject to natural variations in weather conditions and how these interact with variations in demand (for example, whether low rainfall coincides with high demand in winter, which is discussed at length in our response to Option 8.6). This is potentially surmountable by aggregating a variety of generation sites/technologies.

However, thermal generation is currently the only technology that can reliably play this flexible supporting role in New Zealand at reasonable cost. Genesis has looked at joining as a counterparty to PPAs to offer generation as support for the deals, but pricing these agreements is challenging and carries significant risk in our experience. Genesis would be open to a discussion with the Government on how our generation portfolio can help support PPA arrangements and system security generally.

Q8.4 What are your views and preferences in relation to different options A to D above?

Increasing PPA activity to bring forward New Zealand renewable electricity projects is a laudable goal. Genesis's experience demonstrates that these agreements can help decarbonise the electricity system while ensuring reliable and affordable supply. However, PPAs are complex to design and execute, and renewable electricity projects are not without risk. Genesis believes there would have to be a clear consumer benefit, which outweighs financial risk to the Crown, in the Government playing any role in PPAs.

If one of these options is to be pursued, Option A – a contract matching service – has the most appeal. As previously mentioned, there is already willingness on the demand and supply sides of the market to have discussions about potential contracts. These deals will eventuate if commercial terms can be arrived at that suit the needs of both parties. We consider that the Government underwriting contracts or providing a clearing house function (Options C and D respectively) would

be unlikely to drive the level of new PPA activity that would justify the considerable risks of these interventions.

Option B – aggregating state-sector parties as off-takers – has some merit, but Option A could likely achieve an equally positive outcome. The Government has announced ambitious goals for state-sector decarbonisation, and bringing a variety of organisations together to act as bulk buyers is logical. The paper suggests administering any such scheme alongside the All-of-Government contract for electricity. Genesis considers that this would be a mistake. Long-term off-take agreements that underpin significant infrastructure investments, such as those discussed by Option B, require specialised skills to negotiate and execute.

Considerable care will be required in any such negotiation. The Government would be exposing Crown funds to a high degree of risk through locking state agencies or public institutions such as schools and hospitals into long-term power purchase deals.

Q8.5 ***For manufacturers*: what delivered electricity price do you require to electrify some or all of your process heat requirements? And, is a long-term electricity contract an attractive proposition if it delivers more affordable electricity?**

As a purchaser of PPAs, the price at which we will sign deals needs to be at or near our long-term expectations for delivered wholesale electricity in particular regions.

Q8.6 ***For investors/developers*: what contract length and price do you require to make a return on an investment in new renewable electricity generation capacity? And, is a long-term electricity contract an attractive proposition if it delivers a predictable stream of revenues and a reasonable return on investment?**

In Genesis's experience manufacturers want significantly shorter terms and lower prices than those that would be acceptable to developers. For example, the 20-year contract Genesis has signed to underwrite the Waipipi wind farm is about double the duration that major users have indicated they would like to commit to terms for[7]. Similarly, as a purchaser several deals have fallen through due to what we consider to be unrealistic price expectations on the supply side.

8.2 Encourage greater demand-side participation and develop the demand response market

Q8.7 Do you consider the development of the demand response (DR) market to be a priority for the energy sector?

Closing the demand/supply gap for renewable electricity will require a range of measures, and demand response has the potential to be a valuable way of keeping demand and supply in balance as both rise out to 2050.

DR should be prioritised in scenarios where it is proven to be cost effective relative to alternatives such as new transmission, distribution or generation investment.

For example, distributors could reduce their forecast capital expenditure through a reverse-bid process, where they go to market for a range of options to meet forecast demand and supply on their local networks.

Q8.8 Do you think that DR could help to manage existing or potential electricity sector issues?

[7] https://www.scoop.co.nz/stories/BU1909/S00015/heavy-industry-in-bid-to-accelerate-renewable-generation.htm

Yes. In particular peak demand management and addressing supply constraints (whether as a result of network congestion or tight fuel supply). Our indicative estimates suggest the wholesale price value of demand response would be in the order of $150-$250/MWh during winter evening peaks.

DR will be important to balance variable renewables like wind and solar, but it will not fill the multi-week gaps in electricity supply that can emerge as a result of New Zealand's heavy dependence on hydrology and lack of interconnection with other markets. Security of supply could be jeopardised if policymakers place too much importance on DR as a tool to deal with seasonal and dry-year shortages.

Ensuring settings are right to enable DR to make its maximum contribution will be important, as will ensuring that firming and backup thermal remains available to affordably underpin security of supply.

The paper notes that DR markets "will not deliver significant growth in renewables nor encourage demand-side electrification at scale". This is likely to be correct. However, high-quality DR markets could play a low-cost and high-impact role in supporting the reliable and affordable electricity supply required to incentivise transport and process-heat applications to reduce their carbon intensity. Also, through reducing peak demand, DR has the potential to contribute to decarbonising the existing electricity supply mix.

Q8.9 What are the key features of demand response markets? For instance, which features would enable load reduction or asset use optimisation across the energy system, or the uptake of distributed energy resources?

As noted in the paper, DR can take many forms. Determining the most appropriate DR market design necessarily begins with defining the problem it seeks to solve. An effective national DR market will rely on:

- Clear, simple national rules.
- Clear pricing.
- Standardised time-of-use network pricing.

There is also the opportunity for DR to develop as an option at residential level. Genesis supports enabling consumers to become better informed about their energy choices and adapt their behaviour accordingly. In recent years we have invested heavily in apps and tools that help our customers reduce their impact on the grid and the planet.

Energy IQ is our smartphone app and web portal that enables our consumers to monitor their energy use. It contains the *Eco Tracker* tool, the only consumer-facing platform that enables consumers to monitor the greenhouse gas emissions of the electricity market (and, therefore, the environmental impact of their consumption) in real time. More than 35,000 customers currently use this tool.

We encourage our customers to use these tools to help them make more informed choices about how they use energy. Greater automation of behind-the-meter appliances would be a logical next step towards a meaningful consumer demand response programme.

The existing Minimum Energy Performance Standards could be adapted relatively simply to ensure new appliances entering the country could be remotely controlled, enabling retailers like Genesis to offer customers a variety of new service options that could save them money and take pressure off the grid.

The paper notes the significant regulatory complexity associated with developing a DR market and points to the potential need for new legislation and/or regulations. Genesis considers that the appropriate role for the Government is to ensure that participants can commercialise their ability to flex demand, in trades with the party or parties that value it the most.

Q8.10 What types of demand response services should be enabled as a priority? Which services make sense for New Zealand?

Pilot schemes overseas and in New Zealand have demonstrated that DR has immense potential for softening peak demand, which confers significant benefits in deferring investment in network and generation infrastructure, and thermal running costs.

The ability to call on load reductions from relatively large consumers, as Transpower has demonstrated over the course of its DR investigation programme[8], is potentially a 'quick win' for peak support.

However, enabling smaller consumers to participate – even passively – in the demand response market offers a significant prize long term. Policy and legislation should focus on ensuring that the barriers to allowing consumers to participate, for example obstructive network access arrangements and pricing, are removed.

8.3 Deploy energy efficiency resources via retailer/distributor obligations

Q8.11 Would energy efficiency obligations effectively deliver increased investment in energy efficient technologies across the economy? Is there an alternative policy option that could deliver on this aim more effectively?

