

Online submission at: <https://engage.vic.gov.au/towards-2050-gas-infrastructure-zero-emissions-economy>

**To Infrastructure Victoria regarding Towards 2050: Gas infrastructure in a zero emissions economy interim report,**

Environment Victoria welcomes the opportunity to make a submission on *Towards 2050: Gas infrastructure in a zero emissions economy interim report*.

Environment Victoria (EV) is an independent and not for profit organisation that has been campaigning to look after Victoria's environment since 1969. With more than 40-grassroots member groups and 200,000 individual supporters, Environment Victoria is a growing community of Victorians standing up for a safe climate, healthy rivers, and a sustainable future.

We recently made a submission to the Department of Environment, Land, Water and Planning regarding Victoria's Gas Substitution Roadmap Consultation Paper which covers many relevant issues related to this submission. To avoid duplication and to add context, that submission will be attached as an appendix and should be considered integral part of this submission.

Our view is that while there is a degree of flexibility for mixing different sources of energy to replace gas, Victoria should aim to:

1. **Set a trajectory to effectively transition away from gas in the shortest possible time.** The gas industry, all through its supply chain, is a major contributor to climate change. By phasing out gas we will not only reduce our emissions from our gas consumption, but we will also prevent further emissions through the gas supply chain and reduce or avoid the local environmental impacts around gas supply projects and infrastructure.
2. **Take immediate advantage of mature and affordable technologies.** For gas uses where mature alternative solutions already exist and are capable of delivering emissions reductions, such as space- and water-heating heat pumps, their adoption should be incentivized immediately, rather than waiting for potential alternatives such as hydrogen to be truly market-ready. Uncertainty around the best solutions for some types of gas consumption cannot be used as a reason to delay clear no-regrets pathways such as buildings electrification.
3. **Drive critical amendments to planning schemes and building codes.** Technology alone will not help us reduce our emissions in line with what is needed to avoid the worst consequences of climate change. We need to update our planning schemes, building codes and plumbing regulations so these are consistent with our long-term and interim emissions targets and that these play a facilitating role in reducing emissions in the transition away from gas. At the very minimum we should immediately eliminate regulations that mandate or incentivise household gas connections. The Victorian government should also go further and set a requirement for new buildings to be-all electric. Short of a state-wide requirement for all-electric buildings, local councils should be encouraged to amend planning schemes to require all-electric buildings in their local government area.
4. **Support low-income households to transition away from gas.** Certain alternatives such as electric heat pumps have extremely low operating costs but currently have high upfront costs. Without targeted support vulnerable Victorians could end up stuck with expensive-to-run gas heaters while those who can afford it transition to cheaper, healthier and cleaner alternatives. Efforts to substitute gas should aim to alleviate energy poverty among vulnerable Victorians rather than

entrenching it. We note that the four-year heater replacement rebate scheme announced in November 2020 by the state government is targeted a low to mid income homes. We would like to see this kind of scheme expanded over time to reach more households and extend to different types of household gas appliances.

**Do you have any further information, evidence, or concerns that you wish to raise in relation to the scenario design and analysis?**

All scenarios modelled by Infrastructure Victoria assume that overall gas consumption in Victoria will reach 233 PJ by 2030 which is actually 5.9% higher than the amount of gas consumed in Victoria last year (220 PJ)<sup>1</sup>. It is a great missed opportunity to not have modelled and scenario which included immediate and deep efforts to reduce the emissions from the gas sector.

This is particularly concerning under the light of Working Group I Contribution to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report<sup>2</sup> which has highlighted the urgent need to deeply reduce our emissions within the next decade. There is a narrow path to avoid climate catastrophe and to do so we need to immediately engage in profound emissions reductions.

According to the Climate Council, an appropriate response to the IPCC report would be for Australia to reduce its emissions by 75% below 2005 levels by 2030, and achieve net zero emissions by 2035.<sup>3</sup> With gas currently contributing 17%<sup>4</sup> to Victoria's emissions, we urge the Victorian government to, regardless of the chosen scenario to replace gas, adopt a rapid transition away from gas. In light of existing evidence it is clear that rapid climate action should take priority over maximizing the use of gas infrastructure.

One thing that is not openly addressed in the designed scenario is the economic impact of low-carbon fuels on households. Existing evidence has shown that all-electric households are already cheaper than gas in Victoria.<sup>5</sup>

This difference between the cost of gaseous fuels and electricity will most likely increase under the proposed scenarios, as 'low-emissions fuels' tend to be even more expensive than fossil gas and are projected to stay that way for the foreseeable future. Bio-methane tends to cost \$20-40/GJ which is several times higher than current gas prices, and would heavily impact vulnerable Victorians and price sensitive industries.

This is not expected to change substantially over the next decades. According to the International Energy Agency *'there are limited prospects for major reductions in the cost of producing biomethane. The technologies for biogas production and upgrading are relatively mature although there may be higher*

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<sup>1</sup> [https://aemo.com.au/-/media/files/gas/national\\_planning\\_and\\_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en](https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en)

<sup>2</sup> <https://www.ipcc.ch/report/ar6/wg1/>

<sup>3</sup> [https://www.climatecouncil.org.au/wp-content/uploads/2021/08/IPCC-6AR-WGI-Explainer\\_updated.pdf](https://www.climatecouncil.org.au/wp-content/uploads/2021/08/IPCC-6AR-WGI-Explainer_updated.pdf)

<sup>4</sup> <https://www.infrastructurevictoria.com.au/wp-content/uploads/2021/07/Accenture-Gas-Infrastructure-Advice-International-Comparisons.pdf>

<sup>5</sup> [https://renew.org.au/wp-content/uploads/2018/08/Household\\_fuel\\_choice\\_in\\_the\\_NEM\\_Revised\\_June\\_2018.pdf](https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf)

*potential to bring down the cost of biomass gasification*'.<sup>6</sup> While there might be opportunities to use biogas on-site or for certain uses, it seems to be a prohibitively expensive fuel to be used system-wide.

