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Phillippa Fox
General Manager
Energy & Resource Markets
Ministry of Business, Innovation & Employment
15 Stout Street
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Sent via email: energymarkets@mbie.govt.nz

Dear Phillippa

Discussion document: Accelerating renewable energy and energy efficiency

Firstgas Group Limited (Firstgas) welcomes the opportunity to comment on the discussion document, "*Accelerating renewable energy and energy efficiency*" (discussion document), released in December 2019.

Firstgas is committed to helping New Zealand meet its 2050 emissions reduction targets. We also believe New Zealand can show greater leadership by using its natural capital and trading advantages to help other countries meet their emissions reduction targets. Our primary concerns are to ensure the initiatives to transition to a lower emissions economy are well-informed, consider broader impacts to the economy and communities, and that the lowest risk, highest impact initiatives are used to meet New Zealand's 2050 targets.

Structure of our submission

Our submission has two parts:

- Part one provides background on Firstgas and our specific views on the discussion document and
- Part two responds to selected questions from the discussion document questionnaire (**Appendix 1**).

Nothing in this submission is commercially sensitive and we are happy for this submission to be published on the Ministry of Business, Innovation & Employment's website.

About Firstgas

First Gas Limited (Firstgas)[1] owns and operates more than 2,500 kilometres of high-pressure gas transmission pipelines and other supporting infrastructure that supplies natural gas from Taranaki to residential, commercial and industrial consumers throughout the North Island. Firstgas also operates more than 4,800 kilometres of gas distribution networks. Through these distribution networks, Firstgas provides gas distribution services to gas retailers who sell gas to more than 60,000 customers across Northland, Waikato, the Central Plateau, Bay of Plenty, Gisborne and Kapiti regions.

Firstgas also owns energy infrastructure assets across New Zealand through our affiliate Gas Services NZ Limited (GSNZ). GSNZ is a separate business with common shareholders that owns the Ahuroa gas storage facility ("Ahuroa" trading as Flexgas) and Rockgas – an LPG business supplying 100,000 customers throughout New Zealand.

In New Zealand, effective large scale energy storage options are limited to hydro storage, predominantly in the South Island, Ahuroa gas storage and the coal stockpile at Huntly Power Station

[1] For more information on the Firstgas Group, visit www.firstgas.co.nz, www.flexgas.co.nz, and www.rockgas.co.nz.

in the North Island. On its own, Ahuroa has a similar energy storage capacity to the sum of all South Island hydro storage. We believe Ahuroa will play an important role over the next decades as more intermittent renewable electricity generation is integrated into the electricity market and coal is phased out and when South Island storage capacity is low or unavailable.

Firstgas is investigating opportunities for using our assets in ways that help to reduce New Zealand's carbon emissions. Our gas transmission and distribution networks cover much of the North Island and are ideally placed to support the development, transfer and use of emerging fuels such as hydrogen and/or biogas. In 2020, we will complete feasibility studies into the use of hydrogen in our gas network. This will be followed by a physical trial on part of our network. The feasibility work is part funded by the Provincial Growth Fund and we are working with the National New Energy Development Centre establishment team to understand how our project might fit with the centre's remit.

Firstgas' interest in the discussion paper

Firstgas has a strong interest in maximising the value of existing gas infrastructure as an asset for New Zealand. We believe our infrastructure will make an important contribution towards meeting New Zealand's 2050 emissions reduction targets and continue to support an increasingly sustainable and circular economy well beyond 2050. This view, well supported by International Energy Agency and World Energy Council work on decarbonisation, seems to be missing from the dialogue. In the context of this discussion document, there is an absence of discussion of both the transitional and future role of gas in the New Zealand energy system.

General comments on the discussion document

We provide the following comments on areas not covered by the specific questions in the discussion document.

Transition – not revolution

Gas has the potential for a long future in New Zealand. Not just Crown-owned gas but imported gas, biogas, hydrogen and other forms of gas. Firstgas, as part of its commitment under the World Energy Council Hydrogen Global Initiative[2] is aiming for 20 percent hydrogen blending in our distribution systems by 2030. We also believe significant quantities of biogas could be injected to further decarbonise the gas stream.

