

8 June 2018

Steven Bailey
Low-emissions economy
New Zealand Productivity Commission
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Sent via email: info@productivity.govt.nz

Dear Steven

Draft report – Low-emissions economy

First Gas Limited welcomes the opportunity to make a submission on the Productivity Commission's "*Low-emissions economy Draft Report*" (the draft report). As the owner of gas transmission and distribution pipelines throughout the North Island, we are keen to play our part in the transition to a low carbon economy. Much of this submission focuses on what the draft report suggests for the future role of natural gas and gas pipeline infrastructure.

Overall, we are reassured by the Commission's analysis showing that natural gas has a role to play in lowering emissions, while maintaining energy security and affordability. We are excited by the opportunities that the transition to a lower carbon future will bring, and believe that we are well-placed to be part of the solution that helps New Zealand reach its emissions reduction targets.

Summary of key points

The transition to a low carbon economy will be a long journey that involves difficult trade-offs. If New Zealand is to reach its emissions reduction targets while continuing to grow incomes and wellbeing, we will need to maintain flexibility and adapt our approach over time. We think that the draft report provides a sound analytical basis for understanding the shifts required for the transition to a low carbon economy. Serious analysis of these issues has been missing to date, and we think that the Commission's work will be useful to better inform future policy decisions.

The draft report highlights the need for consistency and consensus between political parties. We agree this is important to provide certainty for investors and consumers. Investor certainty is particularly important given the long term nature of many of the assets required to support a transition to a low carbon economy. However, political consensus may be difficult to attain. We therefore agree with the recommendation in the draft report that an independent institution (a Climate Commission) should have the mandate to advise the government on the trade-offs involved.

There are three areas we highlight in this submission for the Commission to consider further as it finalises its report. These are that:

- Natural gas will play an important role in New Zealand's low carbon economy;
- A credible emissions price is the most effective way to promote the required changes; and
- New Zealand needs to keep its options open when assessing how we will achieve a low-emission economy.

We expand on each of these points below.

1. Natural gas will play an important role in New Zealand’s low carbon economy

The draft report presents three scenarios of how New Zealand can achieve net zero emissions by 2050. Under all of these scenarios, the continued availability of natural gas is part of meeting the target. As shown in Figure 1, natural gas use in 2050 remains at more than 100 petajoules (PJ) per annum in all of the three net zero scenarios modelled. Most of the decline in natural gas usage comes from the closure of one methanol train early in the forecast period (around 2022). Figure 2 illustrates that gas is used across a range of industries including electricity generation, methanol production, process heat, and the supply of energy to residential and commercial consumers.¹

Figure 1: Annual demand for natural gas over 1990 – 2017 (actual) and 2018 – 2050 (forecast)

