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Tēnā koutou,

This submission was written on behalf of Hutt City Council and was approved at Council's Climate Change and Sustainability committee meeting on 14 November 2023.

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# Hutt City Council Submission on the Gas Transition Plan Issues Paper

**Background:**

The Intergovernmental Panel on Climate Change (IPCC) recommends that, to avoid dangerous climate change and associated impacts, global emissions must decrease to net-zero by 2050, and be halved by 2030.

In response, and in order to take responsibility for its emissions, New Zealand has set a net zero carbon target, and put in place a range of measures to facilitate a reduction in emissions (eg Climate Change Response Act, Climate Change Commission, carbon budgets, Emissions Trading Scheme, etc).

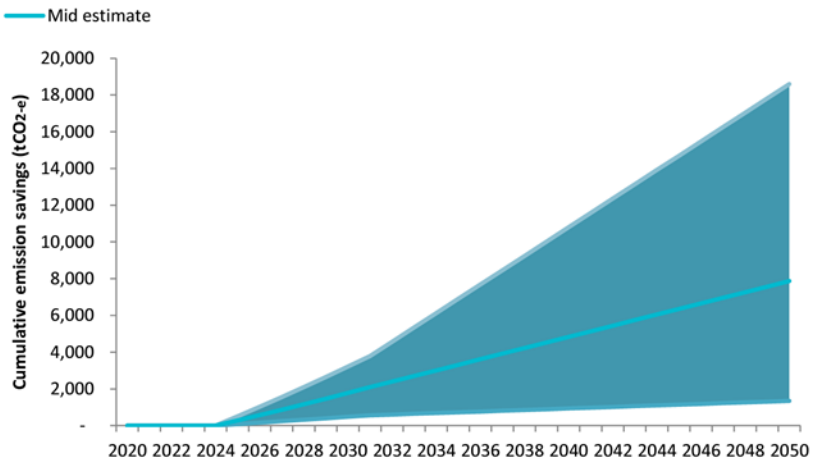
Fossil gas has a high carbon intensity, and unless action is taken, development activity in Lower Hutt (eg new residential buildings, etc) and other areas over the next two decades will increase emissions associated with the use of fossil gas. This growth in emissions is directly contrary to the objective of halving city-wide emissions by 2030, and the need for strong and rapid action in order to have a

chance of averting dangerous climate change beyond 1.5 degrees of global warming.

**Our local context**

Fossil gas is a key emission source in Lower Hutt, making up approximately 36% of Lower Hutt's stationary energy emissions, and 10% of city-wide emissions. Lower Hutt has a projected growth of 13,700 new residential dwellings over the next 25 years, this would mean that Lower Hutt's carbon footprint could see the addition of about 8,000 $tCO2\text{-}e$ by 2050 (with a lower and upper estimate of 1,300 to 18,600 $tCO2\text{-}e$), compared to an alternative scenario where those same dwellings utilise only electricity or some other low carbon energy source.

The figure below shows the avoidable emissions, with a lower and upper estimate depending on the number of dwellings added.




This further growth in emissions is directly contrary to the need for strong and rapid action emphasised in the IPCC's latest AR6 report from March 2023 in order to have a chance of averting dangerous climate change beyond 1.5 degrees of global warming.

**Issues with assumptions made in the Gas Transition Paper Issues Paper:**

The transition plan issues paper (hereafter referred to as the "paper") assumes that hydrogen and biogas can support the energy transition. While HCC does consider that there is a role for these technologies, they are not likely to play any role in helping us halve emissions by 2030, in line with the reductions that are necessary. Indeed, without avoiding additional gas use, emissions will increase.

**Biogas**

A key constraint with biogas is that it is currently not available to be blended with, let alone replace, fossil gas for use by residential or commercial customers. While a new biogas facility processing food waste in Reporoa (and other such facilities) may provide a potential source of biogas to replace some piped fossil gas, this is unlikely to be a significant fossil gas substitute in the short to medium term, which is a critical aspect in light of the need to halve emissions by 2030.

It should not be assumed that operators will choose to sell biogas from anaerobic digestion plants, as having onsite conversion of biogas to electricity can be a cost effective, logistically simpler and more energy efficient options of distributing energy for operators. The paper should use caution in assuming the availability of biogas from anaerobic digestion plants.

In addition, there is likely a higher value use case for hard-to-electrify applications or for power production that does not rely on network distribution. Regarding the latter, while biogas can technically be carbon neutral when combusted, leakage of gas from the network prior to combustion is also problematic, with corresponding flow-on effects for the climate, even when the source of the biogas is renewable.

Regarding health impacts, biogas and fossil gas have the same impacts in a residential setting. Domestic appliances do not completely combust the gas. For example, gas stoves will leak approximately 1% of the methane they consume unburnt, primarily while the stove is off.[i] Further to this, cooking with gas releases chemicals that can cause inflammation in the airways, this has been linked to asthma in children. As noted by the National Asthma Council of Australia, cooking is a daily occurrence that occurs indoors where it is likely that pollution cannot escape easily.

**Hydrogen**

It is possible to replace/upgrade the fossil gas network with a hydrogen network (or a blended network) for residential and commercial applications, albeit there are significant costs and challenges. In addition, hydrogen is not yet available to be blended with, let alone replace, fossil gas for use by residential or commercial customers. This is unlikely to change in the short to medium term, which is a critical aspect in light of the need to halve emissions by 2030.

