Call for evidence: response form

We are looking for responses that are evidence-based, with data and references included where possible. Please limit your response to each question to a maximum of 400 words, plus links to supporting evidence, using the template provided. Please answer only those questions where you have particular expertise or experience.

We recommend that you refer to the Climate Change Response (Zero Carbon) Amendment Bill when considering your answers, which can be found here.

If you have any questions about completing the call for evidence, please contact us via feedback@ICCC.mfe.govt.nz. Please include a contact number in case we need to talk to you about your query.

Please email your completed form by **12 noon, Friday 15 November 2019** to feedback@ICCC.mfe.govt.nz. We may follow up for more detail where appropriate.

Contact details

Name and/or organisation	Meridian Energy Ltd
Postal Address	
Telephone number	
Email address	

Submissions on similar topics

Please indicate any other submissions you have made on relevant topics, noting the particular material or information you think we should be aware of.
Answer: Meridian has previously made relevant submissions to the: • Productivity Commission on both stages of the *Low-emissions economy* inquiry; • Ministry for the Environment on the Zero Carbon Bill and reform of the Emissions Trading Scheme; • Environment Select Committee on the Climate Change Response (Zero Carbon) Amendment Bill; and • Ministry of Transport on *Moving the light vehicle fleet to low-emissions*. All submissions are available online.

Commercially sensitive information

Do you have any objection to the release of any information contained in your response, including commercially sensitive information? ***If yes, which part(s) do you consider should be withheld, together with the reason(s) for withholding this information.***
Answer: No.

Questions for consideration:

Section A The first three emissions budgets

Under the proposed Zero Carbon Bill, the proposed Commission will have to provide advice to government on the levels of emissions budgets over the coming decades.

Currently, the Zero Carbon Bill requires budgets to be set from 2022-2035 (three separate budgets covering 2022-2025, 2026-2030, and 2031-2035). When preparing this advice the proposed Commission will have to consider the implications of those budgets for meeting the 2050 target. The Commission will also need to consider the likely economic effects (positive and negative) of its advice.

Question 1: ***In your area of expertise or experience, what are the specific proven and emerging options to reduce emissions to 2035? What are the likely costs, benefits and wider impacts of these options? Please provide evidence and/or data to support your assessment.***
Answer: Approximately 40% of New Zealand's gross greenhouse gas (GHG) emissions come from energy, including around 5% from electricity generation. Meridian wishes to comment on emissions reductions in the energy sector only, and not on emissions from agriculture, industrial processes, or waste. Meridian runs a high-resolution optimisation model for the entire New Zealand electricity market with a 30-year lead outlook. Renewable electricity generation is a proven option to reduce emissions in the energy sector. The model provides insights into the likely costs, benefits and wider impacts of increasing the amount of renewable electricity generated in New Zealand. The model factors in the forecast changes to wind and hydrology with a changing climate (and the impact of this on hydro and wind generation) as well as the electrification of transport and industrial heat processes. We model two scenarios:

- **Evolution** – a moderate decarbonisation scenario that represents the electricity market over the next 30 years using current trends, including moderate improvements in energy efficiency, demand increases from population growth, and a moderate increase in electrification of transport and industrial heat conversion. This scenario is more or less "business as usual" and represents a world in which no major policy changes have been enacted that would create significant industry disruption or regulatory constraints on the electricity market.

