



17 July 2020

New Zealand Green Building Council  
Level 2, Tower 1  
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AUCKLAND 1010

**Firstgas Group**  
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Sent via website: <https://www.nzgbc.org.nz>

Dear Andrew

## Keeping options open for getting to net zero: Firstgas Group response to the Homestar scoping document

Firstgas welcomes the opportunity to submit to the New Zealand Green Building Council (NZGBC) on the "Homestar v5" scoping document dated 15 June 2020. We support programmes like Homestar that allow homeowners to make better informed decisions about their energy use, particularly about how they can contribute towards New Zealand's pathway to a net zero carbon economy.

We do not support the proposed Homestar standard for net zero carbon homes that requires highly rated houses to be fully electric. This requirement unnecessarily restricts the choices that will be available to homeowners to reduce their carbon footprint, in line with New Zealand's target of becoming net zero by 2050. This is because the fully electric requirement excludes other options that may be available for homes to become net zero, such as the use of green hydrogen, biogas, and bio-LPG for hot water heating, cooking, and space heating.

Our submission addresses two key points:

- **There are substantial benefits in keeping options open** when setting the requirements for net zero carbon ready homes. These benefits come in the form of potentially lower costs to households (maintaining affordability) and higher quality homes (warmer, drier, healthier).
- **Significant investment is already taking place** to develop green hydrogen, biogas and bio-LPG as realistic zero carbon alternatives to electricity. Firstgas is working on their application and use in New Zealand to reduce our domestic carbon footprint.

As a provider of energy to homeowners, Firstgas has a keen interest in ensuring that homeowners have ready access to the best information possible on energy efficiency and use. We want to help consumers decarbonise their homes while keeping energy costs affordable. We would welcome the opportunity to meet with the NZGBC to discuss the points raised through this submission.

We have provided three attachments with our submission:

- **Attachment 1** provides our responses to selected consultation questions
- **Attachment 2** is a summary of Firstgas Group
- **Attachment 3** is a Firstgas infographic on the benefits of gas (including green hydrogen, biogas and bio-LPG).

### Why should the NZGBC keep options open for getting to net zero?

Homeowners have benefited to date from having the choice of electrical and non-electrical sources to meet their household energy needs. Currently there are over 400,000 homes in New Zealand who enjoy natural gas and LPG in their homes. These homeowners predominantly use gas in three applications:

- Hot water heating
- Cooking
- Space heating.

There are multiple pathways for getting to net zero, without losing the benefits that households currently get from gas. The three options that are currently receiving the most attention and



investment are green hydrogen, biogas (sometimes called biomethane), and bio-LPG. We describe each of these in further detail below, along with references to work overseas and in New Zealand that demonstrates that each of these options is technically feasible and realistic. We are not saying that these options *will* be implemented for New Zealand to get to net zero. But we do believe that it would be premature to close off these options.

The two fundamental reasons to keep these options open for getting to net zero are:

- **Cost and affordability.** Requiring homes to switch to electric appliances to achieve net zero standards will create significant costs. These costs are incurred throughout the supply chain from appliance replacements, household wiring upgrades, electricity network upgrades and new electricity generation sources. Natural gas hot water heating is currently the most energy affordable way to heat water.<sup>1</sup> From this low cost supply chain, it is entirely possible that the cost of decarbonising gas supply provides the lowest total cost solution and therefore helps to reduce the cost to consumers.<sup>2</sup> By specifying an electricity only approach to zero carbon, the NZGBC will effectively prevent households that investment in these appliances from getting the recognition they deserve, while continuing to enjoy the benefits of gas appliances.
- **High quality energy supply.** The adoption of gas has created warmer and happier homes for New Zealanders. Natural gas heats water so that it is instantly available, never runs out, and requires no onsite storage in the home – freeing up floor space for other productive uses. These benefits also apply to LPG, which has a higher delivered cost to consumers (due to supply chain costs) but is more widely available with nationwide coverage (whereas natural gas is only available in the North Island). By specifying an electricity only approach to zero carbon, the NZGBC would restrict choices to solutions that do not have the same attributes as gas.

We strongly recommend that the NZGBC takes a fuel agnostic approach to providing zero carbon energy to the home. That way homeowners will retain the power to choose the energy solutions for their homes, that best meet their needs while keeping prices affordable.