We are concerned at the lack of integrated analysis of the emissions reduction proposals put forward by Minister's, Government agencies, and the Interim Climate Change Commission (ICCC), and the combined impact of those proposals on the broader economy. There seems to be a view that wholesale decarbonisation of long-established industries can be undertaken without impacting the economy and the communities based around those industries. Further, the view that forestry will meet most of New Zealand's abatement needs implies that the Government expects New Zealand's agricultural sector to decline significantly through land use change to forestry. We think there needs to be explicit consultation on these trade-offs, particularly in regional economies and communities in order to honour Government ambitions for a just transition.

The discussion document is electricity-centric and ignores the importance of gas

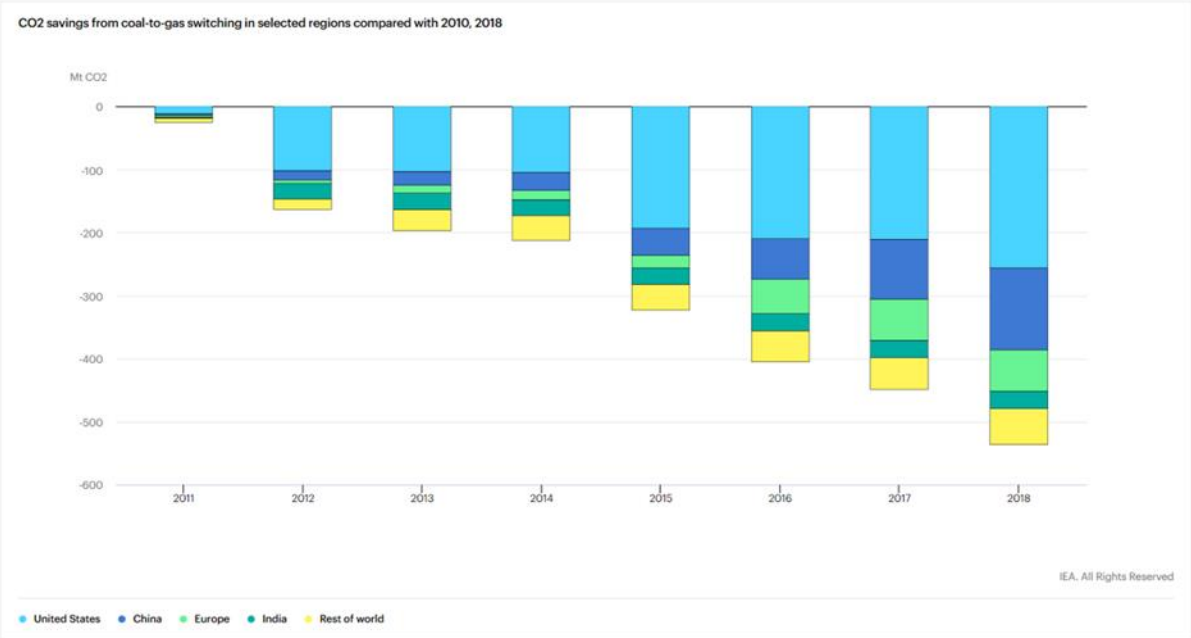
Gas supply disruptions, low hydro lake levels and windless days in the 2018 spring and early 2019 summer all combined to increase coal consumption in New Zealand to levels not seen since 2013. Given this recent experience, we consider that policy analysis in this area should have placed more emphasis on the role of gas as an alternative to coal in periods where other forms of energy are unavailable.

The International Energy Agency (IEA) continues to stress the importance of gas in reducing global carbon emissions. The evidence of the gains in emissions reduction through switching from coal to gas is compelling (Figure 1 below), and conversion from coal to gas is expected to be a critical step in meeting global emissions reduction targets by 2050. 1200Mt of emissions could be saved annually by switching to gas on existing power installations alone[3].

[2] https://www.worldenergy.org/impact-communities/innovation/hydrogen-charter

[3] https://www.iea.org/reports/the-role-of-gas-in-todays-energy-transitions

Figure 1: CO_2 savings from coal-to-gas switching



Growth in global gas trade via LNG is a critical enabler to allow countries to switch from coal to gas. New Zealand is fortunate that it has an existing gas resource that can be used to displace domestic coal consumption, and the potential to help displace coal use in other countries if an LNG scale discovery is made in New Zealand. Gas exports from New Zealand to countries with high current coal demand could make a significant contribution towards meeting the global 2050 emissions reduction targets.