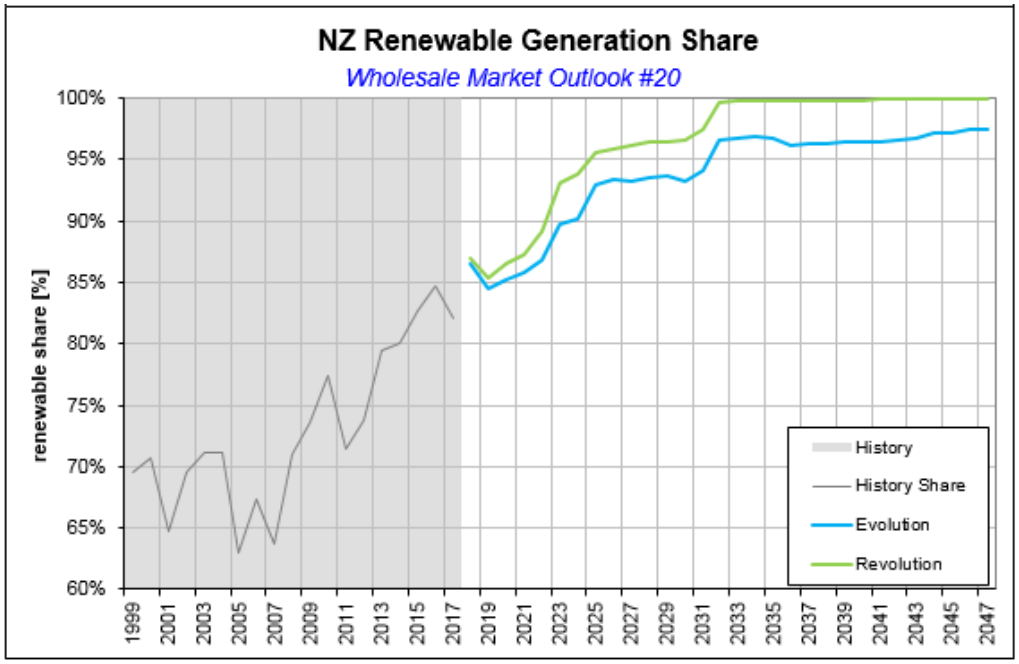
- **Revolution** – a strong decarbonisation scenario that represents the electricity market over the next 30 years where greater steps are taken to decarbonise transport and process heat, and assuming significant developments in climate-related policy to achieve a 2°C world.

In summary our modelling shows:

- The energy trilemma of security of supply, sustainably, and reasonable price, is achievable under the current New Zealand electricity market settings.

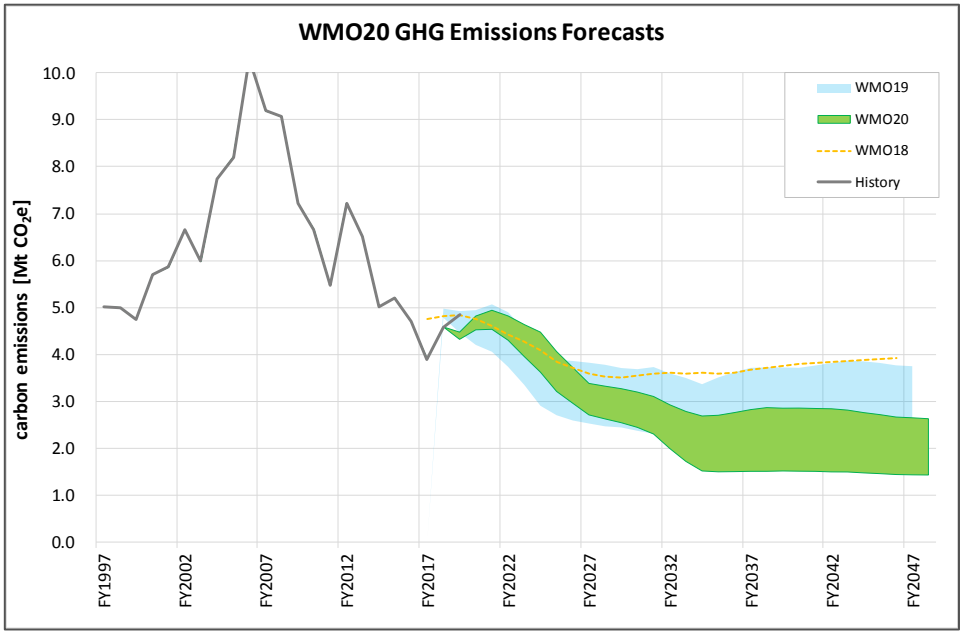
- We remain confident in the view that we expressed in our 2019 Integrated Report that the current market structure and improvements to the Emissions Trading Scheme will create the investment incentives needed for New Zealand to reach at least 95% renewable energy within the next 10–15 years.