Placing a legislative or regulatory obligation on participants to deliver increased investment in energy-efficient technologies would almost certainly result in increased investment. However, obligations of this kind carry attendant risks of driving investment towards sub-optimal technology choices or approaches.

Forcing retailers or distributors to invest in energy-efficiency technologies will also carry significant costs, which will ultimately be borne by consumers regardless of their ability or appetite to pay. Technology-agnostic obligations to encourage efficiency may have merit. However, an incentive structure (whether targeted at consumers or retailers) would be preferable.

At Genesis, we have taken the strategic decision to deliver value to customers by putting control of energy use in their hands, and providing information and support to help them make choices that result in better outcomes for them. In our experience, particularly in relation to schools, customers are very receptive to using energy more efficiently when they are given the guidance they need.

Genesis has experience working directly with customers to improve their energy efficiency and save costs. In the past two years we have worked on building energy services capabilities, which are now available for our customers to employ. For example, we offer free 'pre-screening' with schools to review opportunities for decarbonisation and improved energy efficiency.

Alongside our energy services partner DETA Consulting, this has seen us provide schools with information and execution that have resulted in energy savings of more than 25 per cent, with associated emission reductions of more than 34 per cent. These savings have been driven by

[8] https://www.transpower.co.nz/keeping-you-connected/demand-response/our-demand-response-programme-0

improving lighting efficiency, moving away from coal and towards HVAC systems, improved hot water efficiency, and improving building efficiency through insulation and double-glazing.

We believe there is a strong and growing competitive advantage in helping our customers to use energy more wisely, hence our considerable investment in the space. It has resulted in the development of innovative and user-friendly tools, and this investment might not have taken place had we been obligated to focus on another area.

Ensuring the market provides the right signals, and high-quality information is readily available, is the best way for policy and regulation to support the uptake of energy efficiency. Energy efficiency is a compelling proposition already, but this could be further supported by appropriate incentive structures such as the United States' ESPC example set out in the paper.

Q8.12 If progressed, what types of energy efficiency measures and technologies should be considered in order to meet retailer/distributor obligations? Should these be targeted at certain consumer groups?

As indicated above, Genesis does not believe participants should be obliged to deploy energy-efficiency resources.

The targeting of efficiency resources could be better achieved through existing state service delivery organisations such as EECA, the Ministry for Social Development, the Ministry of Health and the Ministry of Education working alongside the energy industry.

A carefully designed incentive scheme that rewards consumers for investing in efficiency measures (or provides some relief on the up-front capital cost) would be a sensible step and would fit neatly alongside EECA's existing work programme.

Q8.13 Do you support the proposal to require electricity retailers and/or distributors to meet energy efficiency targets? Which entities would most effectively achieve energy savings?

As the paper notes, investments in efficiency measures already occur when these make commercial sense. Also, "encouraging energy efficiency when these prerequisites are not present may increase system costs, which may in turn be passed on to the consumer". Genesis agrees with this analysis. Providing incentives to invest in energy efficiency, rather than requirements, is likely to achieve a better outcome.

Incentives and/or obligations for investing in energy efficiency are most appropriately targeted at those who receive the most benefit over time, which generally speaking will be consumers. The appropriate role for businesses like Genesis is in arming consumers with the tools and information they need to make the best decisions for them, and connecting them with those providers that can help them achieve efficiency goals.

8.4 Investigate regulatory and economic requirements to develop offshore wind assets in New Zealand

Q8.14 Could you or your organisation provide guidance on the likely compliance costs of this policy?

The likely compliance costs of this policy are very difficult to estimate without further guidance on the design of the policy.

Q8.15 Do you consider the development of an offshore wind market to be a priority for the energy sector?

The current market structure has resulted in significant new renewable builds being commenced or announced recently. The decisions on what plants are most appropriate (and the order in which these should be brought to market) are best left to participants who put capital at risk. Accordingly, Genesis does not see developing a market for any particular technology to be a priority for the Government.

Having said that, the legislative and regulatory environment will need to allow for development to occur and Genesis supports the Government reviewing settings to ensure opportunities to capitalise on all technologies can be captured as they arise. To this end, it would be prudent to review the RMA and marine legislation to ensure there are no unnecessary barriers to harnessing offshore wind resources should it prove economic to do so in future.

Q8.16 What do you perceive to be the major benefits and costs or risks to developing offshore wind assets in New Zealand?

The benefits and costs or risks are well set out in the paper. There is a considerable wind resource off the New Zealand coastline that could be harnessed without the impacts on amenity values that conventional onshore wind farms can have. However, doing so would be very costly with current technology. Exact costs are uncertain and different participants will have different views, but Genesis agrees with the paper's conclusion that the scale required to deliver a wind farm economically would result in a substantial oversupply of electricity and an unacceptably inefficient outcome.

8.5 Renewable electricity certificates and portfolio standards

Q8.17 This policy option involves a high level of intervention and risk. Would another policy option better achieve our goals to encourage renewable energy generation investment? Or, could this policy option be re-designed to better achieve our goals?

Significant renewable energy investment is already taking place without incentives. Genesis concurs with the consensus view that renewable technology is currently the lowest-cost form of generation. This is especially true given the carbon costs imposed on thermal generation, and these costs are expected to rise. The key challenge for policymakers is not driving greater investment in renewables; rather it is ensuring backup is available to provide system security and affordability while this investment takes place.

This challenge manifests through the need to maintain access to a store of energy that can be called upon to generate in calm and dry conditions and, increasingly, when the sun does not shine. An economic solution is necessary for meeting New Zealand's peak and seasonal demand requirements.

Q8.18 Should the Government introduce RPS requirements? If yes, at what level should a RPS quota be set to incentivise additional renewable electricity generation investment?

Renewable investment is already taking place and will continue, so there is little value in imposing requirements on retailers to ensure a certain proportion of the quota of their purchased electricity is renewable, and to offset any shortfall. If the intention is to ensure that new renewable generation displaces existing thermal plant more quickly than is currently the case, careful consideration will need to be given to the system security and price (value and volatility) implications.

The New Zealand electricity system is already almost 85 per cent renewable in an average year. Major users could easily demonstrate compliance with all but the most onerous renewable

portfolio standards, which would simply impose administrative costs on consumers and the Government with few discernible environmental benefits.

Q8.19 Should RPS requirements apply to all retailers and/or major electricity users? What would be an appropriate threshold for the inclusion of major electricity users (i.e. annual consumption above a certain GWh threshold)?

As above, Genesis sees little value in introducing RPS requirements.

Q8.20 Would a government backed certification scheme support your corporate strategy and export credentials?

Genesis is trialling the New Zealand Energy Certificate Scheme[9] with a small group of commercial customers. We took the decision to participate in the scheme in response to customer demand, typically from those customers involved in emissions reporting. Our customers have told us that a credible certification scheme would have value for them from a reporting standpoint.

Q8.21 What types of renewable projects should be eligible for renewable electricity certificates?

If a scheme were to be pursued it would be crucial to make the distinction between 'renewable' (which includes geothermal, for example) and 'zero carbon'.

Rigorous standards would need to be adhered to to avoid exposing purchasers of renewable electricity certificates to brand and compliance risks around the claims they make to investors and customers. For example, with the exception of customers directly connected to a generation source, the electricity they use will always be a mix of whatever generation was feeding into the grid at the time of their consumption. This will almost always include a greenhouse gas-emitting component (whether that be thermal or geothermal). Purchasers of renewable electricity certificates would need to be advised that their reporting and communication with consumers must be carefully worded to avoid misleading claims.