Firstgas has raised this issue several times in recent submissions. In response to a call for evidence made by the Interim Climate Change Committee, we provided analysis showing that connecting five of the remaining large North Island coal users to natural gas would reduce emissions by around 500,000 tonnes per annum.

Government should be agnostic towards emissions reduction and abatement options

We believe that the 2050 emissions targets represent a huge challenge for New Zealand and that consideration of all technologies will be required across the energy system. Targeting particular technologies at this stage could preclude more cost-effective solutions, deter investment in mature technologies in favour of 'perfect solutions' and be detrimental to a just transition.

In terms of the preferred technologies outlined in this discussion document, both geothermal and biomass have potential issues that mean it may not be prudent to rely on them as long term options to reduce emissions to the 2050 targets. For geothermal, subsidence and discharges of fluids to rivers containing high levels of heavy metals[4] are well known in the Taupo Volcanic Zone, emissions associated with induced and natural eruptions are also a risk[5]. Geothermal generation in NZ produced 815 kt of CO_2-e in 2017[6] which is approximately 18% of total electricity sector emissions. Some fields are also known to emit similar levels of CO_2[7] to gas fired electricity generation units. There is potential for increased environmental regulation to limit the cumulative impacts of increasing geothermal generation development.

[4] https://www.geothermal-energy.org/pdf/IGAstandard/WGC/2005/0263.pdf

[5] Bixley, P.F, and Browne, P.R.L. 1988: Hydrothermal eruption potential in geothermal development. Proceedings 10th New Zealand Geothermal Workshop 1988, 195-198.

[6] Total geothermal emissions in 2017 were 814.77 kt CO2-e while emissions from combustion to produce electricity were 3,616.19 kt CO2-e (https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/new-zealand-energy-sector-greenhouse-gas-emissions/). 182.24 PJ of geothermal energy was produced in 2017 and 174.23 PJ of this was used in electricity generation (https://www.mbie.govt.nz/assets/Data-Files/Energy/energy-balance-tables.xlsx) – i.e. 96% used in electricity. This leads to emissions from geothermal electricity generation being 18% of electricity emissions.

[7] https://nzgeothermal.org.nz/app/uploads/2019/11/Katie-McLean.pdf

Increasing the use of biomass for energy also raises issues that will need to be resolved. Conversion of process heat from coal to biomass has never been applied at scale before in New Zealand. It is experimental because the logistical supply chain emissions for widespread deployment are unknown in New Zealand. Globally, the biomass option has existed for longer in some other countries, and there are growing concerns about the true effectiveness of biomass in reducing emissions. The European Academies Science Advisory Council has stated that:

> *"Biomass should not be regarded as a source of renewable energy under the EU's Renewable Energy Directive (RED) unless the replacement of fossil fuels by biomass leads to real reductions in atmospheric concentrations of CO2 within a decade or so[8]".*

A number of countries are having to import biomass feedstocks, and it is conceivable that with widespread deployment of biomass in New Zealand, that it may end up being cheaper to import wood pellets or wood waste. While this would add to the transport fuel emissions from biomass, imported wood pellets would create biosecurity risks, and the source of any imported material would need to be verified to ensure it had been produced and processed ethically. Certification schemes would be required to ensure that biomass harvested is replanted, and while this would be difficult in New Zealand, it would be extremely difficult for imported biomass.

We do not raise these points to dismiss the contribution that geothermal and biomass can make towards a lower carbon energy future for New Zealand. The key point here, however, is that we believe that backing one or two preferred technologies would be unwise given the risks that each option faces of ultimately being ineffective in reducing emissions. We think emissions reduction policies should therefore remain technology neutral based on the demonstrated carbon abatement achieved to mitigate the risks associated with the deployment of new technologies.

Biogas and hydrogen are viable technology options to consider

We think the absence of any reference to technologies other than biomass and geothermal is shortsighted and potentially self-defeating. A larger biogas market in New Zealand for example, would have many environmental benefits and long-term emissions reduction potential. Biogas is already well understood in many countries, for example the UK has around 490 biogas plants and injected 12 PJ into the gas transmission system in 2018[9]. Sweden uses around 13 petajoules a year (similar to the energy that can be stored in New Zealand's southern hydro lakes) and has the potential to grow this several-fold by 2030[10]. The technology is well understood.