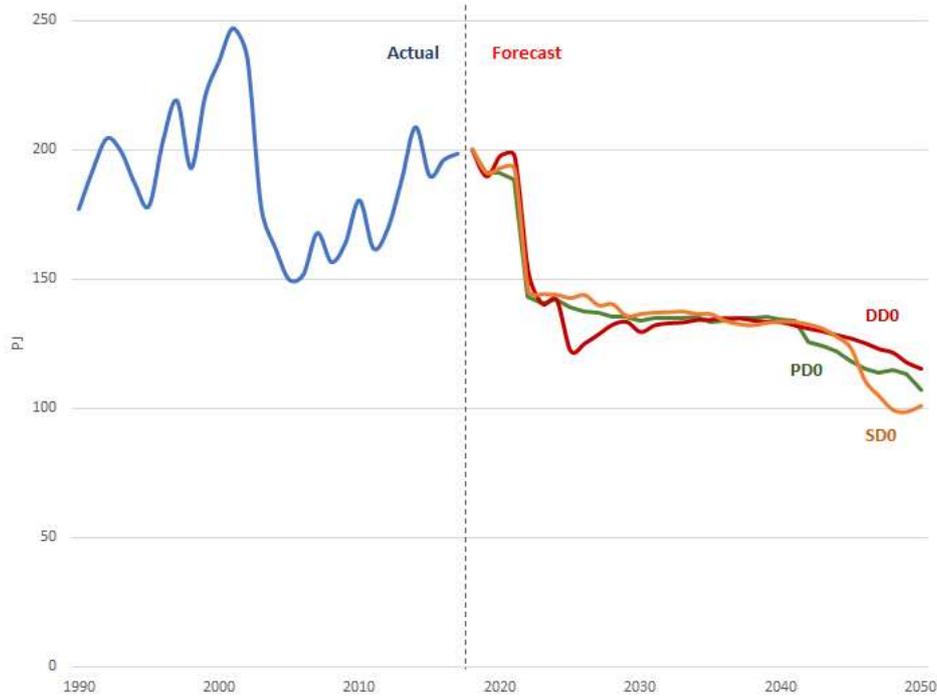
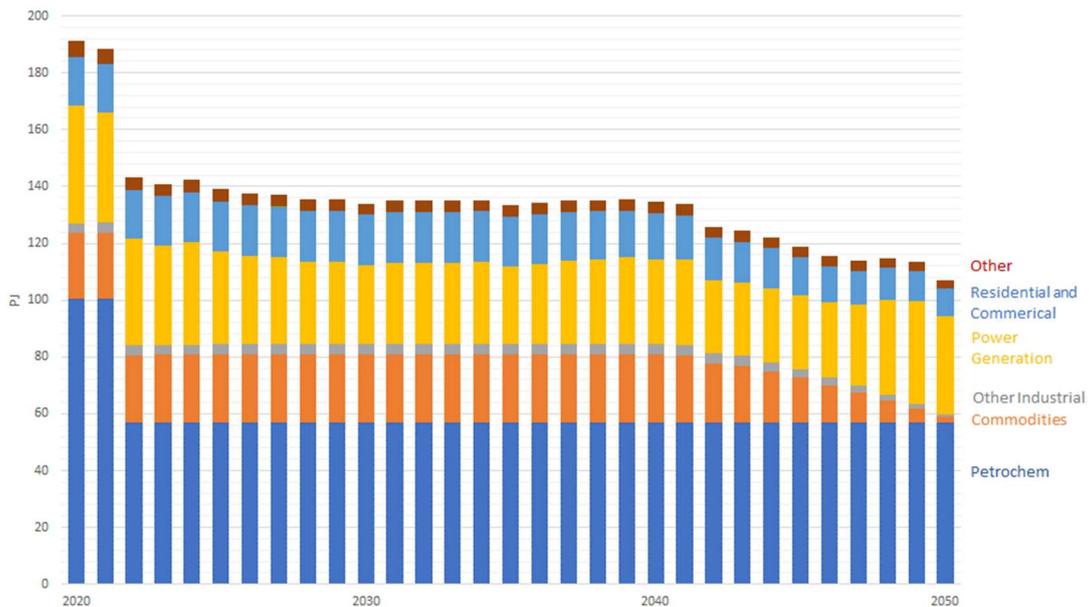


Figure 2: Annual demand for natural gas in PD0 scenario 2018 – 2050 (forecast)



¹ Productivity Commission: Modelling data for gas demand underlying the 6 scenarios.

The ongoing use of gas in a low carbon economy is consistent with other studies. Transpower's white paper *Te Mauri Hiko*² contains a base case scenario that does not see gas used for electricity generation, but shows continued gas for process heat and residential and commercial consumers over the long term. *Te Mauri Hiko* suggests in its base case that by 2050, at least 60% of New Zealand's process heat will continue to be fuelled by natural gas.³

The continued use of natural gas in a low carbon economy may surprise some people. However, the resilience of gas demand across different studies reflects the reality that New Zealand will need to look for opportunities to reduce carbon at the lowest cost to taxpayers and consumers.⁴ Natural gas plays a role because it is:

- **Relatively low carbon:** Gas is a cleaner burning fuel than coal, and a relatively low greenhouse gas emitting fossil fuel. The pipeline infrastructure used to transport gas also emits less carbon than other fuels that rely on road or rail. Our submission to the Commission on the issues paper presented data on the relative emissions from natural gas, coal, biomass and geothermal;⁵
- **Affordable:** Ministry of Business, Innovation and Employment (MBIE) energy statistics show that natural gas is one quarter of the price of electricity for industry per kWh, and less than halve the price of delivered electricity for households.⁶ Alternative energy sources to replace gas can be much more expensive – particularly for firm electricity generation capacity and high temperature process heat. We think that there should be more analysis of the cost impacts of different decarbonisation pathways in the final report;
- **Resilient:** Gas networks have higher levels of reliability than power networks, which are likely to be more susceptible to the effects of climate change. Having more than one way to transport energy also in itself creates greater resilience through diversification; and
- **Flexible:** Gas storage provides a flexible, resilient way to respond to seasonal changes in energy demand. Of the total current storage in the electricity system, the Ahuroa underground reservoir provides as much flexibility as hydro lakes – although hydro lakes have much higher risk profile due to their uncontrollable variability.

Recommend the final report explicitly describes the role for natural gas and pipeline infrastructure

Given the role for natural gas in all scenarios to achieve the 2050 target, we believe the Commission's final report should be explicit about the role of natural gas in supporting an affordable, reliable, low carbon energy system. This will help to ensure that future policy decisions do not undermine that role.

2. A credible emissions price is the most effective way to promote the required changes

First Gas supports the draft report's finding that a credible emissions price and emissions trading scheme (ETS) will be vital to drive the change required to achieve a low emissions economy.⁷ A credible emission price and ETS will provide parties with certainty (particularly with investment decisions), promote the right consumer behavioural changes, and encourage research and investment in options with lower emissions. As we highlighted in our submissions on the issues paper, the ETS has not played this role to date.

To achieve the right outcomes, we consider that the emissions price will require:

- Political consensus and stability of policy settings, over the long-term; and
- A clear link and line of sight with the country's emissions budgets.

² *Te Mauri Hiko Energy Futures*, May 2018, Transpower New Zealand, <https://www.transpower.co.nz/sites/default/files/publications/resources/TP%20Energy%20Futures%20-%20Te%20Mauri%20Hiko%20%2025%20May%2718.pdf>

³ *Te Mauri Hiko* report, pg 21

⁴ Implicit in the underlying analysis in the draft report is that higher cost options, such as the electrification of all heating load by 2050, are not taken.

⁵ Figure 2, Low-emissions economy, First GAs submission to the Productivity Commission, 2 October 2017.

⁶ <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/statistics/prices>

⁷ Draft report finding F4.17.

We also think that sector specific policy and regulation to achieve carbon reductions should be approached with caution.

Political consensus and policy stability keys to success

Achieving our 2050 target will require commitment and consistency from all sectors of New Zealand. The cornerstone of this commitment is political consensus and stability, and where possible, the involvement of independent advisory institutions. We strongly agree with the recommendations in the draft report that:

- The Government should seek to achieve a high level of political support and consensus for climate change legislation;
- Emissions targets should be formulated following a robust public policy process;
- Emissions budgets must carefully balance predictability and flexibility;
- Budgets should be set at a level consistent with achieving the long-term target, while imposing least cost on the economy and society; and
- The regulatory framework to support New Zealand's transition to a low-emissions economy should include an independent climate change institution (a Climate Commission). This Climate Commission must operate at "arm's length" from Government, provide well researched advice, and advise the Government on the emissions budgets.

We endorse the view that for the Climate Commission to properly perform its role, and retain credibility over the long term, the Climate Commission should have a high degree of operational and institutional independence. This independence is necessary to help insulate policy making from short-term political pressures, expand climate policy debate, promote stability and predictability and improve transparency and accountability.

We also recommend that the work of the Climate Commission should be clearly linked to the work programmes of other government agencies to ensure a coherent body of climate change-related research and work, with minimal overlap or duplication. While officials are trying to coordinate their emerging work programmes, we see a risk of overlap in different government initiatives today. For example, the Ministry for the Environment (MfE) has established a Transition Hub to lead government advice on how we transition our economy. At the same time, the Ministry for Business, Innovation and Employment has set up a Just Transitions unit to consider how best to manage the social and economic impacts of the changes involved.