Q8.22 If this policy option is progressed, should retailers and major electricity users be permitted to invest in energy efficient technology investments to meet their renewable portfolio standards?

Genesis does not agree that RPS requirements are appropriate.

Q8.23 Could you or your organisation provide guidance on the likely administrative and compliance costs of this policy?

The administrative and compliance costs of an RPS scheme are very difficult to quantify without direction on its design. However, as set out above, Genesis considers such a scheme would be of limited value in improving environmental outcomes in the New Zealand context, and any costs would therefore be challenging to justify.

8.6 Phase down baseload thermal generation and place in strategic reserve

Q8.24 This policy option involves a high level of intervention and risk. Do you think that another policy option could better achieve our goals to encourage renewable energy generation investment? Or, could this policy option be re-designed to better achieve our goals?

Transitioning thermal baseload to a backup role is desirable and necessary as the electricity sector decarbonises. However, Genesis's experience in the market and expectations for the future tell us

[9] https://www.certifiedenergy.co.nz

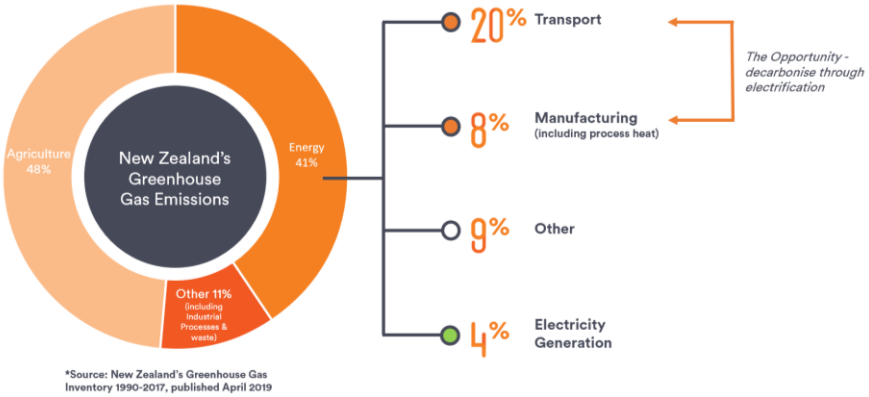
that careful thought is required to ensure the energy trilemma elements of sustainability, reliability and affordability are balanced to the maximum benefit of consumers and the economy.

The proportion of New Zealand's electricity generated by renewables was nearly 83 per cent last year, up from 72 per cent 10 years earlier[10]. That decade saw more than 458 MW of new geothermal and 321 MW of wind installed on the system. More than 1,000 MW of baseload thermal was decommissioned in that time.

The ICCC projects that New Zealand will reach 93 per cent renewable electricity by 2035, if the current trajectory is followed. Almost 360 MW of new wind generation is currently under construction, with a further 93 MW getting underway soon. At least 216 MW of geothermal is in the pipeline, and 377 MW of baseload thermal is considered likely to be decommissioned in the coming years.

At Genesis, we have made a commitment to cease coal use at Huntly Power Station by 2025 under normal market conditions, and have stated an intent to end coal use altogether by 2030 if alternative forms of hydro firming can be found. This could remove about 480 MW of coal-fired generation from the system (either altogether or substituted with gas, which produces half the emissions). There is, however, currently no easy solution to dry-year risk in New Zealand as a consequence of our highly renewable- and hydro-dependent electricity system, which is located on islands in the Pacific that lack the ability to connect to other markets, as is the case in Europe for example.

Clearly, increasing the penetration of renewable generation is not the problem the sector and the nation needs to solve. Rather, the main issue is economically ensuring sufficient backup to weather-dependent renewables while minimising greenhouse gas emissions. As the ICCC and others have illustrated, decarbonising the last few per cent of the electricity mix is prohibitively expensive given the economics of the currently available technology. However, the decarbonisation opportunity presented by a 93-per-cent-plus electricity mix in terms of transport and industrial processes is significant and would be the envy of many markets around the world.



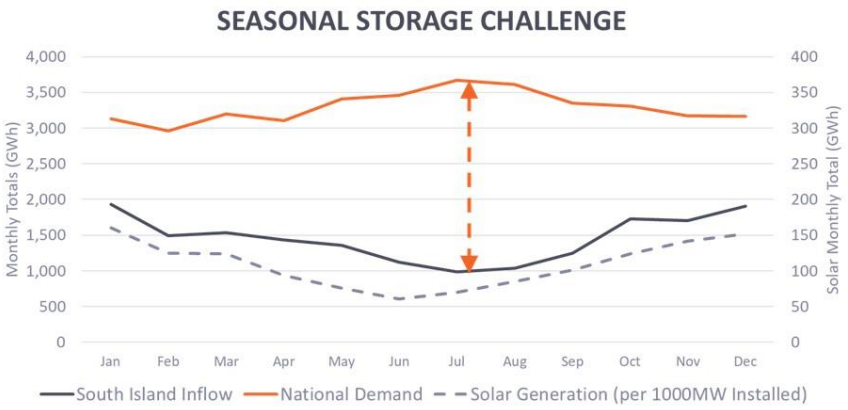
As the electricity system becomes progressively more reliant on intermittent renewables, stored energy that can be quickly dispatched during dry, calm and/or overcast conditions becomes more

[10] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics

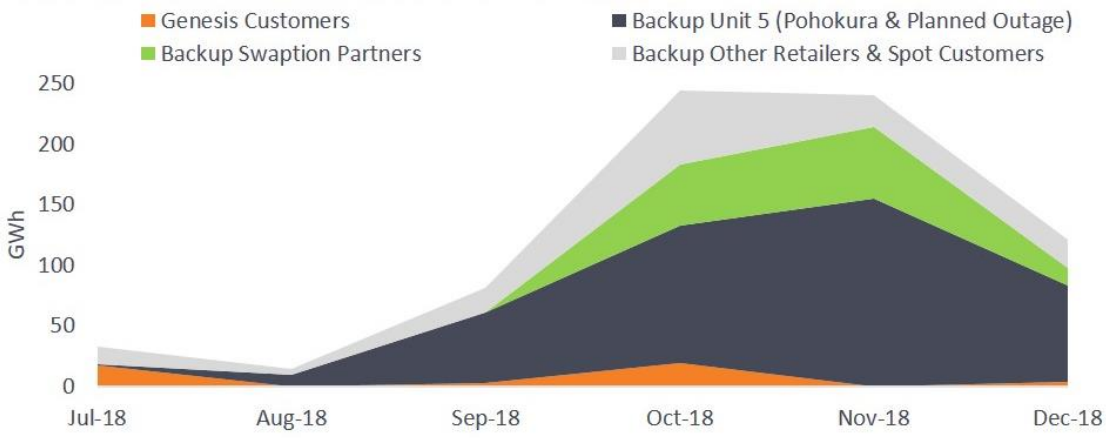
important. New Zealand currently requires about 7,000 GWh of deep energy storage to deal with the seasonal shifts – 2,000 GWh more energy is needed in winter than summer – and dry years in which inflows can be about 5,000 GWh below average. New Zealand's hydro lakes provide about 4,000 GWh of that storage, leaving a 3,000 GWh gap.