Biogas is considered a valuable asset in some countries because it closes cycles, turns waste and residual products into resources, reduces emissions, generates bio-fertilizers for agriculture, provides improved water quality outcomes and creates green jobs. It is also considered a flexible fuel with a useful market and many social benefits[11]." New Zealand is well placed to invest in biogas because we have much of the existing pipeline and gas infrastructure already in place. We also have numerous potential sources of biogas – annually New Zealand generates around 300,000 wet tonnes of biosolids. There are many initiatives are underway to find ways to better manage this material, biogas use for electricity generation is a common opportunity being explored.

In the UK, the adoption of biomethane is expected to help the UK meet its 2020 commitments to supply 15% of energy demand from renewable sources[12]. Biogas initiatives are already underway in many parts of New Zealand[13] and we believe biogas initiatives should be encouraged.

In the context of industrial heat, hydrogen is another pathway to significantly reduce emissions without the need to invest in new boilers. This is because hydrogen blended with natural gas and other gases can be used in existing gas equipment. At present the cost of hydrogen production is relatively high but is expected to fall dramatically[14] over the timeframes outlined in the discussion document. We believe the growing level of international interest and investment in hydrogen means production costs will continue to fall and blending will become increasingly viable. Once again, we think Government

[8] European Academies Science Advisory Council; Forest bioenergy, carbon capture and storage, and carbon dioxide removal: an update

[9] http://www.biogas-info.co.uk/resources/biogas-map/

[10] https://bioenergyinternational.com/markets-finance/biogas-made-in-sweden-reduced-emissions-2018

[11] http://www.biogas-info.co.uk/resources/biogas-map/

[12] http://www.biogas-info.co.uk/resources/biogas-map/

[13] For examples, see https://www.bioenergyfacilities.org/bioenergy-facilities

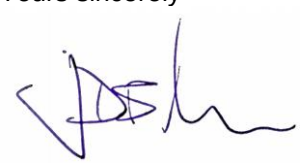
[14] https://www.bloomberg.com/news/articles/2019-08-21/cost-of-hydrogen-from-renewables-to-plummet-next-decade-bnef

should ensure that it has a range of options to reduce emissions rather than backing one or two preferred technologies.

Contact details

If you have any questions regarding this submission or would like to meet with Firstgas to discuss opportunities for optimising the use of natural gas on our networks, please contact me on (04) 830 5306 or via email at josh.adams@firstgas.co.nz.

Yours sincerely



Josh Adams
Transmission Commercial and Ahuroa Business Case Support

APPENDIX 1: RESPONSES TO SELECTED DISCUSSION DOCUMENT QUESTIONS

Question	Response
1.1 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?	Firstgas supports the reporting and auditing proposal in principle. We see merit in all large energy users participating in this regime and believe it will provide useful information to assist the Climate Change Commission understand progress towards achieving New Zealand's emissions targets. The information gathering requirements should align with other jurisdictions to allow New Zealand industries to benchmark themselves against the same industries in other countries. However, administrative burden is a concern, and we therefore want to see reporting that is designed to provide a meaningful basis for action for the company.
1.2 Which parts (set out in Table 3) do you support or not? What public reporting requirements (listed in Table 3) should be disclosed?	As highlighted in 1.1 we think the reporting framework should align with industries in other jurisdictions. More specifically, we think the public reporting requirement should not be limited to coal, gas, electricity, and transport. Biomass, biogas, hydrogen and other sources should also be included.
1.3 In your view, should the covered businesses include transport energy and emissions in these requirements?	Yes. We think transport energy and emissions should be included in the requirements. This includes rail and marine transport. We think there are large emissions reduction gains to be made in marine transport, and we note the global shipping fleet is already beginning to convert to cleaner fuels such as gas and methanol[15]. This is an example where New Zealand's gas sector could make a significant contribution to lowering global emissions.
1.4 For manufacturers: what will be the impact on your business to comply with the requirements? Please provide specific cost estimates if possible.	N/A
1.5 In your view, what would be an appropriate threshold to define 'large energy users'?	We think the threshold could be set based on the higher of a specified dollar value or energy value (e.g. 1 PJ). We don't have a particular view on what the threshold should be, however it should be set so that it catches a representative sample of New Zealand's large energy users.
1.6 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?	If the timing of disclosures is aligned with other reporting obligations, then duplication of reporting requirements would be easier for businesses to manage. We also think that careful consideration should be given to leveraging existing reporting rather than creating a new report. The report also needs to focus on what is useful for the firm to make meaningful change rather than statistics gathering.
1.7 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?	We think the focus on electrification is too narrow. Other technologies, such as hydrogen and biogas, should also be included to ensure businesses have a range of options. If businesses have a range of viable options, then they are more likely to begin transitioning to lower emissions fuels.
1.8 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?	As highlighted in our letter accompanying this submission, and in our answer to 1.7, we think the focus on electrification is too narrow. Other technologies, such as hydrogen and biogas should also be included to ensure businesses have a range of options.
2.6 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?	We think that technology bias should be avoided. Bioenergy via biomass may not be a viable long term option for most large energy users. Please see our comments on bioenergy in in our letter accompanying this submission.

