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2 November 2023

Energy Resources Markets Branch
Ministry of Business, Innovation and Employment
Wellington 6140
Attention: Gas Transition Plan Submissions

Tēnā koe e te tumuaki

SUBMISSION: GAS TRANSITION PLAN ISSUES PAPER

Thank you for the opportunity to submit on the Gas Transition Plan Issues Paper.

About us

GasNZ is the industry voice for gas. We want New Zealanders to enjoy the benefits of gas today and in the future. We advocate for safe and efficient use of existing gas resources, while supporting the transition to greater amounts of renewable, low-emission gases for homes, business and industry.

Our purpose recognises that gas is an essential part of New Zealand's shared energy future and that, for many homes and businesses, there's no alternative to gas to adequately meet their needs.

Our members have interests in natural gas, liquefied petroleum gas (LPG), biogas and hydrogen. From all parts of the gas supply chain, our members are a broad range of gas businesses committed to a net zero carbon future.

GasNZ was formed through a merger of the Gas Association of New Zealand (established in 1909) and the Liquefied Petroleum Gas Association of New Zealand (established in 1977), combined with the express inclusion of renewable gas interests and investors.

Our submission

The focus of our submission is that gas is a fuel in transition, and gas in its many forms for energy will serve New Zealand well through the transition to a net zero carbon future and beyond.

Our key recommendation:

Government works with GasNZ, to bring the gas sector together, to develop appropriate policy and regulatory settings to enable a renewable gas market.

Gas is a key part of our energy future

- Gas is a key part of the energy system of Aotearoa and is integral to a sustainable future. Over 2 million New Zealanders use natural gas and LPG every day.[1]

- People choose natural gas or LPG appliances for a wide range of benefits. In addition to being cleaner burning than some alternatives and often more reliable, gas is affordable and a preferred option for instantaneous heat and cooking.

[1] Data collected by Gas Industry Company and GasNZ of gas and LPG customers shows there are nearly 600,000 customers, at an average of four person dwellings this exceeds more than 2 million direct users each day.

- Retaining gas as an energy source for consumers will avoid the expense of replacing appliances and retrofitting homes, and continues the use of significant gas infrastructure assets already in the ground.

Biogas and hydrogen gas have a promising role to play in decarbonising gas

- Development of a renewable or biogas industry is a significant opportunity for gas consumers to retain the convenience of gas while lowering emissions to support net zero goals.

- Renewable gas has a double benefit for the environment – it reduces emissions by displacing the burning of natural gas, AND it captures the emissions from organic and food waste that would otherwise contribute to climate change.

- Turning waste into a resource will maintain the essential skills, capability, and jobs in the gas industry as it transitions to biogas, hydrogen, and renewable LPG. GasNZ largely agrees with the summary in the gas transition plan issues paper.

- Hydrogen is a possibility across the energy spectrum for gas use, industrial, transportation, electricity generation, blending with natural gas, and, potentially, replacing LPG in gas bottles.

- Green hydrogen allows electricity to be stored over longer durations than other options like batteries, and this will become increasingly important as solar and wind scale up in NZ.

- An early step adopted by other developed countries is hydrogen blending, as this doesn't require significant network expenditure or appliance conversion. New Zealand industry has commenced a trial to blend hydrogen into a natural gas pipeline network, creating options of moving to 100 percent by 2050.

Renewable LPG an ideal 'drop in' solution

- Liquefied petroleum gas (LPG) is a clean burning, safe and portable energy source for high and instantaneous heat. It is mainly used in commercial and residential applications, and has a relatively small total carbon footprint in New Zealand of around 0.5 million tonnes CO_2e per annum.

- The international and domestic LPG industry is laying the groundwork to transition to renewable or bioLPG in the next two decades.

- Modelling by Worley demonstrated that the emissions budget proposed in the Climate Change Commission's 2021 draft advice could be achieved by replacing 70 percent of all LPG with renewable LPG.

Incentives, policy and a supportive regulatory regime are needed

- Achieving the desired economic, societal and environmental benefits of a substantial renewable gas market by 2050 will require policy, regulatory and market-based incentives.

- The highest priorities are ensuring that the regulatory settings enable and encourage investment in renewable gas, and to urgently explore ways this can be achieved.

- GasNZ recommends that government works with GasNZ, to bring the gas sector together, to develop appropriate policy and regulatory settings with government to enable a renewable gas market.

GasNZ's submissions is two parts:

- **Gas as a fuel in transition**: The first section outlines our key points and discusses the main considerations in moving forward. It outlines the benefits of gas now and in the future, and a

pathway to building a renewable gas industry through a partnership between government and industry.

- **Specific Questions and Answers:** To assist with the Questions and Answer format of the discussion paper, this section addresses directly the consultation questions that relate to our key points.

Please contact me if you have any queries. We look forward to the opportunity to continue to shape the transition and evolution of gas as part of a decarbonised energy system.

Heoi anō, nā

SUBMISSION: GAS TRANSITION PLAN ISSUES PAPER

Gas: A Fuel in Transition

1. Gas is a key part of our energy system

Gas is a key part of New Zealand's energy system and is integral to a sustainable future. It has a crucial role in providing energy security and affordable heating options.

Gas increases energy security by sharing the load with electricity, but more vitally by providing the fuel for producing electricity when the wind's not blowing and the lakes are low. And gas bolsters resilience, as it's a reliable source of energy during natural disasters and extreme weather events.

People choose natural gas or LPG for a range of benefits. In addition to being reliable, gas is affordable and has high mobility. Gas is the preferred fuel for restaurants and the hospitality sector. Since 2014, total gas and LPG connections have increased by 23%. Over the same time period, electricity connections have increased by 13%.[2]

Gas is relied on by electricity consumers, as it provides fast start peaking generation to support increasing levels of intermittent renewable generation supplying the national grid, and a wholesale market struggling to meet record winter peak loads.

In addition to supporting generation, gas reduces electricity demand for water and space heating. Residential consumers should therefore be encouraged to stay connected to reticulated gas or LPG systems. An ill-judged ban on new connections mooted by the Climate Change Commission will put undue pressure on already constrained electricity networks and compromise the reliability of energy supply when there isn't enough generation or network capacity to meet demand.

Vitally, gas is a reliable source of energy during natural disasters and extreme weather events. Gas networks demonstrate higher reliability compared to electricity networks, due to the different risks faced by each utility at a distribution level – one substantially overground and vulnerable to wind-related damage, the other substantially underground with better protection from cyclones and other major weather events.

Recent natural disasters in New Zealand have demonstrated the usefulness of natural gas and LPG in times of crisis. Looking to the future, the technology exists now to supply renewable gas through the existing natural gas network, optimising the value of consumers' contributions toward gas infrastructure. This is happening at scale in Europe, supported by government policies that require a shift away from fossil fuels, and is emerging in New Zealand. For example, a large-scale organic processing facility at Reporoa, in the central North Island, became operational in October 2022. Using the biogas made from food scraps, Firstgas and Ecogas have a partnership and expect to be injecting enough biomethane from 2024 to supply 7200 households[3].