- Both our modelling scenarios result in the New Zealand electricity market reaching >95% renewable by 2032. The revolution scenario hits 100% renewable in 2033.

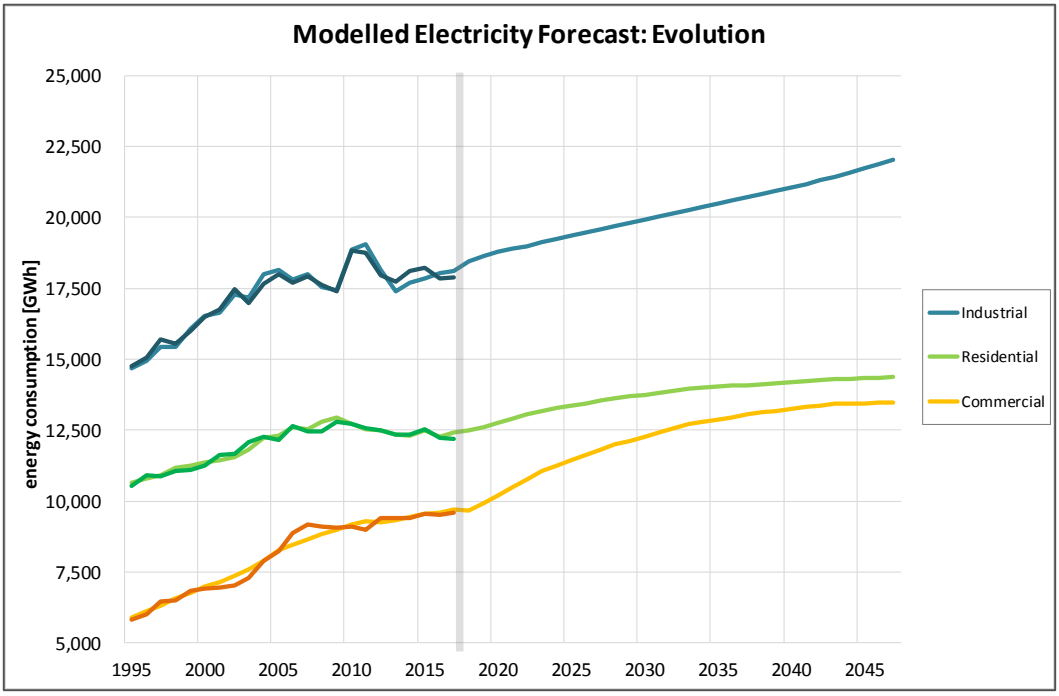


- Both of Meridian's modelling scenarios result in a significant reduction in the amount of GHGs from electricity generation, but also (not shown on below graph) significant reduction in greenhouse gases from the electrification of transport and industrial heat processes. Note that we update these scenarios on a regular