Linking the ETS to carbon budgets will increase its effectiveness

We agree with the draft report's finding that a well-crafted package of reforms is needed to fix the weaknesses in the current NZ ETS.⁸ The draft report also contains separate recommendations on setting legislative targets for carbon reductions. We think that these two components to reduce emissions need to be explicitly linked. This might be achieved by linking ETS price caps and collars to the emissions reduction targets set under legislation—effectively guiding the supply and demand of carbon credits to deliver the emissions reductions that have been set.

Ideally, such a link would not be needed and the market for carbon credits would efficiently price abatement. However, experience with the ETS has shown that the conditions for an efficient market do not exist and are not likely to be present any time soon. We think that policy-makers need to accept that the ETS will continue to have a significant amount of administered control, and that the key role of the ETS is to efficiently deliver the level of abatement required – rather than to determine the quantity of abatement.

Sector specific regulation should be approached with caution

We agree with the draft report's findings that an effective system of emissions pricing should form the centrepiece of New Zealand's strategy to reduce emissions. The draft report suggests the strategy may also require other elements to back up pricing and take the lead in some situations where pricing is not powerful enough because of market or government failures or distributional considerations.⁹ However, we urge caution on other direct measures such as sector specific regulations. Unless these are directed at a particular market failure (e.g. research and development) they can end up distorting outcomes and inadvertently lead to higher emissions, higher costs and more economic dislocation.

⁸ Draft report finding F4.14.

⁹ Draft report finding F4.17

There are plenty of examples from overseas where well-intentioned energy policies to subsidise solar power has caused considerable hardship to consumers. Closer to home, the recent decision to halt new offshore exploration has led to concerns that this direct intervention may result in raising emissions both in New Zealand and globally.

3. New Zealand will be best served by keeping our options open

We support the Commission's view that policy should remain technology neutral in its approach to lowering emissions. However, we are concerned that if too much focus is placed on the priority areas identified by the Commission (electric vehicles, forestry and land use change), this may lead to a lack of attention or resourcing for other options (such as carbon capture and storage and alternative fuels such as hydrogen and biogas).

While New Zealand's high renewable electricity system provides a significant advantage for the transition, it can also mislead parties into believing that electricity can meet most or all of our future energy needs. We think such an outcome is unlikely to be practical or sensible, and that New Zealand will be better served by keeping our future energy options open and maintaining a diversified mix of energy sources and energy transport modes. Given the uncertainty around what technologies will prevail and the actions that will be undertaken internationally by larger economies, First Gas sees considerable value in maintaining flexibility to how we respond to the climate change challenge.

We encourage the Commission to ensure that the final report considers:

- The benefits of a diverse energy system;
- The dual role for existing gas infrastructure; and
- The opportunity for deploying other lower carbon fuels such as hydrogen and biogas, or carbon storage possibilities.

We also encourage the Commission to explore options for encouraging innovation in energy infrastructure, including through regulated funding streams.

Drawing on the strengths of a diverse energy system

Diversification is one of the strengths of New Zealand's current energy system. Despite past attempts to prefer one energy sources over others at various times, New Zealand has consistently managed to maintain a balance that has provided a higher level of affordability and reliability than a narrow mix would provide. In the future, diversification of low-carbon/carbon neutral energy sources will create a more resilient energy ecosystem for New Zealand. Conversely, we think that an over-reliance on electricity will create greater risk of single point of failure issues in energy supply.

The Commission's preference for a technology neutral approach to decarbonisation supports a diverse energy system continuing over time. It also provides greater opportunities for broader thinking and research, and allows for emerging energy sources to develop and be distributed. However, we are concerned that the dismissal of natural gas vehicles in the draft report runs counter to this philosophy.¹⁰ We note that there is considerable internal investment in this area, for example the CNG demonstration projects in the United Kingdom, and it seems premature to write-off potential investment in this area.¹¹ The potential role for hydrogen in heavy vehicle fleets is also dismissed, partly due to the lack of a hydrogen network. However, as we discuss below, further development in this area may enable the current gas network to transport hydrogen, first by blending with natural gas and then via a full hydrogen conversion.