[15] www.irena.org/-/media/files/irena/agency/publication/2019/Sep/IRENA_Renewable_Shipping_Sep_2019.pdf

Question	Response
2.7 Is Government best placed to provide market facilitation in bioenergy markets?	We believe Government's role in facilitating bioenergy markets should focus on: • ensuring all bioenergy options are considered; and • ensuring that certification and fuel obligations are put in place to stimulate markets and to provide credibility for this source of energy. The biggest contribution Government can make towards to meeting New Zealand's 2050 emissions reduction commitments is to encourage a wide range of options rather than a narrow selection of technologies that are untested at scale across New Zealand. Please see our comments on bioenergy in our letter accompanying this submission.
2.8 If so, how could Government best facilitate bioenergy markets? Please be as specific as possible, giving examples.	As in question 2.7, we see bioenergy as broader than just burning wood. We believe all bioenergy options should be considered and that certification and fuel obligations are put in place to stimulate markets and to provide credibility for these sources of energy.
2.9 In your view, how can Government best support direct use of geothermal heat? What other options are worth considering?	Many businesses are already taking advantage of the geothermal resource without Government support, given this we think Government should avoid skewing the existing market and allow it to evolve on its own. We note that with growth in this sector, the territorial authorities will need to ensure the cumulative impacts of expanded resource use are sustainable, and that the associated CO_2 emissions and river discharges are being managed appropriately. For example, some geothermal fields have similar CO_2 emissions to gas fired electricity generation units as well as high heavy metal content in produced water[16]. There may be value in Government undertaking a regional review of the geothermal resource to better understand its long term sustainability, both in terms of its electricity generation potential and direct heat potential, and to factor this in to is emissions reduction planning. Please see our other comments on Geothermal in our letter accompanying this submission.
3.1 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?	We agree that there is an opportunity to de-risk diffusion of new technologies. An excellent example is renewable biogas, this is methane derived from a range of wastes, including sewage sludge. If the emissions from waste are not captured, then they end up in the atmosphere. There is an opportunity to capture and use this gas before it gets vented and to encourage a more circular economy. Please see our earlier comments on biogas in our letter accompanying this submission.
4.1 Do you agree with the proposal to ban new coal-fired boilers for low and medium temperature requirements?	We understand why it might make sense to focus firstly on restricting the use of higher carbon fuels like coal. However, policy settings including the ETS and local consenting conditions should create an environment where energy users do not opt for higher carbon fuels or have strong incentives to explore ways to mitigate those emissions for example through CCS or carbon re-use. We think those market mechanisms are a better way to support a sustainable transition for industries with a high for these types of boilers.
4.2 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?	We think this question is best answered by the Climate Change Commission. Their role is to determine what needs to be done to achieve carbon budgets.

[16] https://www.waikatoregion.govt.nz/Environment/Natural-resources/Water/Rivers/Waikato-River/Wastewater-discharges/