In a report commissioned by GasNZ, Energy Resources Aotearoa, and the Major Gas Users Group, economics consultancy Castalia provided an independent analysis of gas demand under plausible pathways for transitioning the gas sector, and evaluated the trade-offs involved. Castalia found that renewable gas was part of the journey to net zero, noting[4]:

[2] GasNZ, GIC, Electricity Authority and Enerlytica connection data
[3] Renewable Gas Injection — Ecogas
[4] Castalia-2035-2050-Vision-for-Gas-March2023

- Tradeable renewable gas certificates should be explored and targets used if renewable gas prices fall.
- Integrating renewable gases could provide options for New Zealand's gas networks and gas consumers, offering energy choices while achieving emissions reductions.
- The importance of retaining LPG for some users and exploring use of renewable LPG.

On the third point, LPG will remain an important energy source for commercial and residential, agriculture, and transport sectors in future. For some consumers, switching to alternative energy sources is likely to be costlier than retaining LPG.

Similarly, natural gas has an important role in the energy system. It will continue be a fast-start back-up for electricity generation, a view reflected by the Climate Change Commission's preference for a 95 to 98 percent, rather than 100 percent, renewable energy target by 2030[5].

Reasoned thinking supports gas continuing to be part of New Zealand's energy mix – but a gas system that will change from fossil fuels only, to one increasingly mixed with renewable gases. This will take time. Removing natural gas and LPG too quickly will increase electricity prices and reduce reliability.

Policy and regulatory incentives will be needed to drive investment in renewable gas, and require deeper consideration as part of a gas transition plan.

For example, GasNZ supports further work on renewable gas targets. That is, detailed analysis and consultation is undertaken to determine whether an industry-agreed obligation can be reached for a proportion of gas (either as a percentage or in petajoules) to be from renewable (non-fossil) fuel sources. Such an obligation would drive investment in renewable gas technology and facilities.

GasNZ believes that renewable gases – biogas, bioLPG and hydrogen - are key parts of the new energy future, and the Gas Transition Plan should consider encouraging investment in renewable gas to help reach net zero carbon.

A smooth transition is essential but complex. What is indisputable is that gas will be a part of the mix for decades and, by government and industry working in partnership, we can ensure Aotearoa benefits from a continuation of gas as a reliable, cost effective and increasingly low-emissions energy source.

2. Biogas and hydrogen have a promising role to play in decarbonising gas

Biogas

Biogas is made from organic waste such as food, water and agricultural waste. According to the World Biogas Association, by separately collecting food waste to cut today's food waste in half, a three percent reduction in greenhouse gas emissions can be achieved[6]. Treating and recycling all unavoidable organic wastes through anaerobic digestion, a ready-to-use technology, would lower emissions by 10 percent and generate biogas and biomethane, bio-fertilisers, bio-carbon dioxide, and other valuable bio-products.

Turning waste into a resource has several flow-on benefits for New Zealand, namely it:

- Preserves the opportunity for gas consumers to retain the convenience of gas.
- Maintains the viability of many businesses, some with export earnings, which could not be financially sustainable without gas.
- Eases pressure on a resource-constrained electricity sector to rapidly increase electricity generation and distribution at great expense, leading to higher power bills.
- Maintains the skills, capability, and jobs in the gas industry.
- Continues the life of significant gas assets already in the ground and in homes and businesses. Swapping out appliances such as gas water and space heaters will cost

[5] Climate Change Commission's final advice
[6] World Biogas Association (WBA) | Biogas: Pathways to 2030 - Report

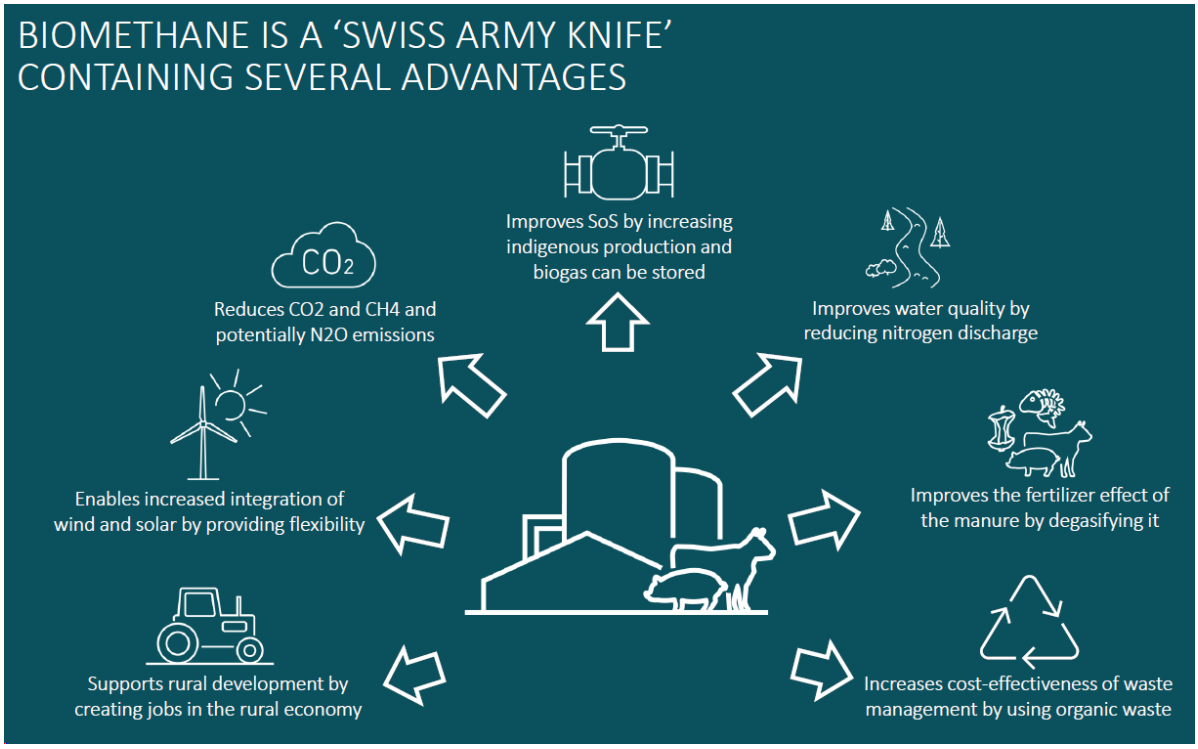
billions of dollars, an expense that could be avoided if biogas, perhaps with hydrogen, gradually replaces fossil fuel gas.

- Further reduces climate-change-causing emissions. In addition to displacing the burning of fossil fuels, biogas has a double benefit in that it collects and uses gases that would otherwise contribute to climate change.
- Putting a value on organic waste as a feedstock will incentivise diversion from landfills and support New Zealand more accurately pricing the cost and value of waste.

Biomethane (sometimes referred to as renewable natural gas or RNG) is a near-pure source of methane produced either by upgrading biogas, a process that removes carbon dioxide and other contaminants, or through processing of solid biomass. Biomethane is indistinguishable from the methane in natural gas and so can be used without need for any changes in transmission and distribution infrastructure or consumer equipment.