New Zealand's unique seasonal demand challenge

— Demand is highest in winter, when southern inflows are the lowest



The coal- and gas-fired Rankine units at Huntly Power Station already effectively play this role. The 480 MW capacity from these units is often deployed to support risk management contracts with other market participants that are more reliant on weather-dependent generation sources. The Rankines also often generate to back up exposed retailers and spot customers during dry periods. The importance of these units will only increase with the expected retirement of the remaining baseload thermal capacity in Taranaki. It is vital to ensure this plant remains available to play its increasingly important backup role.



A poorly managed phase-down or withdrawal of thermal plant could have serious consequences and jeopardise efforts to decarbonise the economy.

The paper asks for the best way to meet resource adequacy while reducing emissions in the electricity sector. Genesis submits that the current market settings meet resource adequacy

requirements for now, but perform poorly in terms of reducing emissions. It is going to be increasingly important to understand the difference between baseload thermal and seasonal firming or peaking thermal requirements in the New Zealand market. Baseload thermal will naturally be displaced by renewables if the transition continues on its current course. But there is a risk that without reform the backup necessary in the next phase will be more expensive and less efficient (in terms of emissions) than it could be. Genesis would welcome the opportunity to work with the Government and the sector to meet this crucial challenge and future-proof New Zealand's electricity supply.

When Genesis made the commitment to only use coal in 'normal' market conditions by 2025 and stated its intent to not use coal at all by 2030, it was on the basis that collaboration between government and other industry parties would help to solve New Zealand's hydro and seasonal risks. With less than 10 years to go now, the time is right to have a national debate on the challenges Genesis sees in this ambition, and for the Government to support the debate with good facts.

Thermal support is also not being delivered as affordably as it could be, with increasing carbon prices exacerbating the impacts of rising fuel costs.

Wholesale electricity prices are a function of hydrology, thermal fuel costs, carbon pricing and perceptions of seasonal and dry-year risks. In a fuel-plentiful market, renewable (hydro) generators price their generation to the point where thermal generators turn off, and in a market where fuel is scarce, hydro generators price to the point where coal- and gas-fired generation (provided by Genesis's Rankine units at Huntly Power Station) turn on. Prices will continue to rise as emission unit prices rise, leading to higher wholesale electricity prices.

As an example, a $1 increase in the price of an emission unit will likely result in a $1 MWh increase in wholesale electricity prices, and at a carbon price of $50 per unit the 'marginal cost' of thermal generation – the price point to turn coal- and gas-fired generation on – would be around $150 MWh. This represents a 20 per cent increase to the current average marginal cost of thermal generation.

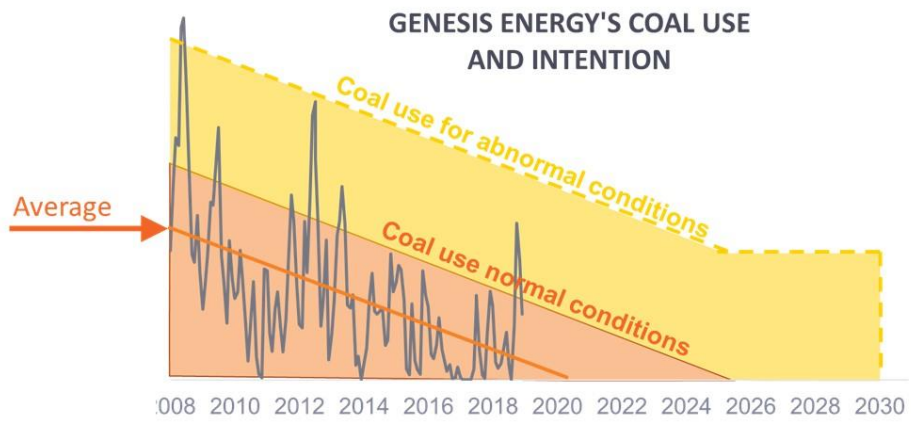
Higher carbon prices do not necessarily result in better carbon outcomes. Without low-cost, reliable electricity other sectors will not electrify and New Zealand will not be able to leverage one of its best assets in the fight against climate change.

Q8.25 Do you support the managed phase down of baseload thermal electricity generation?

The phase-down in baseload thermal electricity generation is occurring, and has been for several years. Genesis supports the market in enabling this.

The transition out of coal is underway

— A ten year window forwards and backwards points to exit



Managing this phase-down to ensure the right outcome is critical. This is a timely point in the energy sector's transition to think carefully about where the responsibility for security of electricity supply should most appropriately lie.

Our research suggests the public understands that thermal generation remains necessary to system security. Sixty-nine per cent of the respondents to UMR's survey felt fossil fuels will remain necessary until renewable resources become more cost effective and reliable.

More than half of the respondents – 52 per cent – said thermal power stations should continue to run in the medium term until other options are developed to deal with electricity shortages. Forty per cent said they would not be prepared to pay more for electricity to accelerate the uptake of renewables, compared with 31 per cent who would.

Genesis is uniquely placed to assist the Government and the wider sector to meet the storage challenge and ensure the right environment for renewables to flourish while providing the security and price predictability large users crave. To that end, we offer the following potential ideas for further discussion (in no particular order):

- A capacity or reserve mechanism that pays thermal to remain available. This would reduce the commercial requirement for owners of plant to run it when it is not required for system security purposes. There could be a financial implication for the Crown, but this could be funded at least in part through ring-fencing Crown dividends from Genesis. Alternatively, the costs of this scheme could be spread across the market. Renewable generators that benefit from Huntly Power Station would therefore pay a fair price for this cover, providing Genesis with the time and resources to transition our generation portfolio. This option meets all the criteria in the consultation paper, with the exception of 'community participation', which is not applicable. The wider economic effects are delivered via the investment in new renewable generation Genesis would undertake to rebalance our portfolio.
- The Crown takes full, or part, ownership of the Rankines and/or a portion of the coal stockpile, and operates a reserve energy scheme. Genesis could continue to manage the plant and fuel supply under contract. The Market Operator would be appropriately placed to

determine when the plant is required, but as set out above a hydro risk curve trigger would be a sensible starting point.

- A scarcity pricing mechanism that enables Genesis to preserve shareholder value while generating significantly less thermal and producing far fewer emissions. This would see extremely high wholesale prices at times when the Rankines are essential to ensuring security of supply. As this would be a market solution, it would require no financial outlay from the Government. While this would increase the risk of participation in the wholesale market during stressed periods, a prudent and reasonable operator could adequately manage the risk via contract and/or securing forward hedge cover.

- A rebate scheme that recycles the windfall profits that accrue to renewable generators as a result of emissions charges, to be invested in genuine emissions reduction. This would ensure the ETS works as intended, rather than its current operation, which generates excess returns for some generators. The mechanism would need to be carefully designed, and there would be associated administrative costs.

Q8.26 Would a strategic reserve mechanism adequately address supply security and reduce emissions affordably during a transition to higher levels of renewable electricity generation?

Potentially. But as the paper correctly notes there are major challenges to designing such a scheme successfully. The consequences of failure are severe. The now-defunct reserve energy scheme that governed the use of Whirinaki resulted in poor risk management practices that threatened supply in dry years, which led to its disestablishment. New Zealand can ill afford confidence in the market to be shaken if the overall objective is the faster electrification of transport and industrial processes. A strategic reserve is one of several mechanisms that could be used to solve the system's storage problem while minimising emissions.

Q8.27 Under what market conditions should thermal baseload held in a strategic reserve be used? For example, would you support requiring thermal baseload assets to operate as peaking plants or during dry winters?