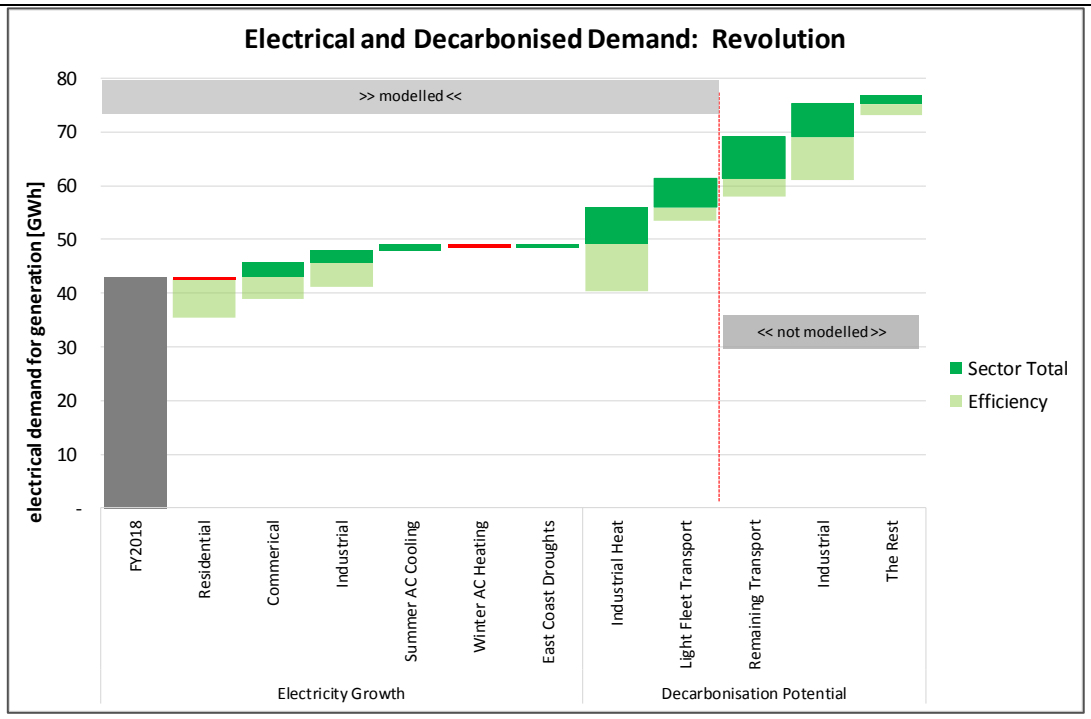
basis, and that the three most recent iterations have shown increasingly fewer forecast emissions from electricity generation.



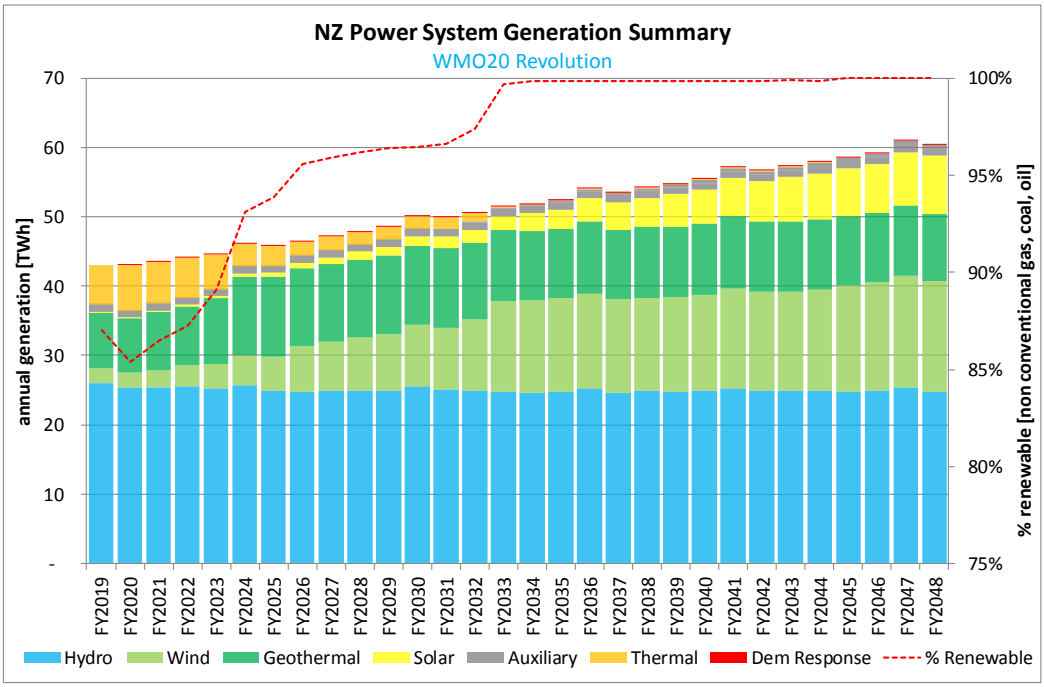
- We project significant electrification of transport and industrial heat processes, meaning an increase in electricity demand over and above increases attributable to GDP and population growth.