In Denmark, biomethane plays an essential role in the green transition of the gas system and for security of supply. In 2022 the biomethane production is expected to make up 30 % of the total gas consumption, and the Danish Government aims for a 100 % green gas coverage already in 2030 – a target which might very well be achieved even before.[7]

The current record for biomethane coverage of the total Danish gas consumption measured over 24 hours is 98,2 %. Denmark sees myriad advantages in converting as pictured below.



Despite the obvious advantages of biogas and biomethane, industry faces significant headwinds in growing the biogas and biomethane sectors. As such it's encouraging that government policy supports and incentivises stakeholders to manage, reduce and recycle their organic wastes in a circular economy to not just cut methane emissions but maximise their value, helping put the world back on track to deliver the ambitions of the Paris agreement.

[7] Dok. 22/04670 5 Offentlig /Public

For example, the Te Rautaki Para Waste Strategy says we must "look for ways to recover any remaining value from residual waste, sustainably and without increasing emissions, before final disposal". Notably, the strategy set a target of reducing the biogenic methane emissions from waste by at least 30 per cent by 2030[8].

To help achieve the 2030 Waste Strategy target, the gas transition plan must support the continued expansion of biogas, biomethane, and renewable LPG through policy settings and financial incentives. Examples include renewable obligations on energy retailers such as a gas procurement target, tradeable certificates where renewable gas can be recognised and rewarded, a targeted levy on organic and food waste to pay for biogas processing and distribution that is collected at landfills (or a German-style prohibition on landfilling for waste with an organic matter content of more than five percent), and government stewardship and support of a biogas industry.

Hydrogen gas

GasNZ largely agrees with the summary in the Gas Transition Plan issues paper, and agrees that the precise extent of hydrogen's role will become clearer over time. At present hydrogen should continue to be considered a possibility across the energy spectrum for gas use, electricity generation, blending with natural gas, and, potentially, replacing LPG in gas bottles.

Gas distributors have a role to play in catalysing the hydrogen economy by supporting demand as the hydrogen sector develops in New Zealand, and distribution companies are already exploring the potential of blending hydrogen with natural gas in our distribution pipelines. Already, Firstgas, along with Powerco, Vector, Nova and GasNet, are planning a hydrogen blend trial to demonstrate the network is capable of transporting hydrogen.

Integrating hydrogen with our energy mix not only demonstrates the value of this network but would give New Zealand the best available balance of energy security, energy equity, and environmental sustainability.

We know it can be done, because it's already happening overseas. Over 30 countries currently have a national hydrogen strategy in place and $70 billion of funding has been committed globally over 228 ongoing projects. Large, diverse energy systems in Australia, the USA and Europe are dedicating massive resources towards reducing the cost of producing and distributing hydrogen – which New Zealand will benefit from if we leave the option open to incorporate hydrogen into our energy mix.

Australia has numerous hydrogen projects underway and have identified several usages: blended with natural gas in pipelines, storing renewable electricity as hydrogen; and exporting as liquified natural gas (LNG) and producing hydrogen at market (unlikely in New Zealand as we do not have LNG infrastructure).

In summary, development of a renewable gas market, including the development of infrastructure and transport facilities to handle the full supply chain from source to consumer is a significant opportunity for gas consumers to retain the convenience of gas, reduce emissions, and maintain energy security.

3. Renewable LPG an ideal 'drop in' solution

The LPG industry can achieve emissions reductions by migrating to renewable LPG. In the same way that biomethane is identical to natural gas, renewable LPG is identical to conventional LPG. It can be used by existing customers with no change to appliances or industry infrastructure.

LPG has lower carbon content per unit of energy than most other fossil fuels, and – like natural gas - almost no particulates that damage air quality. In other words, it's very clean burning. It's also versatile and portable and can be transported safely, which makes it a cost-effective energy source available in remote areas.

[8] Ministry for the Environment. Te Rautaki Para Waste Strategy. March 2023

LPG is primarily used where high burn temperature or mobility value is prized, and where providing this service with electricity or pipeline gas is very expensive and often impractical.

There are hundreds of thousands of LPG cylinders in circulation across New Zealand. All can usefully be changed to 100 percent renewable bioLPG or rLPG as 'drop in' replacements for conventional LPG (cLPG).

Conventional LPG is a byproduct of the natural gas extraction and refinement process, but bioLPG is made differently. Most often it's produced in a biofuel refinery as part of the biodiesel production method. The refinery takes sustainably produced vegetable oils and processes them into renewable diesel and bioLPG.[9]

At present many of those vegetable crops still have a carbon footprint of their own, but as this reduces, so will total emissions profile for bioLPG.

It's also possible to make bioLPG from organic waste products. This includes the waste residue produced from animal feedstocks, and waste wood sourced from the forestry sector. Even algae is being investigated as a future source of bioLPG.

New Zealand imports around a third its LPG from Australia, which has significant plans to transform its industry from conventional to renewable LPG.

By 2045 all conventional LPG supply in Australia will be replaced with renewable LPG, according to Gas Energy Australia. New Zealand will be able to import bioLPG from Australia as it builds its own renewable domestic production.

One of GasNZ's predecessor organisations, the LPG Association, commissioned an external review from Worley, a global energy and engineering consultancy. It looked at renewable LPG technologies and feedstocks.

Modelling by Worley demonstrated that the emissions budget proposed in the Climate Change Commission's 2021 draft advice could be achieved by replacing 70 percent of all LPG with renewable LPG[10].

The most credible pathways to renewable LPG based on New Zealand feedstock availability and scalability of technology are:

Generation	**Technology**	**Output** p.a. 000 tonnes
First	Fatty lipids (tallow from meat waste, bio-crude and algae) to renewable LPG	3
Second	Mixed wastes to renewable DME and renewable LPG	9
	Biogas to renewable DME	30
	Biogas to renewable LPG	40
Third	Softwood to biofuels	20

Worley calculated the likely size of the market in 2035 to be 15 percent less than the 2020 market of 185,000 tonnes per year, and 20 percent less by 2050, due to improvements in energy efficiency and customer switching to other energy sources.

[9] The future of bioLPG - First Gas

[10] LPG Association, Submission to Climate Change Commission, March 2021.

Worley explored opportunities for decarbonisation of New Zealand LPG and demonstrated that keeping existing distribution assets, and progressively displacing conventional LPG with renewable LPG, aids growth of a biofuels industry while supporting jobs, fuel security and energy diversity.

The alternatives are currently are economically challenging, however it is important that we prepare for this shift while maintaining the reliability and affordability of the gas we have now so we can transition and blend as renewable alternatives come to market.

Further, a major obstacle has been that, like other alternative fuels, there is a cost to adoption. Accelerated development and use of renewable LPG to meet emissions budgets is likely to cost more than conventional LPG, but preferable than exiting gas altogether, both economically and for practical convenience.