As above, Genesis does not accept that a strategic reserve mechanism is necessarily the correct option. However, enabling backup thermal to generate when hydro storage reaches a predetermined seasonal level, and offering that generation at a sufficiently high price point to deter gaming by hydro generators, would be a sensible starting point for discussion.

Q8.28 What is the best way to meet resource adequacy needs as we transition away from fossil fuelled electricity generation and towards a system dominated by renewables?

The New Zealand electricity system is already dominated by renewables. As set out above, thermal generation is currently the only reliable way to economically ensure adequate dry-year and seasonal storage in this environment. Unlike many other jurisdictions grappling with the storage issue, New Zealand is geographically isolated without interconnections with other markets with uncorrelated wind and hydro patterns and/or alternative storage options.

Technological advancements and shifting system dynamics will almost certainly change this situation over time, but ensuring reliable and affordable supply during the transition is crucial.

Q8.30 Do you have any views regarding the above options to encourage renewable electricity generation investment that we considered, but are not proposing to investigate further?

A Government-sponsored storage facility for firming hedge products may have some merit, as discussed in relation to the managed phase-down of baseload thermal generation and the 'smoothing' challenges under PPAs.

Genesis agrees that the Government is right to discard the other options discussed.

9. Facilitating local and community engagement in renewable energy and energy efficiency

9.1 Ensuring a clear and consistent government position on community energy issues, aligned across different policies and work programmes

Q9.1 Should New Zealand be encouraging greater development of community energy projects?

Genesis sees great potential for community energy projects, provided they are structured in the right way. Our experience with our award-winning School-gen programme has demonstrated the many benefits that community energy can provide. Our long-running Local Energy Project in Wairarapa illustrated that there is a range of challenges to delivering community energy economically.

Q9.2 What types of community energy project are most relevant in the New Zealand context?

The paper defines community energy projects as "any renewable energy activity that is managed in an open and participative way, and has local and collective benefits and outcomes". Our School-gen programme fits this description. 'Community' is defined as communities of place and communities of interest. In the New Zealand context, geographical proximity is highly relevant due to the specific mix of urban and rural demand, and the variations in renewable resources available to communities (for example, solar is particularly appealing in the Far North).

For more than 13 years Genesis has been involved in facilitating local and community engagement in renewable energy and energy efficiency through School-gen. The programme has seen almost 100 schools benefit from solar panels and measure and track the benefits via the School-gen website. Through these installations they have not only reduced their own carbon emissions, but also been able to use them as educational tools with students assisted by the resources Genesis has provided.

We have seen a significant increase in queries about solar power from schools in recent years, due to an increased focus on sustainability. There is a valuable opportunity for more to happen in this space, especially given the number of schools still relying on coal. Solar is an ideal fit for schools, as their high demand period is during daylight hours. They could also, provided batteries are also installed, play an important role as community hubs when needed.

Q9.3 What are the key benefits and downsides/risks of a focus on community energy?

The benefits of community energy are many and various, including greater engagement in the provision of energy and the related environmental impacts and economic factors. We have seen this through School-gen, where there has been a significant increase in community engagement in energy. When properly executed, community energy projects can also have significant economic benefits, for example through reducing the need for transmission and/or distribution investments. Small-scale local projects also contribute to system security by diversifying supply. Significant efficiency gains are available through co-locating consumers of heat.

In 2017 Genesis launched The Local Energy Project in Wairarapa. It has become New Zealand's longest-running and largest energy research and development community.

The project has given customers access to state-of-the-art technology and given Genesis long-term data and insights on how the residential, business and agricultural sectors use, adapt and embrace new energy technologies. More than 120 customers – both residential and business – have benefited from the project by installing solar PV and batteries at significant discounts.

Genesis also took the opportunity to work with LEP customers to co-create energy-monitoring tools.

The established community of distributed assets provided a quicker path for us to test cutting-edge Virtual Power Plant technology with a New Zealand-based energy start-up.

We have taken a huge number of lessons from this project. One of the key pieces of information to arise was how challenging the economics of aggregating small-scale generation and demand can be for all concerned, and the difficulty of ensuring that the value of assets is fully captured and shared appropriately.

Q9.4 Have we accurately identified the barriers to community energy proposals? Are there other barriers to community energy not stated here?

Genesis agrees that the issues raised in the paper can act as barriers to community energy projects. The current market arrangements can be a deterrent to investing in community energy, but these barriers are not insurmountable and are largely being addressed by the measures set out in the paper.

The economics of small-scale generation are often challenging relative to existing grid supply, and payback periods are often too long to entice small investors.

Q9.5 Which barriers do you consider most significant?

See Q9.4.

Q9.6 Are the barriers noted above in relation to electricity market arrangements adequately covered by the scope of existing work across the Electricity Authority and electricity distributors?

Yes.

9.2 [No options for enabling market access and addressing regulatory barriers proposed]

9.3 Government supports development of a small number of community energy pilot projects

Q9.7 What do you see as the pros and cons of a clear government position on community energy, and government support for pilot community energy projects?

A clear Government position on community energy would be helpful to potential investors and decision-makers at the resource consent level. Government support for a small number of pilot/demonstration projects may have merit, where these projects generate significant co-benefits. However, as set out earlier, the economics of these projects can be challenging, and considerable care would be advisable to avoid unacceptable risks of loss of public funds. There is an opportunity to develop these projects when commissioning new public infrastructure such as schools and hospitals.

Q9.8 Any there any other options you can suggest that would support further development of community energy initiatives?

The development of community energy infrastructure or initiatives should be actively considered during government procurement exercises.

10. Connecting to the national grid

10.1 Encourage Transpower to include the economic benefits of climate change mitigation in applications for Commerce Commission approval of projects expected to cost over $20m.

This would be through the inclusion of the (avoided) emissions price cost incurred by consumers calculated on a consistent basis. Guidance or direction about the emissions price and trajectory would be needed to support this option.

10.2 Put in place additional mechanisms to support or encourage, Transpower, first movers and subsequent customers to agree to alternative forms of cost sharing arrangements by contract.

10.3.1 Optimise asset valuations under the Commerce Commission's regime in circumstances where demand is lower than originally anticipated because expected (subsequent) customers do not eventuate.

10.3.2 Provide for Transpower to build larger capacity connection asset or a configuration that allows for growth, but only recover full costs once asset is fully utilised, with the Crown covering risk of revenue shortfall.

Q10.1 Which option or combination of options proposed, if any, would be most likely to address the first mover disadvantage?

Commercial consumers including Fonterra have reported that the costs of new transmission infrastructure are a significant barrier to large users electrifying their processes[11]. Similarly, transmission costs can be a major barrier to commissioning new generation infrastructure, such as the Castle Hill wind farm for which we currently hold resource consent.

Option 10.1 has merit and would be a relatively low-cost way of helping Transpower to structure its network optimally for the development of renewable resources and the electrification of industrial processes. However, as the paper notes, calculating avoided emissions costs would be challenging. Also, the proposal would be counterproductive if it resulted in higher transmission costs for users due to under-recovery from Transpower. If detailed analysis suggests this would be the case, the proposal should not be pursued.

Connection charges, while not the focus of Transmission Pricing Methodology reform, are being addressed by that process. Genesis urges the Government to work with Transpower and industry – once the transmission pricing methodology reform is complete – to ensure the barriers that can be posed by connection charges are addressed.