## What are the zero carbon gas-based fuels?

Firstgas Group is exploring several alternative fuels that we hope will be part of New Zealand's zero carbon future. There are three gas-based fuels with the potential to help decarbonise New Zealand's energy needs – hydrogen, biogas and bio-LPG. We are currently looking into the adoption and application of these fuels and how they can be suited to use in New Zealand.

### Green hydrogen

We see hydrogen as an exciting future fuel to support New Zealand's energy needs. Produced through electrolysis of water, green hydrogen can be burnt in modified appliances or used in fuel cells to provide home heating. The production of green hydrogen is carbon free.<sup>3</sup>

Firstgas Group is currently part-way through our initial study on using hydrogen in our network – part funded by the Government's Provincial Growth Fund (PGF). We anticipate that this is the beginning of a programme of work to decarbonise our gas networks. This could be done initially by introducing hydrogen as a blend alongside natural gas, and ultimately replacing natural gas to completely decarbonise the use of gas.

Internationally, there are similar projects that are further along in development. These include the HyDeploy decarbonisation trial at Keele University,<sup>4</sup> the Leeds 21<sup>5</sup> trial in the United Kingdom, and work underway by Jemena in Australia to introduce hydrogen to the Sydney gas network within the

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<sup>1</sup> <https://www.consumer.org.nz/articles/home-heating-costs-in-2020>

<sup>2</sup> See Vivid Economics *Gas Infrastructure Futures in a Net Zero New Zealand* available here: [https://firstgas.co.nz/wp-content/uploads/16098-First-Gas\\_Future-of-Gas-Report-Dec18-FINAL-high-res.pdf](https://firstgas.co.nz/wp-content/uploads/16098-First-Gas_Future-of-Gas-Report-Dec18-FINAL-high-res.pdf)

<sup>3</sup> Green hydrogen is made by using clean electricity from renewable energy technologies to electrolyse water (H<sub>2</sub>O), separating the hydrogen atom within it from its molecular twin oxygen.

<sup>4</sup> <https://hydeploy.co.uk/>

<sup>5</sup> <https://www.northerngasnetworks.co.uk/wp-content/uploads/2017/04/H21-Executive-Summary-Interactive-PDF-July-2016-V2.pdf>



next year to partially decarbonise their network.<sup>6</sup> These projects provide an exciting snapshot into the future and provide valuable information for us.

Gas appliance manufacturers are also preparing their devices for a low-cost rollout of green hydrogen. For example, Bosch has recently begun manufacturing a dual powered hot water heating system that can provide instant hot water using natural gas today, with the ability to switch to 100% hydrogen with a flick of a switch.<sup>7</sup>

## **Biogas**

Biogas is the mixture of gases produced by the breakdown of organic matter. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas from wastewater treatment plants and landfill sites is a well-understood gas that could be injected into the natural gas network without any changes to homeowner appliances.

Currently, New Zealand produces 3.6 PJ per annum of biogas that is burnt at site for heating or electricity generation. We believe the potential for biogas is much greater. For example, the United Kingdom produced 120 PJ of biogas in 2017 and 12PJ of that was injected into the gas grid.<sup>8</sup> In Germany, there are currently 232 biogas plants injecting gas into pipeline networks.

We are currently investigating feasibility of injecting biogas into one of our distribution networks. We envisage that this biogas market will grow substantially to assist in decarbonisation of our gas network without the need to replace existing gas appliances. The great thing about biogas is that the technology for biogas is available now and no changes to gas specification or infrastructure are required to implement this solution.

## **Bio-LPG**

We are also investigating decarbonisation of our LPG network through the use of bio-LPG. There are currently several bio-LPG facilities worldwide producing gas from feedstock such as waste vegetable oil. This gas is currently used commercially in Ireland, the UK, Sweden and across Europe.<sup>9</sup>

We think that this gas source has promise to reduce carbon emissions from our LPG supply. It can be done without replacement of existing appliances keeping costs lower for homeowners.

## **Conclusion**

In devising the Homestar rating standards, we urge the NZGBC to keep the options open for households to achieve zero carbon outcomes. We believe gas and gas-based fuels can play a critical role in decarbonising the home and keep the cost within reach for all New Zealanders.

## **Contact details**

If you have any questions regarding this submission, please contact me on 021 911 946 or via email at [ben.gerritsen@firstgasgroup.co.nz](mailto:ben.gerritsen@firstgasgroup.co.nz).