In summary, the Gas Transition Plan must reflect that liquid petroleum gas (LPG) is a safe and mobile energy source for high and instantaneous heat, it is part of the new energy future, and the LPG industry is planning to transition to 100 percent bioLPG in coming decades.

4. Incentives, policy and a supportive regulatory are needed

Achieving the desired economic, societal and environmental benefits of renewable gas by 2050 will require policy, regulatory and market-based incentives. At the right price, public benefits are greater than private benefits so investment by Government on behalf of communities is necessary.

This submission includes a range of options for retaining the gas system and its capability while supporting its transition to increasing amounts of renewable gas.

It is important that we explore regulatory settings and allowances to facilitate the needs of a renewable market for the future.

Collaboration on policy

We recommend that the Gas Transition Plan should explore whether an industry-agreed package of targets coupled with a committed government support mechanism can be developed, noting that any interventions would need to be determined in partnership with government and stakeholders.

GasNZ would like to work with government on further developing the potential for a renewable gas target and package, and would be very interested in taking a lead role in bringing the gas companies together to collaborate with government.

Renewable gas certificates

As part of a comprehensive package a renewable gas target could be backed by tradeable renewable gas certificates where renewable gas is recognised and rewarded, thereby incentivising renewable gas production. A certification scheme would improve the viability of biogas and facilitate investment in the sector.

Certification would provide not only a potential mechanism for suppliers to capture additional value of renewable gas, it also[11]:

- Allows consumers to make better informed choices around purchasing renewable or fossil fuel sourced gases.
- Provides price signals for suppliers to incentivise investment.
- Provides production requirements and/or standards to ensure facilities are established and operating to meet green standards so consumers can trust what they are purchasing.

[11] Charts-and-data-for-2021-final-advice.xlsx (live.com)
PwC. Green Gas Certification Scheme Research. September 2020PwC. Green Gas Certification Scheme Research. September 2020

- Aids the international trade of renewable gases and recognition of the additional value they afford on international markets.
- Provides immutable proof of ownership of the renewable attributes of renewable gas, hereby enabling users to claim the credit from their procurement decisions in reporting their GHG emissions
- Through the creation of a gas residual supply factor, ensures that only those parties that purchase renewable gas can claim that benefit.
- Aids the domestic trade of renewable gases by providing a mechanism for gas retailers to meet their renewable gas targets.

Renewable gas certificates are discussed further in the consultation questions for Chapter 3, Renewable Gas Trading of Renewable Gases.

Other incentives or interventions

GasNZ would support any policy mechanism that signals a commitment to the development of renewable gas and helps underwrite investment in renewable gas projects.

Other examples of positive interventions include a targeted levy, collected at landfills, on organic and food waste. The levy would be allocated exclusively to biogas processing and distribution.[12] When compared with levies applied in eastern Australian states, New Zealand currently has very low landfill levies, making it less economic to separate organic waste at the source and recycle it through anaerobic digestion.[13] Another option is to implement a German-style ban on the dumping of organic waste at landfills.

Financial incentives are also recommended, and could be allocated in a way similar to Energy Efficiency and Conservation Authority co-funding of boiler swap outs – the GIDI Fund - which is successfully decarbonising industry and government heat.

Likewise the Australian Renewable Energy Agency (ARENA) fund was established in 2012 to support improvements in the competitiveness of renewable energy and enabling technologies and has funded a range of new renewable gas projects to market.[14] On the GasNZ Renewable Gas Tour of Australia in April 2023, it was notable that 7 of the eight projects we visited had rece4ived ARENA funding, the exception was a training facility for renewable gas in Queensland that was supported through ha different government programme.

Lastly, GasNZ encourages input from overseas into the Gas Transition Plan. For example, the European Union is addressing the main barriers to increased sustainable biomethane production.

The resultant EU Biomethane Action Plan[15] addresses the main barriers to increased sustainable biomethane production and use, and integration into the EU internal gas market by:

- Establishing an industrial biogas and bio-methane partnership to stimulate the renewable gases value chain;[16]
- Taking additional measures to encourage biogas producers to create energy communities;
- Providing incentives for biogas upgrading into bio-methane;
- Promoting the adaptation and adjustment of existing, and deployment of new, infrastructure for transport of more bio-methane through the EU gas grid;
- Addressing gaps in research, development and innovation;
- Facilitating access to finance, and mobilising EU funding.

[12] gov.ie - Government agrees to the introduction of an obligation on the heat sector by 2024 (www.gov.ie)
[13] PwC. Green Gas Certification Scheme Research. September 2020
[14] Australian Renewable Energy Agency (ARENA) - Home
[15] European Commission. REPowerEU. May 2022
[16] Biomethane Industrial Partnership | European Biogas Association

GasNZ's key point is that in addition to financial incentives, an option for encouraging renewable gas investment in New Zealand is through an industry-agreed renewable gas obligation or target, supported by tradeable renewable gas certificates. These are constructive ways forward that should be explored collaboratively between industry, government and consumers. However, there are other options, and GasNZ is keen to explore these ideas in a New Zealand setting.

Recommendation

GasNZ recommends that government works with GasNZ, to bring the gas sector together, to develop appropriate policy and regulatory settings to enable a renewable gas market.

Specific Questions and Answers

1. Consultation Questions for Chapter 2, Transitioning our gas sector.

- **How can New Zealand transition to a smaller gas market over time?**

While it's correct that the natural gas market will be smaller over time, gas and LPG must continue to have a future that is not dependent on fossil fuels. A progressive view that renewable gas is a growing industry is preferable to a message that New Zealand's gas market will shrink and be encouraged to do so. With appropriate support, this can ensure that the gas industry contributes to a lower emissions future while continuing to give energy consumers choice of a range of fuels.

Gas pipelines supply more than 292,000 customer connections today. And 297,000 businesses and residential customers use bottled LPG for space heating, including in agriculture and horticulture. It's used in manufacturing processes, and cooking and water heating. Both natural gas and LPG provide necessary fuel diversity that bolsters resilience in times of adverse events, such as floods and cyclones. And gas broadens the energy mix, reducing the pressure to build or upgrade expensive electricity infrastructure. Keeping the gas market makes perfect sense.

The future therefore requires a carefully managed changeover to ensure continuity of a safe, reliable, and affordable energy supply; a future in which gas and LPG consumers transition their consumption to renewable gas or alternative renewable energy sources. This is a growth story that harnesses the flexibility of gas, not one of decline.

There is ample evidence overseas and increasingly in New Zealand about the feasibility of biogas at scale. This benefit will accrue as more projects are delivered and as organic waste management advances.

Biogas is created through anaerobic digestion, a series of processes in which micro-organisms digest organic wastes in sealed containers. It is the same natural process that people and mammals use to break down food in stomachs. The process extracts energy of organic material in the form of biogas, a mixture of methane (60%), carbon dioxide (40%), and trace gases. Organic material left is rich with nutrients for returning to soil and supporting food security[17].