Option 10.3.2 would enable electrification and the development of renewables in areas where transmission is currently a barrier. While the costs could be considerable should the forecast demand or supply not arrive, this may be acceptable relative to the decarbonisation opportunity available.

[11] https://www.mbie.govt.nz/dmsdocument/5368-fonterra-process-heat-technical-paper-submission

The cost of connecting load is often too high for electrification to be economic for many large energy users[12]. Furthermore, these costs fall disproportionately on the first consumer to need this infrastructure, creating a first-mover disadvantage. This also applies to the connection of new renewable generation.

This needs to be solved quickly so New Zealand can capitalise on its renewable advantage. We believe there is a strong case for the costs to be spread across the system, given that the benefits of renewable development ultimately accrue to the whole economy and the environment.

Q10.2 What do you see as the disadvantages or risks with these options to address the first mover disadvantage?

See Q10.1.

Q10.3 Would introducing a requirement, or new charge, for subsequent customers to contribute to costs already incurred by the first mover create any perverse incentives?

Potentially, and care would be required in the design of any new requirement or charge to avoid unintended consequences. However, the status quo risks delays to investment in new renewable electricity generation and the electrification of industrial processes. Therefore there is merit in the Government working with Transpower, generators and major users to discuss how a scheme like this could work.

Q10.4 Are there any additional options that should be considered?

Genesis believes there is merit in looking at measures that would ensure transmission infrastructure and capacity is available to connect renewable electricity generation to the system, and enable large users to electrify. Other markets, including Texas, provide for transmission investments to be approved or built in advance of new generation or load. This would provide investors with comfort that the necessary transmission will be there to connect new renewable electricity generation or electrify industrial processes.

10.4 Provide independent geospatial data on potential generation and electrification sites (e.g. wind speeds for sites, information on relative economics and feasibility of investment locations given available transmission capacity).

Q10.5 Do you think that there is a role for government to provide more independent public data? Why or why not?

Genesis prefers the Government to play a facilitating role in information sharing, rather than taking the responsibility for and financial risks of data collection. The Government could play a useful role in disseminating this information, where it would not impinge on the competitive advantage of those participants that have collected information to support investment decisions or to on-sell to potential developers. An allowance for Transpower to undertake some independent data collection could be built in to its regulated revenue, subject to caveats similar to those above.

Q10.6 Is there a role for Government to provide independent geospatial data (e.g. wind speeds for sites) to assist with information gaps?

[12] We are aware of a situation where a manufacturer could double the capacity of its electrode boiler but is prevented from doing so due to grid constraints and the associated costs.

The Government's role in facilitating renewable electricity generation and providing information in relation to generation and demand could include the following:

- In respect of identifying generation sites, the Government could ensure there is an enabling legislative and policy framework that gives the industry confidence in the ability to obtain consents and undertake developments. This confidence will enable developers to invest in data collection. For example, policy could be introduced to enable the investigation, development and operation of renewable energy activities (large to small scale) with a permissive consenting framework (i.e. Permitted, Controlled or Restricted Discretionary Activities).

- In respect of identifying demand location, this is already a role for local authorities in allocating suitable land-use zones. Genesis considers there is benefit in the Government and local authorities carrying out regional spatial planning that clearly identifies areas to be enabled and areas to be avoided, with provision for nationally significant infrastructure.

- Facilitating improved information sharing to provide greater insights into demand, generation and transmission capacity. However, as the paper notes, care is required to ensure the competitive advantages of firms that have independently invested in data are not reduced.

Q10.7 Should MBIE's EDGS be updated more frequently? How often?

More frequent EDG scenarios would be useful; however, this should not crowd out other higher-priority policy work that MBIE undertakes. The cost of more frequent modelling would need to be well understood before this is undertaken, which would inform whether a levy arrangement would be appropriate.

Q10.8 Should MBIE's EDGS be more granular, for example, providing information at a regional level?

Potentially. The EDGS could be the appropriate way to facilitate information sharing on transmission capacity, demand and generation as set out in the response to Q.10.6. This would be useful at least at upper and lower North Island, and upper and lower South Island levels.

Q10.9 Should the costs to the Crown of preparing EDGS be recovered from Transpower, and therefore all electricity consumers (rather than tax-payers)?

See Q10.7.

Q10.10 Would you find a users' guide helpful? What information would you like to see in such a guide? Who would be best placed to produce a guide?

We consider that the cost of producing a user guide may be better allocated to ensuring legislation and policy are clear, fit for purpose and easily understood by all parties.

Q10.11 Do you think that there is a role for government in improving information sharing between parties to enable more coordinated investment? Why or why not?

Yes. See Q10.6 and Q10.8.

Q10.12 Is there value in the provision of a database (and/or map) of potential renewable generation and new demand, including location and potential size? If so, who would be best to develop and maintain this? And how should it be funded?

Yes, see Q10.6.

Q10.13 Should measures be introduced to enable coordination regarding the placement of new wind farms?

Genesis considers it appropriate that sites be developed according to merit, and that this ensures the lowest-cost outcomes for consumers. That said, the facilitation of information sharing and data publishing as set out above would help investment planning and decision-making. This is particularly true in relation to transmission planning, where a more coordinated and forward-looking approach could make a meaningful contribution to faster growth in renewable generation. This work would likely be necessary if progress is to be made on unlocking areas for renewable development through pre-build or pre-approval of transmission investments.

Q10.14 Are there other information sharing options that could help address investment coordination?

No comment.

11. Local network connections and trading arrangements

Q11.1 Have you experienced, or are you aware of, significant barriers to connecting? Are there any that will not be addressed by current work programmes outlined above?

The paper notes several workstreams underway to address issues with network connection arrangements. These include developing a default distributor agreement, distribution pricing reform and the open networks project. Genesis has been engaging with these processes, and we hope to see improvements on the status quo.

28 February 2020

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Energy Markets Policy
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By email: energymarkets@mbie.govt.nz

Dear Energy Markets Policy,

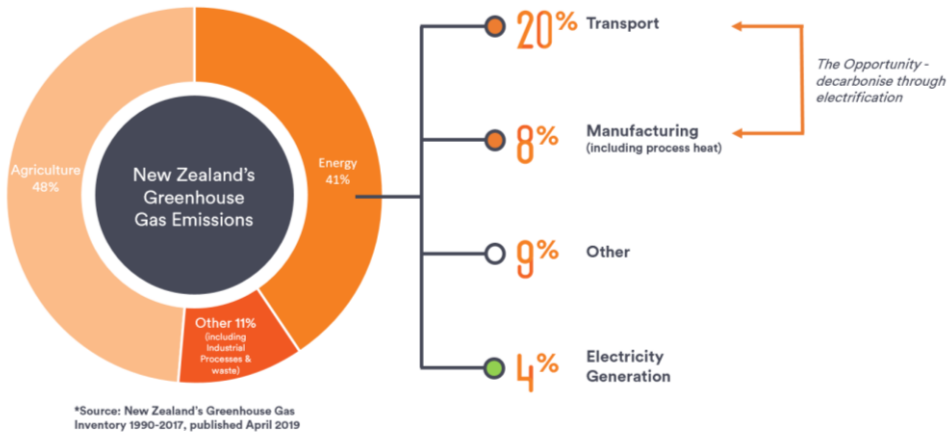
Accelerating renewable energy and energy efficiency

The electricity sector must play a critical role in driving decarbonisation through electrifying the more carbon intensive parts of our economy, in particular, industrial processes and transport. With one of the most renewable electricity systems in the OECD at 84%[1], New Zealand has an opportunity to lead the world in electrification. However, there are real risks that policy positions could have the opposite effect and dis-incentivise electrification through a higher cost and less reliable electricity system. Getting it wrong could have impacts for generations to come.