Dual role for existing gas infrastructure as new technologies develop

We see the potential for gas pipeline infrastructure to play a dual role as New Zealand moves towards the net zero emissions target:

- The transportation of natural gas displacing higher carbon fuels such as coal and diesel (in the near term); and
- The transportation and storage of other new lower carbon fuels, such as biogas and hydrogen, as technology develops and matures (over the longer term).

¹⁰ Page 305 of the draft report.

¹¹ <http://www.cngservices.co.uk/index.php/services/natural-gas/natural-gas-vehicles>

Fuels such as biogas and hydrogen do not really feature in New Zealand's energy mix today and are not explored in depth in the Commission's report. However, these fuels are being considered extensively internationally, and could potentially be deployed in New Zealand using existing pipeline infrastructure. We outline below two examples that provide useful insight for the Commission's final report.

1. H21 Leeds City Gate Project

In Leeds, Northern Gas Networks (NGN) has investigated the possibility of converting the city's gas network to hydrogen (the H21 Leeds city gate project). The UK currently relies heavily on reticulated gas for residential heating and cooking, as well as industry and power generation. NGN is looking at ways of decarbonising gas to avoid requiring a mass switch to electrification for decarbonisation.

The report¹² found that the existing gas network in Leeds can be converted to hydrogen with minimal disruption to customers and minimal new energy infrastructure. The report also found that the existing heat demand for Leeds (the United Kingdom's third largest city), could be met via steam methane reforming and salt cavern carbon storage. This technology is in use around the world today.

2. Australian hydrogen trial

Closer to home, Australian gas networks have teamed up with AquaHydrax to demonstrate that a new and less expensive method of hydrogen conversion using electrolysis is viable. Under the pilot project, a small electrolysis plant will be set up at Australian Gas Networks' Adelaide operations depot to split hydrogen from water using surplus electricity from renewable energy sources. The small amounts of hydrogen produced will be injected into the local gas network. It is anticipated the project will prove small amounts of hydrogen can be put into the networks now and that eventually, by 2050, the networks should be able to change over completely to hydrogen.¹³

Facilitating innovation in energy infrastructure

While the draft report discusses various funding options for research and development, we consider that the Commission should explore options that encourage innovation from New Zealand's regulated energy businesses.

The Commerce Commission has an important role in regulating energy infrastructure providers that don't face competition in the market.¹⁴ Under the Commerce Act, the Commerce Commission has powers to regulate the price and quality of goods and these services, and in doing so is expected to provide incentives for investment and innovation.¹⁵ We consider that the regulatory framework could provide a lever for encouraging innovation in low-emissions technologies that support the Government's 2030 and 2050 targets.

Recent work by Castalia¹⁶ discusses the difficulty in providing regulated infrastructure providers with incentives to innovate. Castalia highlights an approach taken by the regulator in the UK, Ofgem, to enable distribution networks to help the country meet its climate change targets by establishing a low carbon networks fund. This allows companies to run trials to gain experience with new technology, commercial and network operating arrangements that could be put in place. Any knowledge gained and lessons learned from the projects are shared. The fund is largely contestable and all funding is only for approved projects that meet the low carbon objectives.

Some of the projects funded to date include:

- The H21 Leeds City Gate project¹⁷ discussed above originally received £266,400 funding from Ofgem's Network Innovation allowance¹⁸. This was extended in 2017 when Ofgem provided £9 million funding to NGN to conduct further work and provide evidence to support the viability of converting the United Kingdom gas distribution networks to 100% hydrogen¹⁹

¹² <https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Report-Interactive-PDF-July-2016.compressed.pdf>

¹³ <https://www.australiangasnetworks.com.au/news-and-articles/news/pilot-project-first-step-to-decarbonise-gas>

¹⁴ Regulated energy businesses include 1 electricity transmission business (Transpower), 28 electricity distribution businesses, 1 gas transmission business (First Gas) and 4 gas distribution businesses.