Initially, blended gas – a mixture of conventional gas and renewable biogas - is the most feasible option, followed by increasing biogas proportions over time. Conservative estimates indicate that New Zealand has enough accessible and economic organic feedstock to replace around seven petajoules of gas up to 2035[18], which is equivalent to half of total commercial and residential natural gas use in New Zealand today. Ambitiously, more energy – 91.5 petajoules - could be harnessed after 2035 from a range of sources.

Developing these sources of biogas will result in larger net reductions in New Zealand's carbon emissions than alternative options, as these waste streams have the double environmental benefit of diverting material from landfill and other high-emitting end locations. This is critical to help New Zealand achieve its emissions reduction targets under the Paris Agreement.

The gas transition plan should therefore reflect the significant opportunity for biogas in our energy system and provide confidence for gas distributors and industrial processors to continue to develop the current opportunities. It should send a message that gas is a fuel in transition that has a positive future, helping balance the energy trilemma of security, affordability and sustainability, all while supporting existing customers who rely on or prefer gas.

A positive narrative about gas being a key part of the new energy future is preferred over the negativity about gas's future in official documents. For example, a Climate Change Commission recommendation

[17] ibid World Biogas Association

[18] Wood Beca Gas Transition Plan - Biogas Research Report February 2023

that government should ban new fossil gas connections had a chilling effect on industry and consumers, risking both an unmanaged supplier-led exit, and a shutdown of biogas options before getting to the first milestone with a blended option.

The cost of banning new connections is that, at some point, the industry will lose the scale required to incentivise and manage the switch to renewable gas. People, skills, knowledge and investment currently in conventional gas are needed to transition natural gas and LPG into renewable energy.

There are various data showing the scale of the gas industry workforce. For example, the high-pressure and low-pressure gas pipeline companies alone employ 491 people[19]. As of 2022, approximately 7,340 people are employed in the energy sector in Taranaki[20] – a significant proportion would be in the gas industry. And there were 6209 licensed gas fitters in September 2023[21].

In addition to those directly employed in the industry, a greater number are employed indirectly, including those who sell and repair gas appliances, and fillers and drivers of LPG.

The gas industry is therefore a vital contributor to our economy, providing employment opportunities for thousands of individuals across various sectors. From exploration and extraction, high-pressure and low-pressure pipelines, to transportation, energy-intensive industries, and the development of cutting-edge technologies, this industry fuels job growth at scale. It not only offers stable employment for those directly involved in the extraction and transmission/distribution of natural gas but also supports jobs in other sectors such as engineering, construction, manufacturing, and the fitting, selling, and repairing of gas appliances.

The technology and opportunity to transition gas to renewables is here today. It is far less likely to be available in the future if the existing industry has become sub-scale.

There is a need for government to support coordination between multiple stakeholders involved in making biogas production and delivery happen. However, we consider that economic incentives such as having a renewable gas target and tradeable certificates are more important to promoting renewable gas production.

In summary, the gas industry should be supported and given adequate time to increase renewable gases supplied to homes and businesses. Alongside carbon capture utilisation and storage for heavy industry gas users, renewable gas provides a sustainable pathway for the gas sector to contribute to New Zealand achieving net zero emissions by 2050, a goal fully supported by GasNZ members.

- **What is needed to ensure fossil gas availability over the transition period?**

GasNZ has no specific comments on this question but supports the submission of Energy Resources Aotearoa.

- **What factors do you see driving decisions to invest or wind down fossil gas production?**

An important factor in any decision to invest or wind down fossil fuel gas production is the scale of the New Zealand gas industry compared to its electricity system.

People might assume that the electricity industry – which has two million customer connection points – is substantially larger than New Zealand's gas industry, which has 292,000 natural gas connections and 297,000 LPG customers (a number which excludes LPG used by heavy industry and hundreds of thousands of gas barbecues).

While electricity has more than triple the number of customer connections, both the gas and electricity sectors are very similar in terms of amount of energy they deliver to customers. In fact, gas delivers slightly more.

[19] Gas Infrastructure Working Group Findings Report. August 2021
[20] Energy Resources Aotearoa
[21] Plumbers, Gasfitters and Drainlayers Board

Data from the Ministry of Business, Innovation and Employment shows that electricity consumption was 142 PJ in 2022. This compares to net gas production of 143 PJ in the same period.

The scale and reliance on gas must be taken into account in any decisions which risk undermining the gas industry before it can transition to renewable sources. Its hasty demise in an uncoordinated supplier-led exit will leave a gap that electricity could take decades to fill, and at great expense.

For example, Wellington Electricity's (WE) most recent asset management plan[22] said that a transition from gas to electricity by 2050 would add 260 megawatts or 52 percent to its current network demand, a bigger impact than electric cars, public transport, and population growth. WE forecasts that delivering the capacity required will need approximately $1 billion in investment over the next decade, and $2 billion over 30 years. This is a significant increase on WELL's historic levels of capital expenditure.

The key point is that fossil fuel gas production has an important place in filling demand for energy, and cannot be easily replaced. The gas industry should therefore be given the time and support to transition itself to a low-emissions industry which increasingly uses more biogas, biomethane, hydrogen, and renewable LPG, and less fossil fuels. To do otherwise will result in the electricity industry struggling to meet demand for generation, transmission and distribution.

- **Does the Government have a role in enabling continued investment in the gas sector to meet energy security needs?**

The government has an important role in continued investment in the gas sector to meet energy security needs.

In addition to setting a positive tone (see above answer), the government can proactively support the development and expansion of a biogas industry. Fuller comments are made below, in section seven (consultation questions for Chapter 3, biogas and biomethane).

- **Does the Government have a role in supporting vulnerable residential consumers as network fossil gas use declines? If yes, what do you see this role being?**

The answer is yes but before considering who to support and how, it would be useful to determine the number of residential gas users who might be vulnerable or struggle financially to transition from network fossil fuel use to electricity.

The customers who lack resources to switch their gas appliances to electricity or other energy sources cannot afford to install solar panels and batteries, swap to electric-powered hot water systems, replace gas hobs with induction cooktops, or remove gas fires for heat pumps.

GasNZ estimated the number of gas customers in hardship through extrapolating the methodology used in MBIE's illuminating work on energy hardship. An MBIE survey found that about six percent, or 110,000 out of 1.9 million households, could not afford to heat their home, with renters, Māori and Pacific people disproportionately worse affected[23].

The North Island has nearly 300,000 gas connections. A similar number of homes and businesses rely on bottled LPG for their heating energy needs. Assuming an average household has 2.7 inhabitants[24] , nearly 1.6 million New Zealanders rely on natural gas and LPG. This excludes households which prefer bottled LPG for their backyard barbecues.

Using MBIE's survey data, it is fair to assume that 35,000 households (six percent of 589,000 gas customers) using gas are struggling to heat their homes. The Gas Infrastructure Futures Working Group calculated higher figure of 19% of gas consumers.[25]

Absent government support, these households will not be investing many thousands of dollars to remove their gas appliances and invest in electric machines such as heat pumps and battery EVs. It

[22] Asset Management Plan (welectricity.co.nz)
[23] Defining energy hardship | Ministry of Business, Innovation & Employment (mbie.govt.nz)
[24] Statistics New Zealand
[25] Paragraph F5 NZ Gas Infrastructure Future (gasischanging.co.nz)

would be better for vulnerable households – suitably supported by winter energy payments and other income or tax assistance – to instead stay connected to natural gas or LPG systems, which gradually transition to low-emission biogas.