In this response, Genesis Energy Limited (**Genesis**) lays out some of the considerations required to get the policy settings right and on which we believe we have a unique vantage point from which to comment. Our overall premise is that higher carbon pricing will not necessarily lead to better carbon outcomes and the electricity wholesale market design of today, may not be what we need to achieve New Zealand's overall carbon reduction ambition.

Genesis believes baseload thermal generation has had its day. The economics of renewable baseload are now such that it is cost effective to build geothermal, wind and solar. This is evidenced by the new 133 MW Waipipi wind farm in Taranaki, where Genesis has partnered with Tilt Renewables and also by Genesis's recent announcement that we are at an advanced stage of discussions for a 300 MW solar farm in the upper North Island. These two projects will collectively produce about 1,000 GWh and enable a reduction of 550,000 tonnes of carbon emissions per annum as they displace baseload thermal generation out of the electricity system.

[1] https://www.mbie.govt.nz/dmsdocument/7040-energy-in=new-zealand-2019



Other generators have also announced new build projects. The electricity market has delivered these outcomes without intervention, other than a $25 price on carbon emissions.

Despite this, the wholesale electricity market will become increasingly tested and problematic as the system becomes more reliant on generation which is subject to seasonal and intra-day weather conditions. To date, Genesis sees no solution to the backup thermal need of the New Zealand electricity system. Backup thermal with deep energy storage will continue to be needed to ensure security of supply.

The immediate opportunity for New Zealand is to leverage the highly renewable electricity sector to incentivise decarbonising transport and industry. The country can achieve this by building a cross-sector multi-decade vision with phases to the transition. Genesis believes the Climate Change Commission is the right body to create this plan and ensure cross-sector implications are considered.

This consultation correctly identifies several barriers to maximising New Zealand's renewable advantages. Statutory planning rules, transmission pricing and cost allocation are slowing New Zealand's progress on further decarbonising and meeting its climate change commitments.

Ensuring the system has access to a store of energy that can be called upon to generate in calm and dry conditions and when the sun does not shine is critical to maximising the benefits of our low carbon electricity system. Meeting New Zealand's peak and seasonal power requirements remains a fundamental challenge.

Thermal generation has traditionally played this role and will necessarily continue to do so for some time, while emerging technology evolves to cost effectively fulfil this need. Demand response also has an important role to play but will not solve the challenge on its own.

During the transition to a low carbon energy future, policies must focus on balancing the energy trilemma with the resources available. Delivering on this will be key to decarbonising New Zealand's economy without an unnecessary impost on consumers and businesses.

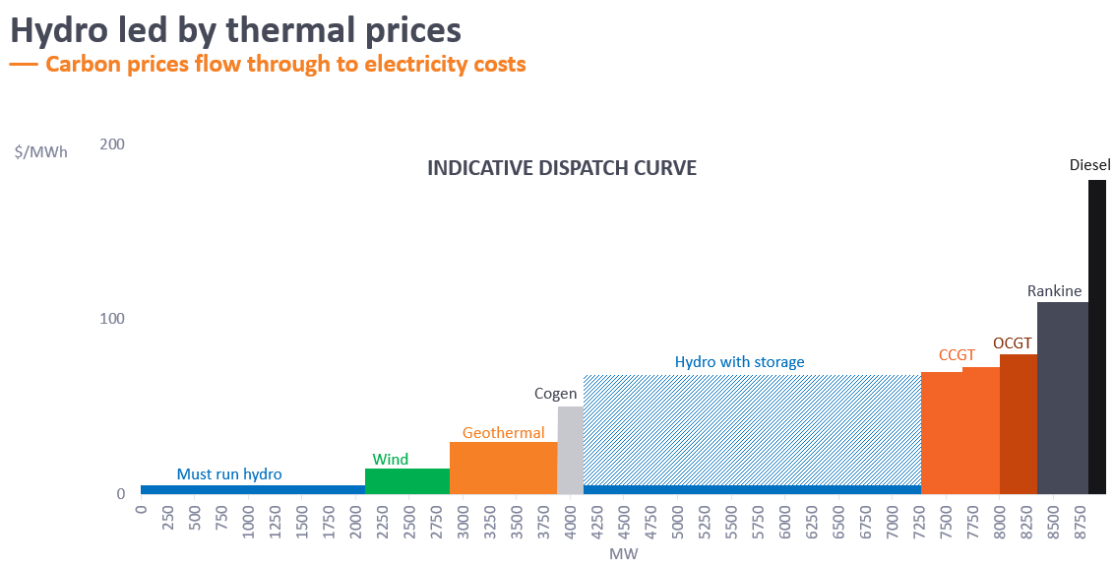
Our most recent public survey, conducted by UMR this year, found 52 per cent of the 1,000 nationwide respondents thought that thermal power stations should continue to run in the medium term until other options are developed to deal with electricity shortages. Forty per cent said they would not be prepared to pay more for electricity to accelerate the uptake of renewables, compared to 31 per cent who would.

Affordability of electricity

This consultation contains many good suggestions for encouraging greater uptake of electricity and other clean energy sources. However, major users will continue using fossil fuels if the economics do not support a switch. Similarly, encouraging electrification of transport will rely on ensuring there remains a secure, reliable and cost-competitive power supply into the future.

In the current wholesale electricity market structure, increasing carbon prices and recent shortages of gas have raised the cost of thermal generation. This flows through to wholesale prices across the board and, with a small lag effect, also through to consumer and industrial electricity prices. This has led us to the conclusion that higher carbon prices do not necessarily result in better carbon outcomes[2]. When running, thermal generation usually sets the wholesale market price as it is the most expensive form of generation. Rising input costs flow through to all wholesale market purchasers (and consumers). However, when thermal plant is not running, renewable generators often 'price up' to marginally below the operating cost of operating thermal plant, knowing they can keep the thermal plant out of the market up until that point.

We have seen this phenomenon reflected in wholesale prices over the past 18 months, in particular, when infrastructure and fuel outages have led to increased security of supply risks. This is increasing the cost of electricity to all users – consumers and businesses alike. The interplay between wholesale electricity market design and the emissions trading scheme (**ETS**) has the potential to create unintended consequences for the energy transition.



[2] High carbon prices driving up electricity prices may in fact result in carbon leakage through major users using fossil fuelled alternatives to electricity, either in New Zealand, or abroad.

Access to low-carbon electricity

Transmission new connection costs also have a major role to play in either encouraging or discouraging electrification. The cost of connecting load is often too high for electrification to be economic for many large energy users[3]. Furthermore, these costs fall disproportionately on the first consumer to need this infrastructure, creating a first-mover disadvantage. This applies to the connection of new renewable generation also. There is currently more than 1,980 MW of potential wind capacity[4] consented but not committed, with the cost of transmission a key barrier to development. Mechanisms to socialise the cost of connecting new renewable sources of electricity and new demand sources could remove one of the biggest barriers, beyond the cost of electricity, to decarbonising New Zealand over the next few decades.

This needs to be solved quickly so New Zealand can capitalise on its renewable advantage. While the solutions are complex and ultimately the costs need to be met, we believe there is a strong case for the costs to be spread across the system, given the benefit of renewable development ultimately accrues to the whole economy and the environment. The Texas (ERCOT) market presents a potential example of this and is worth consideration. An analogy to this approach is road infrastructure where investment front runs the growth for which it is built, with the costs socialised across the broader community, not paid for by the first person to drive down the road.