Question	Response
4.4 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?	We see the CETPs as providing information on how to make early reductions in emissions at least cost without picking winners. Phasing out fossil fuels may not be the option that provides for lowest emissions in the long term as early conversion to an unsuitable technology could preclude later integration of sustainable solutions such as biogas or hydrogen.
4.5 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?	We think the introduction and implementation of national direction needs careful thought and should be one of the tools of last resort. Under the current RMA framework, if these low GHG-emitting methods are truly environmentally sustainable then they should have few issues being approved.
8.24 [Phase down of thermal baseload and establish strategic reserve] 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?	We think this policy option should be redesigned to achieve your goals. Thermal baseload generation is already a much smaller part of the generation mix than it was twenty years ago and continues to decrease. The emissions from gas fired electricity generation[17] are almost below 1990 levels and have been declining since 2000[18]. However, the dry windless spring of 2018 illustrated that New Zealand continues to rely on thermal baseload generation for security of supply. If New Zealand wants to reduce its emissions without compromising security of supply, then displacing coal with natural gas and gas storage is a prudent option. A further linked option is to support Carbon Capture and Underground Storage as an effective abatement option until we are confident that New Zealand's energy system can operate securely without thermal baseload generation. *More on the risks of removing thermal baseload* The ICCC paper on accelerated electrification stated that 100% renewables is achievable but expensive. What it didn't mention is the exposure of New Zealand's generation assets to natural disasters and the lack of redundancy in the event of say a large earthquake in the southern hydro lakes and/or Cook Strait cable. GNS has calculated a 30% likelihood of the Alpine Fault rupturing in the next 50 years[19], so there is a relatively high probability of disruption to the backbone of New Zealand's energy system. New Zealand's geothermal fields are also in a live volcanic area and have experienced natural and induced eruptions. We think it is prudent to continue to ensure New Zealand has a range of firm generation options spread around New Zealand rather than concentrating the intermittent renewable generation risk.
8.25 Do you support the managed phase down of baseload thermal electricity generation?	We support a well-planned transition to cleaner technologies, but only if this can be done without compromising New Zealand's energy security. Investment decisions in electricity generation are complex, and Government intervention in this area has a high risk of unintended consequences. We don't think intervention is necessary because the Interim Climate Change Commission has already found that renewable generation is increasing without Government intervention.

[17] MBIE 2017 emissions statistics

[18] https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/new-zealand-energy-sector-greenhouse-gas-emissions/

[19] https://www.orc.govt.nz/managing-our-environment/natural-hazards/earthquakes/alpine-fault

Question	Response
8.26 Would a strategic reserve mechanism adequately address supply security and reduce emissions affordably during a transition to higher levels of renewable electricity generation?	We don't have the answer to this. It is a question of how much reserve is needed, the cost to maintain a reserve and who bears that cost. Fundamentally we disagree with any proposal that interferes with property rights and the lifecycle economics of existing assets. Market intervention has many risks and underestimating the reserve requirements could have severe consequences in a prolonged drought or a disruption to key generation assets. As an infrastructure owner we stress the need for clarity on any rules relating to a strategic reserve so that we can act on a day. We cannot comment usefully on the proposal for a strategic reserve without this type of detail.
8.27 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?	There are many potential scenarios where a strategic reserve could continue to play a role in New Zealand. Depending on the nature of the strategic reserve (fuel, output, location etc), it may not be effective when its needed most. Based on this we think continuing to have diverse storage and generation options, geographically and technologically is critical to security of supply, rather than relying on one specific facility. Following the recent announcement that the Taranaki Combined Cycle plant will be mothballed in 2023, we don't believe New Zealand is positioned to remove much more thermal baseload capacity over the next 5-10 years without exposing the country to longer term energy security risks. This may change over time with improving technology, but for now we think the security of supply risks need to be taken seriously. The Government will need to decide if the removal of the emissions associated with the remaining thermal baseload units is more, or less important than security of supply.
8.28 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?	We note that New Zealand's energy system is already dominated by renewables. Over the last five years the average contribution to electricity generation made by renewables has been about 85 percent. If fossil fuels are needed to guarantee energy security then we think that trade-off is acceptable. We believe that the emissions from fossil fuels can be minimised through conversion of coal to gas, gas storage, use of hydrogen and biogas and emissions sequestration using Carbon Capture and Underground Storage. Given the high emissions from geothermal generation and the potential sustainability issues with biomass we would support more dialogue on whole of system emissions. The current focus on renewables versus fossil fuels obscures the impacts of both sources of electricity and precludes options to decarbonise thermal generation.
8.29 Should a permanent capacity market which also includes peaking generation be considered?	We don't have a view on this because it requires a detailed, integrated view of New Zealand's energy market which is currently not available. Current analysis segments the discussion into (1) electricity and other fuels and (2) renewables and other - regardless of the emissions intensity and environmental impact of these groups. This is too simplistic a basis for a real conversation about reducing emissions in the energy market. We recommend undertaking a thorough review if this is to be considered to ensure the full range of complexities are understood before making any policy decisions.