Gas represents good value as a source for heating our water and homes. For example, water heating and flued gas heaters are among the least expensive sources of heat. A flued heater costs between 11 to 17 cents a kilowatt hour (kWh), according to Consumer New Zealand[26], the most affordable option behind heat pumps. Overall, residential electricity cost consumers 32.83 cents per kilowatt hour in the three months ending June 2023, compared with 18.02 cents for gas[27].

In summary, government has an important role in supporting vulnerable energy consumers through income supplements, tax relief, and targeted energy payments. But this support should not be delivered in a context that results in hardship for tens of thousands of vulnerable consumers who rely on gas and cannot afford to swap their appliances from gas to electricity. A superior option is for vulnerable gas users to retain their existing connections to gas networks (natural gas or LPG) in a gas system which gradually provides greater amounts of renewable gas.

[26] Home heating costs in 2023 - Consumer NZ

[27] Energy prices | Ministry of Business, Innovation & Employment

2. Consultation Questions for Chapter 3, biogas and biomethane

- **On a scale of one to five, how important do you think biogas is for reducing emissions from fossil gas? Why do you give it this rating?**

Five out of five.

- **Do you see biogas being used as a substitute for fossil gas?**

Yes.

- **If so, how?**

GasNZ would like to highlight research by Wood Beca[28], which shows the great long-term potential for biogas to be used as a substitute for fossil gas.

It estimated the total biogas and biodiesel potential across New Zealand of various material streams (with a caveat that the gross figures may be economically challenging to achieve).

Waste/Residue Feedstocks	
Total Biogas Potential (from organic waste/agricultural residues)	24 PJ/year
Total Syngas Potential (from woody biomass)	63 PJ/year
Total Biodiesel Potential (oils/fats)	4.5 PJ/year

We also investigated possible future sources of biogas energy, including purpose-grown Energy or Utility crops. This could provide vast quantities of bioenergy, but the use of productive land for energy needs to be weighed up carefully.

Energy or Utility Crops	
Total land required to meet NZ natural gas demand (149.5 PJ/year)	21% of NZ productive grassland (1,700,000 ha)

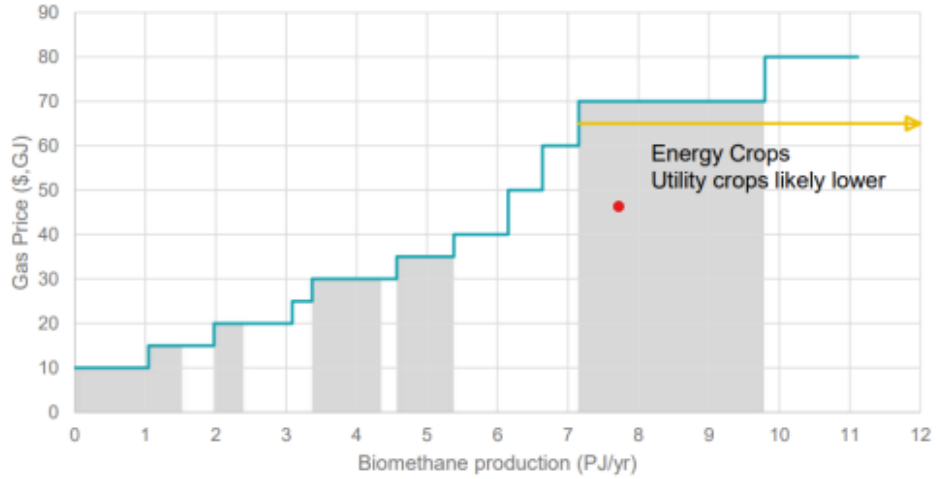
The table shows that waste and residue feedstocks could potentially produce 91.5 petajoules of renewable energy, mostly as gas. This is a significant proportion of the current production of natural gas, which is about 140 petajoules.

In the medium term, Wood Beca found that the total accessible and economic size of New Zealand biogas potential up to 2035 is around 7 petajoules, which is half the total commercial and residential natural gas use in New Zealand. As stated above, renewable biogas has the double benefit of large net reductions in carbon emissions, as waste used to make biogas diverts material from landfill and other high-emitting end locations.

MBIE's issues paper[29] includes a graph, reproduced below, showing the estimated feasible gas production in New Zealand at different price levels.

[28] Wood Beca. Gas Transition Plan – Biogas Research Report. February 2023

[29] Gas Transition Plan issues paper (mbie.govt.nz)



It comments that biogas from landfills, wastewater treatment plants, and food waste digesters can be accessed, upgraded, and injected into the fossil gas network at relatively low cost per unit of biomethane, but at a higher price than current fossil gas.

However, doing so requires greater incentives to divert waste from landfills to processing facilities such as biogas plants.

The New Zealand government is helpfully working on policy that should reduce waste through recycling and collection systems, increasing the amount of organic material separated at source, and collecting and processing it separately. This work sits under three connected work streams: the Waste Strategy released in March 2023; a yet-to-be-tabled Bill that would replace the Waste Minimisation Act 2008; and the Climate Change Commission's Emissions Reduction Plan.

All three policy programmes, in their own ways, support the diversion of organic waste to reprocessing at biogas production plants.

The Emissions Reduction Plan has a focus on reducing our reliance on fossil fuels and supporting the switch to low-emissions fuels, setting a target that half of total final energy consumption is from renewable sources by 2035.

The Waste Strategy says New Zealand must look for ways to recover any remaining value from residual waste, sustainably and without increasing emissions, before final disposal.

And the new waste legislation will strengthen the waste levy so it can apply to all forms of final disposal, including waste-to-energy facilities. Legislation will also include mandatory recycling and landfill bans.

The Gas Transition Plan needs to capture the principles in all these piece of work – the Emissions Reduction Plan, the Waste Strategy, and waste legislation reform – to support availability of organic waste for biogas and investment in biogas processing facilities.

For example, stopping organic disposal at landfills would be a huge fillip to the biogas industry. This has been demonstrated overseas. To increase the amount of feedstock available for biomethane, Germany has prohibited landfilling for waste with an organic matter content of more than five percent since 2002. Germany is the leader in global biogas and biomethane production, representing more than 50 percent of production in the EU. There are more than 9,500 biogas plants in Germany which generate over 300 petajoules of raw biogas, equal to around 10 percent of the energy Germany gets from natural gas, or twice New Zealand's total fossil fuel gas production.

While a landfill ban would be a huge incentive to repurpose waste, another option is to introduce a targeted levy on disposal of organic waste at landfills, a level which would directly support the reprocessing of waste into biogas.

In summary, the Gas Transition Strategy must align with the clear direction on waste management and renewable energy by other government agencies which encourages diversion of organic waste from landfills to reprocessing facilities.