Planning rules are also delaying the transmission infrastructure needed to enable renewable electricity generation, and the generating plant itself. The Resource Management Act is currently a barrier to developing renewables, slowing progress on projects that would have a meaningful impact on New Zealand's greenhouse gas emissions. Amendments are required that are permissive of renewable energy in a nationally consistent way. This applies equally to existing and new renewable projects. If reconsenting processes hinder the operation of existing renewable assets then the nation will need to work harder just to stand still, making achieving New Zealand's environmental goals that much more challenging.

Reliability of electricity

New Zealand currently requires about 7,000 GWh of deep energy storage to deal with the seasonal shift in demand between summer and winter – in which 2,000 GWh more energy is needed – and dry years in which inflows can be 5,000 GWh or more below average.

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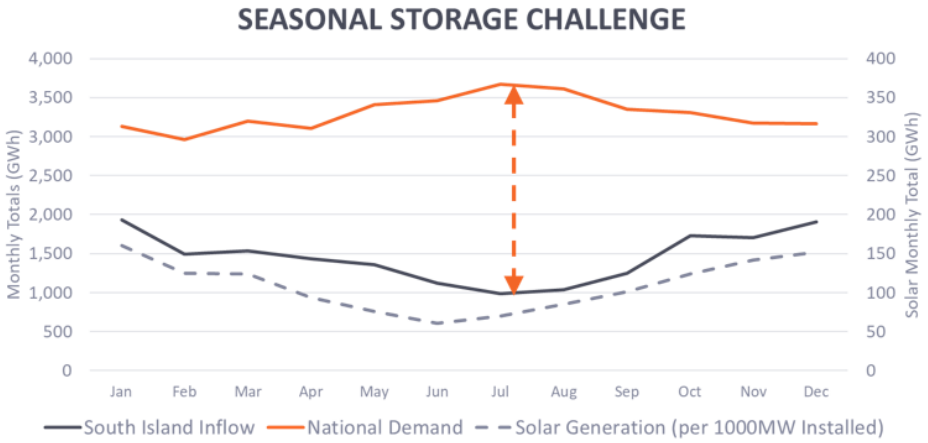
[3] We are aware of a situation where a manufacturer could double the capacity of its electrode boiler but is prevented from doing so due to grid constraints and the associated costs.

[4] http://www.windenergy.org.nz/consented-wind-farms



Existing hydro lakes provide about 4,000 GWh of that storage, leaving a 3,000 GWh gap during a dry winter. For scale, 3,000 GWh is about five times what Lake Taupo currently stores for generation[5], or 140 Tesla Powerwall batteries for every household in New Zealand. The latter option would cost in the order of $2 million per dwelling. That storage gap is currently met by thermal plant at Huntly Power Station.

As the nation's energy supply becomes more reliant on electricity and electricity is increasingly generated by intermittent renewables, access to stored energy will become significantly more important. In addition, there are affordability considerations to an increasingly variable and weather dependent energy system. It is true that renewables are the lowest cost form of new generation but their intermittent nature will create considerable volatility in wholesale prices, as the cost of backing up the volatility has to be recovered over a decreasing volume of non-renewable generation.

That volatility is currently manageable and the system can tolerate more but work by the Interim Climate Change Committee[6], the Productivity Commission[7], Transpower and others shows that a 100 per cent renewable electricity system results in significant price and peak security risk.

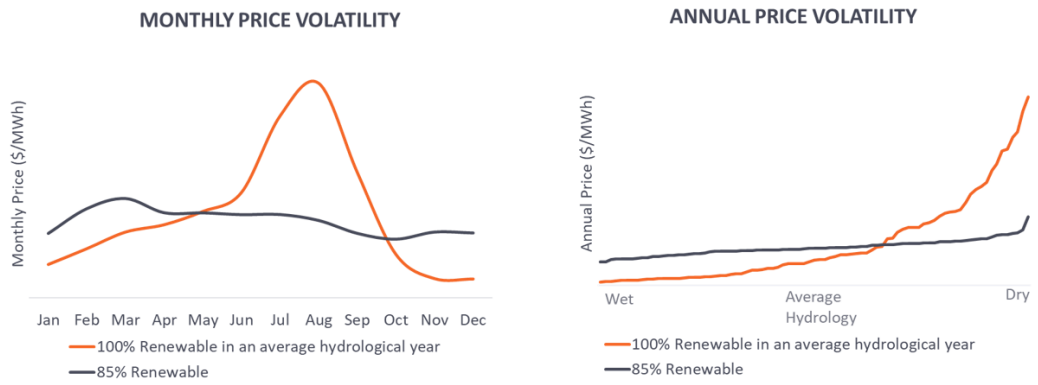
5 At the currently consented operating range of 1.4 metres.

6 https://www.iccc.mfe.govt.nz/assets/PDF_Library/daed426432/FINAL-ICCC-Electricity-report.pdf

7 https://www.productivity.govt.nz/assets/Documents/4e01d69a83/Productivity-Commission_Low-emissions-economy_Final-Report.pdf

High renewable penetration will have challenges

— If you just overbuild renewables, price rises 20% on average and becomes much more volatile



Genesis believes that the current market structure will not provide sufficient incentives for thermal assets that support seasonal firming need. This creates a medium-term risk to the target of low-cost energy with strong security of supply. Additionally, we believe that the proposed trajectory on carbon pricing will only act to deliver super profits to legacy hydro assets and will not necessarily deliver improved carbon outcomes for the wider economy or the New Zealand consumer.

Demand side management

This consultation paper rightly recognises that effort is required on both the supply and demand sides of the energy equation. Genesis remains focused on working alongside our customers to help them manage their energy use, enabling them to better control their costs and environmental impact.

Energy efficiency is a critical part of meeting the trilemma challenge. The discussion paper notes that although energy efficiency investments are already economically sound, they are often deferred due to competing priorities. Genesis believes providing the appropriate incentives, for suppliers and consumers, would lower this barrier and help fast-track meaningful action to reduce energy consumption.

However, while energy efficiency and demand response are both critical elements of the New Zealand energy market of the future, they will not solve the seasonal and hydro risks inherent in such a highly renewable and weather dependant electricity system. They are only part of the solution.

Conclusion

The New Zealand electricity sector is in an enviable position internationally, due to its high and growing proportion of renewables. These assets will enable decarbonisation of other parts of the energy mix, while the electricity sector itself also continues to reduce its impact. Care is required to ensure the transition is managed well. The Government needs to carefully consider its role in ensuring secure and reliable electricity is able to support a wider de-carbonisation of the economy without unintended consequences. In Genesis' view this means consideration needs to be given to a cross-sector impact assessment on the consequence of the ETS on electricity prices and the interplay with wholesale electricity market design. Consideration should be given to removing the barriers to both new

renewable build and new grid connections and broader incentives should not be ruled out if they achieve the goal of a lower carbon economy, while keeping costs down for consumers.

As New Zealand's largest consumer electricity retailer and one of the nation's larger electricity generators with unique experience contributing to the country's security of supply, Genesis is committed to helping the Government achieve its policy goals and the removal of greenhouse gases from the economy.

We look forward to collaborating with you on this unique opportunity.

Yours sincerely

Marc England
Chief Executive