A further complication is that if hydrogen is only blended with fossil gas, it is not possible to eliminate the emissions associated with the combustion of fossil gas.

But if the blend is too high (ie more than 20% hydrogen), the residential appliances will need to be replaced, with corresponding cost implications.

Like fossil gas, hydrogen can be stored but is subject to leakage from the gas network. In a blend with fossil gas, the leakage of fossil gas from the network prior to combustion is problematic, with corresponding flow-on effects for the climate. However, leaking hydrogen also poses a climate risk, and while it is not a greenhouse gas by itself, it can extend the lifetime of other greenhouse gases.

Even if the above limitations could be overcome, a key drawback for hydrogen is that it needs to be produced first before it can be used for heat production, i.e. energy is lost along the way. Assuming hydrogen is made using renewable and low carbon electricity through electrolysis of water (thereby producing green hydrogen), significantly more electricity is needed to produce the same result (heating or powering a home). Notably, the "Which way is forward?" study by Concept Consulting in 2022 noted that "green hydrogen is not an economic pathway to decarbonise pipeline fossil gas used for heating."

While that does not mean that hydrogen cannot play a key role in the production of heat, it means that its use is likely of higher value in hard-to-electrify applications, such as the production of steel, as opposed to low to medium-temperature residential and industrial heat applications, particularly since cost effective alternatives exist.

**Electricity**

Electricity can be used for space heating, water heating, and cooking. There are range of technology options that utilise electricity, including conventional electric resistance heaters and heatpumps for space heating, instantaneous electric and electric storage cylinders for heating water, and electric stoves and induction stoves for cooking.

New Zealand's electricity production is already more than 85% renewable, which means that electricity is much lower carbon than alternative options such as fossil gas. Electricity production is expected to become more renewable and lower carbon over the next 10 years, hence it is a key energy source for New Zealand to achieve its net zero carbon target.

Considering that most homes and businesses in New Zealand are connected to the electricity network and the availability of a range of electric technologies for

various applications, electricity is a key alternative energy source to fossil gas in Aotearoa.

**Achieving the plan's desired outcomes**

The paper notes the desired outcomes the plan is seeking, three of these are discussed below.

***Sustainability:*** *Aotearoa New Zealand avoids making decisions that further lock in our reliance on fossil fuels*.

The paper has not set out a clear path to avoiding new reliance on fossil gas. Indeed, without avoiding adding new gas use, it actually perpetuates locking in reliance on fossil gas, and thereby it fails to meet its own desired sustainably outcome.

While it is agreed, as per page 21, that there are switching costs involved in changing from gas to alternatives such as heatpumps, the paper is silent on how New Zealand would avoid adding to the problem. Avoiding adding new gas use avoids the problem getting bigger. Indeed, on page 24, the paper notes that "gas consumers often have significant capital tied up in gas appliances and equipment which makes the costs and timing of transitioning challenging", which is why it is puzzling that the paper does not comment on the need to avoid adding additional gas demand, when alternatives are available and cost effective for low to medium heat applications.

***Emissions reductions:*** *Aotearoa New Zealand prioritises reducing emissions in the most economically efficient way. The pace of emissions reductions will need to support Aotearoa New Zealand's emissions budgets and 2050 emissions targets.*

A number of the paper assumptions are problematic. For example, the paper makes a claim that "consumers, particularly businesses, purchasing gas may be willing to pay a small premium for biogas". Why would consumers and business wish to do so, when lower cost alternatives such as heatpumps, are already available and cost effective?

***Energy Equity:*** *Adverse and unexpected effects on fossil gas consumers are prevented or mitigated and consumers retain access to affordable, reliable and abundant energy. This includes minimising the broader effects on prices paid by consumers, as well as pricing of inputs for businesses as we transition.*

Beyond addressing the desired sustainability and emissions reduction outcomes of the paper, HCC strongly supports the need for support packages, to reduce switching costs for existing residential customers, as per page 26.

Providing a financial incentive would help to enable gas users to make the switch to electric or other low carbon alternatives. If combined with other market signals, this option would be expected to result in an overall decrease in New Zealand's emissions, as the number of homes and businesses using fossil gas would gradually decrease over time.

In addition, support packages would help to avoid those that are less financially able, getting locked into higher emitting forms of energy that are forecast to increase in cost over time. "As demand declines, the fixed costs of maintaining the pipeline network will be shared between fewer consumers, creating the risk of gas becoming increasingly expensive for consumers" (page 26). Further increases in carbon prices will also impact the affordability of gas in the future. This should include a consideration of the impact on renters as they don't have the ability to choose to avoid gas but still have to pay for its use. An incentive for landlords to make the change to support their tenants should be considered.

With this in mind, to allow new investment in gas reliant technology at a time were signals point to gas' financial and environmental impacts becoming increasingly unjustifiable, is not aligned with the intended outcome to prevent or mitigate adverse effects on fossil gas consumers.

[i] Lebel, E. D., Finnegan, C. J., Ouyang, Z., & Jackson, R. B. (2022). Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes. Environmental Science & Technology