At the very least, the transition plan must include analysis about the link between the gas transition and the waste strategy and related work. This will assist understanding of outcomes and also pricing implications/drivers in waste.

3. Consultation questions for Chapter 3, hydrogen

- **On a scale of one to five, how important do you think hydrogen is for reducing emissions from fossil gas use? Why do you think this?**

Three out of five.

- **Do you see hydrogen being used as a substitute for fossil gas? If so, how and when?**

In answering both questions, GasNZ largely agrees with the summary in the gas transition plan issues paper. We note the paper's discussion and findings are similar to a 2021 report by the Gas Infrastructure Working Group[30].

While the full extent of hydrogen's role will become clearer over time, at present hydrogen should continue to be considered a possibility across the energy spectrum for gas use, electricity, blending with natural gas, and, potentially, replacing LPG in gas bottles.

Since the 2021 report, a lot has happened. For example, global investment - particularly in the United States after the passage of the Inflation Reduction Act – has increased sharply . This is expected to lead to cost reductions and efficiency improvements in electrolysis. New Zealand stands to benefit from these developments, just as we benefited from massive cost reductions in wind and solar due to subsidies in Europe.

As the scale of the transport task for distributing green hydrogen – and other zero-carbon gases – increases, using repurposed or new hydrogen pipeline networks will likely become a more efficient and acceptable solution than alternatives like trucking hydrogen.

That said, a future involving transportation of green hydrogen using repurposed or new gas pipelines will require a sufficient current and future market to justify the high fixed investment costs needed to build, repurpose, maintain and replace pipeline and consumer assets over time.

An early step adopted by other developed countries is hydrogen blending, as this doesn't require significant network expenditure or appliance conversion. New Zealand industry has commenced a trial to blend hydrogen into a natural gas pipeline network[31], creating options of moving to 100 percent by 2050.

These and other demonstration projects will build knowledge and reduce emissions until more information emerges on the potential future role of hydrogen. In a future where gas distribution networks primarily transport locally-produced biomethane, temporary hydrogen blending can help these networks manage operational imbalances.

Hydrogen as a substantial future energy source is gathering much attention. Over 30 countries currently have hydrogen strategies in place and $US70 billion of funding has been committed globally across 228 ongoing projects[32].

Integrating hydrogen with our energy mix not only demonstrates the value of the gas network, it also gives New Zealand the best available balance of energy security, energy equity, and environmental sustainability in the transition to the net-zero future.

Demand for green hydrogen is expected to grow significantly in coming decades as technology improves and the market for hydrogen scales up. Gas distributors have a role in catalysing the hydrogen economy by supporting demand as the hydrogen sector develops in New Zealand, contributing to modest emission reductions.

There's a compelling case for government funding or policy mechanisms to help accelerate the development of the hydrogen industry. We applaud MBIE's policy work in establishing a regional hydrogen rebate scheme, and hope this results in a soon-to-be-functioning rebate. This $100m

[30] ibid Gas Industry Working Group

[31] Hydrogen blending: A big step on the path to net zero - First Gas

[32] Hydrogen Insights 2021 | Hydrogen Council

investment will support early adopters in hard-to-abate industries to reduce emissions and build industry knowledge, skills, and supply chains.

Supportive government interventions such as the rebate scheme will keep options open, but they must be supported by regulatory frameworks that enable the adoption of hydrogen as consumers choose it - if and when the price of hydrogen falls.

- **What else can be done to accelerate the replacement of fossil gas with low-emissions alternative gases?**

GasNZ has focused on what it sees are the two best ways to accelerate the replacement of fossil fuel with low-emissions alternative gases, followed by other suitable options.

Such policies would complement and support the development of a thriving anaerobic digestion industry by providing a more certain path to market for biogas from anaerobic digestion, and help underwrite investment in renewable gas projects.

a) Renewable gas mandate

A high priority is developing an agreed obligation from industry participants that a proportion of gas used for homes and businesses must be from renewable (non-fossil fuel) sources.

GasNZ would like to work with government on further developing the potential for a renewable gas target, and encourages officials to explore an obligation in the gas transition plan.

b) Renewable gas certificates renewable gas target must be backed by tradeable renewable gas certificates where renewable gas can be recognised and rewarded, which will incentivise renewable gas production. A certification scheme would improve the viability of biogas and facilitate investment in the sector.

Certification not only provides a potential channel for additional value to renewable gas suppliers, it also[33]:

- Allows consumers to make better informed choices around purchasing renewable or fossil fuel sourced gases.
- Provides price signals for suppliers to incentivise investment.
- Provides production requirements and/or standards to ensure facilities are established and operating to meet green standards so consumers can trust what they are purchasing.
- Aids the international trade of renewable gases and recognition of the additional value they afford on international markets.
- Provides immutable proof of ownership of the renewable attributes of renewable gas, avoiding the potential for double counting of renewable attributes.
- Through the creation of a gas residual supply factor, ensures that only those parties that purchase renewable gas can claim that benefit.
- Aids the domestic trade of renewable gases by providing a mechanism for gas retailers to meet their renewable gas targets.

Renewable gas certificates are discussed further in the next set of questions (consultation questions for chapter 3, renewable gas trading of renewable gases).

c) Other incentives or interventions

GasNZ would support any policy mechanism that signals a commitment to the development of renewable gas and helps underwrite investment in renewable gas projects.

[33] PwC. Green Gas Certification Scheme Research. September 2020

Other examples of positive interventions are a targeted levy on organic and food waste to specifically pay for biogas processing and distribution that is collected at landfills[34], banning the dumping of organic waste at landfills, and government stewardship and support of a biogas industry.

These should all be considered for inclusion in the Gas Transition Plan.

Government also has a role in supporting decarbonisation of gas, in the same way it is helping remove coal boilers from the state and private sector. In the same way that the government is co-funding boiler swap outs, it could provide funding for biogas projects through the Energy Efficiency and Conservation Authority's Government Investment in Decarbonising Industry (GIDI) fund, and the government's waste minimisation funds.

A potential approach to governance over the various incentives and interventions could be through a government-industry partnership.

In Europe, while there is no specific biogas mandate, the European Union has a binding renewable energy target for the EU for 2030 of at least 32 percent, to be achieved through a series of actions, including substituting fossil fuels.

The EU wants to boost sustainable biomethane production to 35 billion cubic metres by 2030. To increase the capacity of biogas production in the EU and promote its conversion into biomethane, the estimated investment need amounts to 37 billon euro over the period.

The resultant EU Biomethane Action Plan[35] addresses the main barriers to increased sustainable biomethane production and use, and integration into the EU internal gas market by:

- Establishing an industrial biogas and bio-methane partnership to stimulate the renewable gases value chain;[36]
- Taking additional measures to encourage biogas producers to create energy communities;
- Providing incentives for biogas upgrading into bio-methane;
- Promoting the adaptation and adjustment of existing, and deployment of new, infrastructure For transport of more bio-methane through the EU gas grid;
- Addressing gaps in research, development and innovation;
- Facilitating access to finance, and mobilising EU funding.