- Meridian also models increases in demand coming from changes to heating and air conditioning load and increases to irrigation load in some areas.

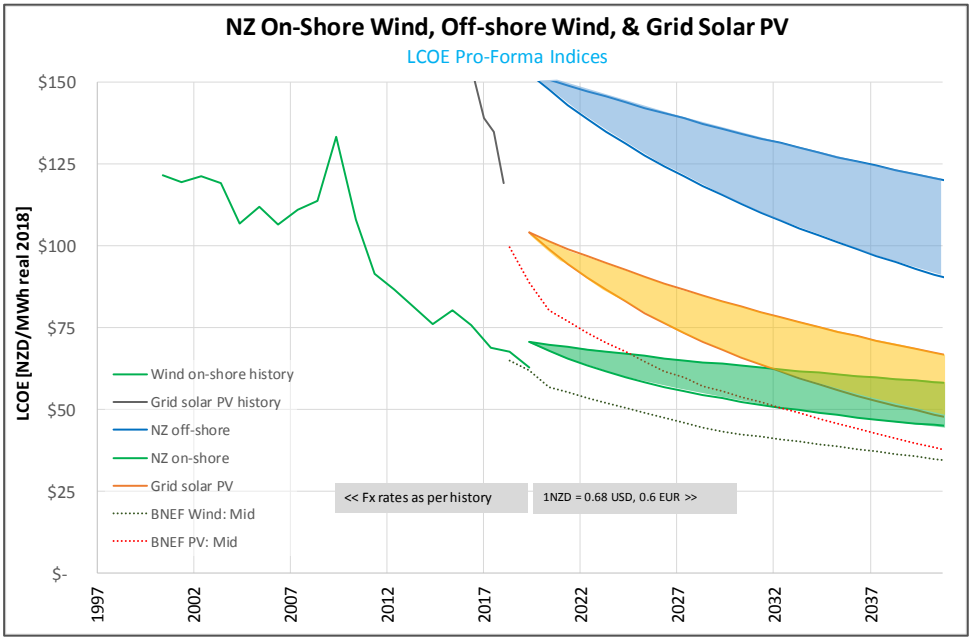


- Our modelling shows that increases in demand and significant generating plant retirements over the next 30 years result in significant new build of generation over this period.



- Wind and solar generation costs have been declining rapidly in recent years. The obvious first cab off the rank in terms of the cheapest new generation is wind generation, and we see significant new wind generation being built over the next 30 years, including a number of Meridian investments. Also becoming cost

effective is grid solar generation, which our modelling shows being built after the mid-2030s.



- Meridian's modelling indicates that the New Zealand electricity market will continue to decarbonise itself without any further intervention as this is the most efficient outcome. Some gas peaking plant may be required in the system over the mid-term to maintain reliability and price outcomes – this was well covered in the ICCC's *Accelerated electrification* report.

- Meridian's modelling also indicates that the New Zealand electricity market will enable the decarbonisation of significant transport and industry through the provision of renewable, reliable and reasonably priced energy.

From a generator and generation developer's perspective, we anticipate that under current electricity market arrangements most of this transition will take place seamlessly within the next couple of decades. No changes to the fundamentals of the electricity market and no subsidies will be required. However, certain actions or interventions will determine the speed of change and whether the New Zealand electricity market follows a pathway that look more like Meridian's modelled evolution or revolution scenarios.