¹⁵ Commerce Act 1986, sections 52A(1)(a) and 54Q

¹⁶ Section 5, *Evidence on the impacts of regulatory incentives to improve efficiency and service quality*, 2012, Castalia strategic advisors, <https://www.comcom.govt.nz/dmsdocument/415>

¹⁷ <https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Report-Interactive-PDF-July-2016.compressed.pdf>

¹⁸ https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/NGN_InnovationReport_2017_v4.pdf, pg 8

¹⁹ <https://www.northerngasnetworks.co.uk/2017/11/30/ofgem-awards-9-million-innovation-funding-northern-gas-networks-pioneering-clean-energy-project-h21/>

- The Cadent Hynet project, which includes the development of a new hydrogen pipeline; and the creation of the UK's first Carbon Capture, Usage and Storage (CCUS) infrastructure²⁰ While currently industry led, it is anticipated the project will receive funding as part of Ofgem's RIIO 2 review in 2021. Supporting this expectation Cadent cites Ofgem's recent RIIO 2 Framework Consultation that states, in terms of its support for future innovation, "it may now be appropriate to re-focus support towards larger-scale whole system oriented projects"²¹ and
- The Cadent HyDeploy project, which is a pioneering energy trial to establish the potential for blending hydrogen, up to 20%, into the normal gas supply to reduce carbon dioxide emissions.²²HyDeploy has received £6.7 million from Ofgem's Gas Network Innovation Competition fund.²³

New Zealand should learn from the experience in the United Kingdom where contestable funding is available for networks that want to run trials and innovate with low carbon technologies. We see a similar fund could be used here to harness the knowledge and experience regulated companies already have and leverage off this for further research and development. A secondary benefit to such a fund is that the knowledge gained is shared publicly and the risk of the duplication of effort is reduced.

Recommendations to preserve energy options

We recommend that the Commission expand the discussion of other energy options and the benefits of a diverse energy system in its final report, and recognise the options that are retained by preserving New Zealand's gas pipeline infrastructure.

Concluding comments

We appreciate the opportunity to provide comments on the draft report and be part of the effort to move New Zealand toward a low emissions future. Achieving net zero emissions will require significant changes to decarbonise the country's energy system. We believe that the scale of this challenge makes it important to consider the full range of options, including the use of multiple decarbonised energy networks, both electricity and gas, to ensure consumers enjoy the lowest possible energy prices over the long term.

To this end, First Gas has joined with Powerco to commission Vivid Economics²⁴ to explore the role of gas pipeline infrastructure in a low emissions future. The analysis will build on the considerable 'low carbon economy' scenario work undertaken to date in New Zealand. The emphasis will be on the role of gas networks in the various pathways that support the goal of net zero emissions by 2050, while maintaining reliable and affordable supply. We expect to have the draft report completed by late July 2018 and would be happy to present the findings to the Commission.

If you have any questions regarding this submission or to set up a meeting, please contact me on 04 979 5368 or via email at karen.collins@firstgas.co.nz.

Yours sincerely



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²⁰ <https://www.liverpoolecho.co.uk/news/business/massive-hydrogen-plant-planned-banks-14641049>

²¹ https://hynet.co.uk/app/uploads/2018/05/14368_CADENT_PROJECT_REPORT_AMENDED_v22105.pdf, pg 30

²² <https://hydeploy.co.uk/about/>

²³ https://www.ofgem.gov.uk/system/files/docs/2017/02/hydeploy_project_direction_-_signed.pdf

²⁴ Vivid Economics is a London based firm that produced the *Net Zero in New Zealand* report in 2017. That report looked at several scenarios to reduce the country's emissions and was commissioned by GLOBE-NZ – a multi-partisan group of MPs. It is available at <http://www.vivideconomics.com/wp-content/uploads/2017/05/Net-Zero-in-New-Zealand-Summary-Report-Vivid-Economics.pdf>