The Gas Transition Plan should explore a New Zealand version of the Biomethane Industrial Partnership.

In addition to financial incentives, an option to encourage renewable gas investment in New Zealand is through the development of an industry-agreed renewable gas obligation or target, supported by tradeable renewable gas certificates. However there are other options, and GasNZ is keen to explore these ideas in a New Zealand setting.

[34] The stated purpose of the current waste levy of $50 a tonne is to raise revenue for the promotion and achievement of waste minimisation and recognise that disposal imposes costs on the environment, society and the economy.

[35] European Commission. REPowerEU. May 2022

[36] Biomethane Industrial Partnership | European Biogas Association

4. **Consultation Questions for Chapter 3, Renewable Gas Trading of renewable gases**

- **On a scale of one to five how important is a renewable gas trading to supporting the uptake of renewable gases?**

Five out of five.

- **Why have you given it this rating?**

Many of the reasons for supporting renewable gas trading are included in the summary in the issues paper. The most obvious is that a certification scheme would improve the viability of biogas and facilitate investment in the sector. GasNZ strongly endorses this statement.

A list of reasons in support of certification was included in an above answer. In summary, certification's main benefit is allowing consumers a choice in what they purchase, and an assurance that they're purchasing renewable gas, thereby encouraging demand and investment in biogas.

We welcome that market participants, such as Certified Energy, a private company, have launched early versions of these schemes[37].

GasNZ is also very supportive of the Gas Industry Company furthering its work on developing a regulatory framework and monitoring regime for renewable gas certification providers. It currently runs a process to allocate gas from different locations to different users, but which doesn't rely on the type of gas - conventional or renewable - that the user purchased being consumed by that user. It would not be too onerous to include biomethane in the existing reconciliation system that GIC operates. We see this additional oversight as helpful in ensuring the integrity of claims in relation to renewable gas.

Following the release of a PwC report on certification[38], GIC said it was working to understand what industry processes and frameworks are needed to support the introduction of 'green gases,' including hydrogen and biofuels. It also commissioned work from Wood Beca on biogas generation.

GasNZ sees an opportunity for it to collaborate with other parties on designing a more detailed framework for a renewable gas target that is tied to a renewable certificate scheme.

- **What role do you see for the government in supporting such a scheme**

Gas certification schemes could be developed by industry or government. In New Zealand, Certified Energy is close to releasing version two of a methodology for operating a renewable gas certification scheme. And in Australia, the state governments through GreenPower have recently launched a pilot renewable gas certification scheme.

Government's most important role is to support the gas industry in a staged, measured transition from fossil fuels to increasing amounts of renewable gas. More specifically, a government-supported obligation that a rising proportion of renewable gases must be injected into pipelines would incentivise biogas production. These incentives would help develop the nascent biogas certification process in New Zealand. One particular way government could help is in supporting first movers in obtaining certification. Government could resource a pilot to test a certification scheme is fit for purpose, and not too onerous or costly for the later adopters.

Certified Energy established a biogas certification scheme in 2022. For production to qualify as biomethane within Certified Energy's Energy Certificate Scheme, it must use organic waste from:

- Municipal, industrial and commercial wastewaters or sludges.
- The organic part of municipal solid waste separated at source or prior to landfill.
- Waste from food production such as crop residues or horticultural waste.

[37] Certified Energy
[38] ibid

- Food and beverage processing waste.
- Food waste from retailers, distributors, consumers (including hospitality, government, institutions, companies).
- Vegetative matter, including garden waste, and timber waste.
- Animal waste.
- Landfill gas.

Certified Energy already operates in the renewable electricity market, so has the capability to extend into the gas market, albeit an industry with different challenges due to the emissions profile of anaerobic biogas compared to hydro, wind and solar electricity.

Across the Tasman, the Australian state governments have taken the lead in developing a renewable gas certification scheme. GreenPower was established in 1997 by the New South Wales government. The NSW Office of Energy and Climate Change is the program manager for GreenPower with oversight from state and territory governments. GreenPower's renewable gas certification pilot launched in August 2023 will enable commercial and industrial gas customers to match their gas use with renewable gas certificates.

In the same way that Certified Energy operates in New Zealand, each GreenPower certificate represents accredited renewable gas that displaces fossil natural gas in Australia. This directly supports renewable gas projects and allows customers to match their fossil natural gas use with low-emission renewable gas. Projects around Australia can apply to be certified[39]. The certificates are targeted at commercial and industrial businesses seeking independently renewable gas options on which they can rely for their climate action.

The Malabar Biomethane Injection Plant is scheduled to become the first renewable gas facility registered under the certification. The Malabar project is using biogas from wastewater to produce biomethane for injecting into New South Wales pipelines. Certificate sales provide an additional revenue stream for renewable gas producers like Malabar, helping more projects become commercially viable.

GasNZ believes that the future of gas should explore renewable gas certification and trading. It is very supportive of these market-based schemes, which will be essential if the transition strategy includes a renewable gas obligation.

In summary, the gas transition plan should send a positive message that gas will be part of the new energy future, set a target that encourages greater amounts of renewable gas to be blended with conventional gas, and supports the establishment of independent renewable gas certification schemes.

[39] GreenPower launches its Renewable Gas Certification Pilot for businesses | GreenPower

5. Consultation Questions for Chapter 3, Carbon Capture, Utilisation and Storage

- **On a scale of one to five how important do you think CCUS is for reducing emissions from fossil gas use?**

Five out of five.

- **Why did you give it this rating?**

Carbon capture use and storage are critical to the future of the gas industry, in particular for mitigating the effects of large point-source emissions. These point-source emissions are from gas consumers which take the bulk of gas produced in New Zealand. But CCUS is not an easy option.

The gas industry should therefore be supported and given adequate time to add renewable gases to homes and businesses, which along with carbon capture utilisation and storage for heavy industry gas users, provides a sustainable pathway for the gas sector to contribute to New Zealand achieving net zero emissions by 2050, a goal fully supported by GasNZ members.

A recent report from Castalia[40] determined that:

- CCUS technologies and adoption can support significant gross emissions reductions and help contribute to the national net-zero target.
- CCUS should be rapidly investigated as an option to capture point source emissions from industrial, chemical, electricity generation, and process heat users of natural gas, as well as scope one emissions from upstream oil and natural gas producers.
- Policymakers should focus on how investment in CCUS can be accelerated and ensure regulatory certainty enables investment.
- The sooner CCUS is available, the greater the emissions reduction benefits are realised.

GasNZ agrees with Castalia's findings and recommends that the gas transition plan place a strong emphasis on supporting carbon capture and use.

- **What are the most significant barriers to the use of CCUS in New Zealand?**

Regulatory settings need to be developed. An initial step is to ensure that any carbon removals via CCUS are eligible for credits under the ETS. Technical feasibility analysis for New Zealand's geography and technology cost forecasts also need to be confirmed before CCUS is considered an effective long-term and stable decarbonisation option.

[40] ibid