Our response to Question 2 provides further detail on potential actions and interventions.

Please let us know if the ICCC is interested in details of Meridian's modelling, including the costs of new renewable generation and the impacts of a changing climate on wind and hydro generation. We may be able to share further information but would need to properly consider the commercial sensitivity of the information and the extent of confidentiality undertakings we might require.

Question 2:

In your areas of expertise or experience, what actions or interventions may be required by 2035 to prepare for meeting the 2050 target set out in the Bill? Please provide evidence and/or data to support your assessment.

Answer:

The passing of the Climate Change Response (Zero Carbon) Amendment Bill with broad political support is a key first step to establish targets, a budget setting process, and institutional arrangements that enable independent advice and monitoring of progress.

The Government also needs to pass the Climate Change Response (Emissions Trading Reform) Amendment Bill. The New Zealand Emissions Trading Scheme (ETS) should be the main policy lever to meet the 2050 target and each emissions budget. Removal of the $25 fixed price option, inclusion of agriculture, phase out of free allocations, and the ability to limit the volume of emissions units available will enable the Government to deliver emissions outcomes in the economy that align with budgets.

The shape of the emissions budget trajectory set by the Government and the volume of ETS units made available each year will in large part determine the rate of change and distribution of any costs and benefits over time. Meridian encourages the ICCC and Commission (once established) to provide advice that is conscious of equity over time and between generations. For example, budgets that allow for complacency and a flat emissions trajectory early on will mean that more mitigation and a sharper transition is required in later decades.

The ETS will enable the Government to set expectations and will provide a market that enables the identification of least cost mitigation across the whole of the New Zealand economy. This is preferable to direct interventions on a sector by sector basis, particularly if interventions by the Government pick winners, which may not prove to be efficient for taxpayers and consumers in the long-term.

As an example of efficient ETS outcomes, in the electricity market Meridian and other generators, retailers, and consumers purchase hedges to cover risk, including the risk of a dry year. These are financial hedges but are often offered by parties that are backed by thermal generation. Meridian considers it probable that in future parties will offer and purchase hedge products backed by other sources, including demand response aggregators, hydrogen generation, or pumped hydro generation. Over time, ETS unit prices will make thermal options for dry-year cover less attractive relative to various alternatives and the market will identify the most efficient option (factoring in the cost of emissions). If the Government or Commission wants to move faster then limiting the number of units available under the ETS will be the most efficient intervention.

In addition to the ETS, the type of interventions that will be effective are those that:

- remove barriers and streamline market dynamics to enable faster and more cost-effective transitions; or

- address situations where ETS price signals do not adequately incentivise necessary behavioural change.

Example of such interventions include:

- **Resource Management Act (RMA) reform and improved national direction regarding the consenting of renewables.** There is some scope for delay and increased costs for the transition in the form of barriers under the RMA. These will potentially constrain and hold back investment in renewable electricity generation and add costs for renewable developers and consumers. This could include, but will not be limited to:
    - A new National Policy Statement for Renewable Electricity Generation should be clearer and directive about the outcomes the Government wants to achieve for renewable electricity and climate change – Meridian provided a redrafted National Policy Statement in our submission on the Productivity Commission's *Low-emissions economy* draft report.
    - Elevation of renewable electricity generation and the effects of climate change to section 6 of the RMA so that they are matters of national importance that decision-makers must recognise and provide for.
    - National Environmental Standards to limit debate on accepted standards like wind farm noise effects set out in New Zealand Standard (NZS 6808:2010).
    - Longer consent durations and lapsing timeframes for renewable generation projects.
- **Preserving and enhancing New Zealand's backbone of hydro generation.** The retirement of thermal generation plant and the building of new wind and solar generation will introduce significant intermittency to the electricity system. To maintain security of supply when the wind is not blowing and the sun not shining, it is vital that hydro generation is preserved and enhanced if possible, as essential "battery banks" to firm increasing intermittency in the electricity system. As consent and public acceptance of new large hydro plant is very difficult to secure, the ability to increase efficiencies on existing large hydro is vital. In addition to the RMA measures above, the National Policy Statement on Freshwater Management, Appendix 3 must be completed as proposed so that councils can make decisions that allow for the ongoing operation of existing renewable generation schemes. Unless this is done, there is significant risk of renewable electricity generation being reduced to:
    - achieve water quality outcomes through dilution of nutrients; or
    - reinstate flows in diverted sections of rivers.