Yours sincerely

**Ben Gerritsen**  
General Manager Commercial and Regulation

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<sup>6</sup> <https://jemena.com.au/about/innovation/power-to-gas-trial#:~:text=The%20%2415%20million%20trial%20is,1.4%20million%20customers%20each%20year.>

<sup>7</sup> <https://www.h2-view.com/story/worcester-bosch-officially-reveals-new-hydrogen-boiler/>

<sup>8</sup> DUKES Tables 6.6 and 6.1-6.3

<sup>9</sup> <https://www.shvenergy.com/biolpg/>



## Attachment 1: Answers to selected questions

Question	Firstgas response
<p><b>Section 10</b> Do you think that Homestar should include requirements for all habitable rooms to be heated, perhaps at the higher levels of Homestar?</p>	<p>Current advice commonly given is to 'only heat the room you're in'. However, this does not maintain the thermal mass of a home and leads to higher energy usage and poorer health outcomes. Requiring all habitable rooms to be heated means that central heating systems are on a level playing field with room by room heating, when considering energy usage and cost.</p>
<p><b>Section 14</b> Do you think we should have mandatory minimum energy and/or carbon performance levels for each Star rating? What do you think are the best metrics for minimum performance (energy, cost, carbon emissions, primary energy etc)?</p>	<p>The approach taken to look at carbon intensity of heating is correct. It supports a regime where the average carbon intensity of electricity is reflected in the assessment and relative inefficiency of heat pumps in colder temperatures is acknowledged. This allows other sources of heating (gas, biogas, biofuels, biomass) to compete on level playing field with electrical heating.</p>
<p><b>Section 15</b> Do you support combining all of the energy credits into one holistic energy/carbon credit supported by the development of a new calculator (possibly on-line)?</p>	<p>We do not think that combining all these credits is a good idea. It would not lead to enough granularity on the individual trade-offs in the whole home that contribute to comfort as well as efficiency e.g. instantaneous hot water plus heat pump for cooling might be a good trade-off.</p>
<p><b>Section 24</b> Do you think that Homestar should include recognition for low global warming potential refrigerants?</p>	<p>We agree that the global warming potential of the refrigerants in heat pumps should be included in the assessment. Not doing so means that the impact of these appliances is not being compared like for like with other appliances.</p>
<p><b>Section 26</b> Should Homestar explicitly recognize and reward net zero carbon (ready) homes? If yes, should Homestar require homes at higher star levels (say 9 and 10) to be net zero carbon (ready)?</p>	<p>We think that the criteria for net zero carbon home is too restrictive and does not reflect fully net zero carbon homes. Fully electric homes are not net zero carbon due to the average carbon intensity of electricity in New Zealand. Moreover, limiting technologies to electricity ignores the potential for biogas, hydrogen, biofuels and biomass to contribute to home heating. These fuels can do so with a lower overall investment in the electricity network and reduce the need for onsite battery storage etc.</p>



## Attachment 2: About Firstgas Group

Our vision is to lead the delivery of New Zealand's energy in a changing world. Our mission is to safely and reliably deliver energy that's affordable and accessible to Kiwi families and businesses. We're really proud of this and of the important role we play in Kiwis' lives.

Based in New Plymouth, Firstgas Group is an umbrella brand consisting of Rockgas, Firstgas, Flexgas and Gas Services NZ. Firstgas and Rockgas are consumer brands that supply LPG and natural gas to over 165,000 customers through their gas network of over 2,500 kilometres of high-pressure transmission pipeline and 4,800 kilometres of distribution pipeline in the North Island, 36 local LPG suppliers, and over 180 Refill and Save locations across New Zealand.

Flexgas and Gas Services NZ are energy storage, operations and maintenance brands who make sure gas can be delivered safely and continuously. Flexgas operates the Ahuroa gas storage facility in central Taranaki. Gas Services NZ provides operational and maintenance support to all gas infrastructure owners, including the brands within Firstgas Group.<sup>10</sup>

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 the Huntly Power Station 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, 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.

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<sup>10</sup> For more information on the Firstgas Group, visit [www.firstgas.co.nz](http://www.firstgas.co.nz), [www.rockgas.co.nz](http://www.rockgas.co.nz), [www.flexgas.co.nz](http://www.flexgas.co.nz)



## Attachment 3: Firstgas Group infographic