  Both would impact the levels of hydro generation achievable and the extent to which new renewables can be integrated into the electricity system. As a

result, climate change goals would become more difficult to achieve with increased costs and/or reduced security of supply.

- **Policies to facilitate alternatives to fossil fuel use for light transport and industrial heat.** Meridian's modelling shows that the New Zealand electricity system can enable the relatively rapid electrification of the light vehicle fleet and of heat used in industrial processes. Government policies to facilitate this electrification (or other fossil fuel alternatives) should be encouraged, including the proposed Clean Car Standard and feebate scheme. Sector specific intervention in light transport is justifiable given:
    - the limited impact of the ETS on fuel prices and consumer incentives;
    - vehicles stay in the New Zealand fleet for a long time, locking in the associated emissions for their lifetime;
    - rapid uptake of low emission vehicles will be critical to reduce emissions and is one of the most effective steps that New Zealand can take right now; and
    - there are associated long-term economic benefits to New Zealanders because of greater fuel efficiency.

Question 3:

In your areas of expertise or experience, what potential is there for changes in consumer, individual or household behaviour to deliver emissions reductions to 2035? Please provide evidence and/or data to support your assessment.

Answer:

Meridian modelling shows the household uptake of electric vehicles will have significant impacts on emissions. With an increasing number of large, mobile batteries in New Zealand, Meridian expects businesses to evolve to coordinate or incentivise the charging and discharging of batteries to manage peak generation requirements and network constraints. Several firms have already undertaken trials.

Aggregated mass market demand response of this kind, whether through electric vehicles, home batteries, or smart appliances, would have significant security, reliability, and price benefits including:

- enabling higher levels of intermittent renewable generation (closer to 100%) in the electricity market; and
- reducing underutilised generation and network capacity, particularly thermal peak generation and the associated emissions.

The Electricity Authority has several projects to facilitate demand side participation in the New Zealand electricity market, including real-time pricing, open networks, and participation of new generating technologies in the wholesale market.[1] EECA has also been working with Australian regulators on the development of standardised demand response capabilities for certain appliances.[2]

Question 4:

When advising on the first three emissions budgets and how to achieve the 2050 target, what do you think the proposed Commission should take into account when considering the balance between reducing greenhouse gas emissions and removing carbon dioxide from the atmosphere (including via forestry)?

Answer:

Question 5:

What circumstances and/or reasons do you think would justify permitting the use of offshore mitigation for meeting each of the first three emissions budgets? And if so, how could the proposed Commission determine an appropriate limit on their use?

Answer:

New section 5W of the Climate Change Response Act states that:

(1) Emissions budgets must be met, as far as possible, through domestic emissions reductions and domestic removals.

(2) However, offshore mitigation may be used if there has been a significant change of circumstance—

(a) that affects the considerations on which the relevant emissions budget was based; and

(b) that affects the ability to meet the relevant emissions budget domestically.

The words "as far as possible" are open to interpretation but there can be no doubt that this is a strong direction to not use offshore mitigation if possible and to only do so in limited circumstances.

The Commission will still have a role under new section 5X(1)(e) to advise the Minister on the matters relevant to setting an emissions budget, including "the proportions of an

[1] https://www.ea.govt.nz/development/work-programme/
[2] http://energyrating.gov.au/sites/new.energyrating/files/documents/Consultation%20Paper%20-%20Smart%20Demand%20Response%20Capabilities%20for%20Selected%20Appliances_0.pdf

emissions budget that will be met by domestic emissions reductions and domestic removals" and "the appropriate limit on offshore mitigation that may be used to meet an emissions budget, and an explanation of the circumstances that justify the use of offshore mitigation (see section 5W)."

In advising on emissions budgets it seems that the Commission's starting point will be that budgets are to be met by domestic mitigation only. This seems appropriate considering the nationally determined commitments (NDCs) under the Paris Agreement and the ongoing and unresolved international negotiations regarding the Article 6 mechanisms for voluntary co-operation between states seeking to meet NDCs.

The circumstances that might justify permitting the use of offshore mitigation for meeting each of the first three emissions budgets, include:

- international agreement on mechanisms under Article 6 of the Paris Agreement;
- a subsequent bilateral agreement between New Zealand and another nation regarding the use of offshore mitigation;
- reopening of the ETS to high-quality, reputable international units;
- units available overseas at lower costs than domestic mitigation options; and
- as required under new section 5X of the Act, a significant change of circumstance that both:
    - **affects the considerations on which the budget was based** – this could include situations not contemplated when the budget was set such as when a natural disaster or other national emergency occurs, or if significant changes in the economy were not considered, or if significant changes to the 2050 targets or level of mitigation agreed internationally were not considered; and
    - **affects the ability to meet a budget domestically** – this could include situations where the ability of the New Zealand economy to manage the costs of domestic mitigation is affected.

Section B Emissions reduction policies and interventions

The proposed Commission will also need to consider the types of policies required to achieve the budgets it proposes. This consideration should include:

- sector-specific policies (for example in transport or industrial heat) to reduce emissions and increase removals, and
- the interactions between sectors and the capability of those sectors to adapt to the effects of climate change.

Question 6: ***What sector-specific policies do you think the proposed Commission should consider to help meet the first emissions budgets from 2022-35? What evidence is there to suggest they would be effective?***
Answer: See Meridian's response to Question 2 above.

Question 7: ***What cross-sector policies do you think the proposed Commission should consider to help meet the first emissions budgets from 2022-35? What evidence is there to suggest they would be effective?***
Answer: See Meridian's response to Question 2 above.

Question 8: ***What policies (sector-specific or cross-sector) do you think are needed now to prepare for meeting budgets beyond 2035? What evidence supports your answer?***
Answer: See Meridian's response to Question 2 above.

Section C Impacts of emissions budgets

The proposed Commission will need to consider the potential social, cultural, economic and environmental impacts of emission budgets on New Zealanders, including how any impacts may fall across regions and communities, and from generation to generation. Potential impacts may be either positive or negative.

Question 9: ***What evidence do you think the proposed Commission should draw upon to assess the impacts of emissions budgets?***
Answer: The Commission will need to model the expected emissions prices that will flow from the budget and resulting ETS unit volumes and the economic cost of those emissions prices and any other sector specific policies in effect over the budget period. Cultural and social impacts are more difficult to assess quantitatively but we encourage the Commission to consider the distributional impacts of mitigation policies. Co-benefits of emissions reduction should also be considered, for example human health benefits due to air quality, or increase in native biodiversity from restoration.

Question 10: ***What policies do you think the proposed Commission should consider to manage any impacts of meeting emissions budgets? Please provide evidence and/or data to support your assessment.***
Answer:

Section D Other considerations, evidence or experience

Question 11: ***Do you have any further evidence which you believe would support the future Commission's work on emissions budgets and emissions reduction policies and interventions?***
Answer:

Please email your completed form to feedback@ICCC.mfe.govt.nz by **12 noon, Friday 15 November 2019.**

If you have any questions about completing the call for evidence, please contact us via feedback@ICCC.mfe.govt.nz.