On the other hand, while green hydrogen might play an important role for hard-to-abate uses, the reality is that its outlook in the absence of carbon pricing is not promising. Even in the long term (up to 2050) it is projected to be more expensive than existing technologies for residential users.

In fact, according to a report prepared by Advisian, commissioned by the Clean Energy Finance Corporation green hydrogen *may be* competitive to the natural gas network by 2050 for residential and commercial customers (albeit still a bit more expensive).<sup>7</sup>

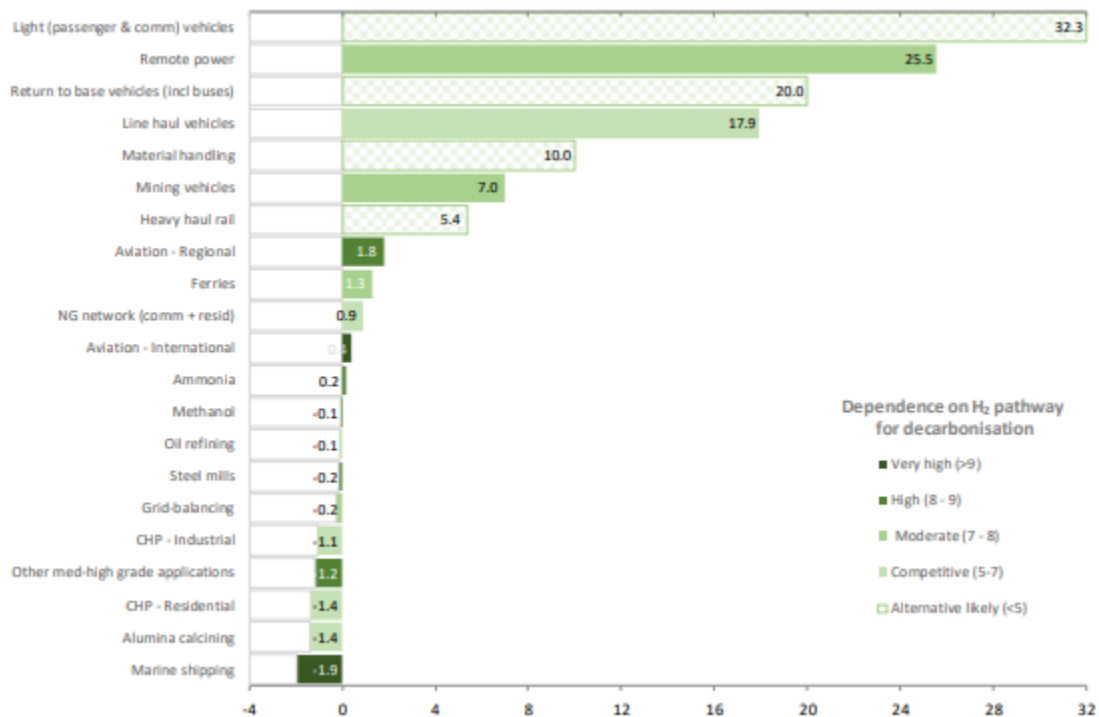


Figure 1: Economic gap (2050) by industry (\$/kg) Source: Advisian (2021)

This graph shows the economic gap between likely delivery price and capacity to pay, based on incumbent technologies. Positive scores show where green hydrogen could be economically competitive. This graph does not compare hydrogen to other decarbonisation alternatives such as electrification, where the gap might be wider.

In other words, if the Victorian government chooses to bet on green hydrogen and/or biomethane to replace fossil gas, it will come at a cost to residential and commercial users. In effect, these users would have to pay for fuels that will, at the very least, be more expensive than the gas currently available (which in turn is more expensive than efficient electric appliances)

Replacing an expensive fuel with other even more expensive fuels will negatively impact vulnerable Victorians who would be better served with efficient electric appliances. Avoiding these impacts should be prioritised over efforts to maintain the value of existing gas infrastructure.

<sup>6</sup> <https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/sustainable-supply-potential-and-costs>

<sup>7</sup> <https://www.cefc.com.au/media/nkmljvkc/australian-hydrogen-market-study.pdf>

Finally, even if Victoria were to pursue a scenario which does not rely on green hydrogen, this does not mean that the Victorian government should stop investing in developing a hydrogen economy. Given the abundant and low-cost renewable energy that is increasingly becoming available in Victoria, it makes sense for Victoria to electrify buildings but to develop a hydrogen industry focused on other energy needs and export opportunities. In effect, according to the Hydrogen Council, hydrogen will be a competitive decarbonisation alternative in parts of the globe where consumers don't have clean power alternatives or where they prove more expensive than hydrogen.<sup>8</sup>

### **Do you have any further information or evidence that can help identify an optimum scenario for a net zero emissions gas sector in 2050?**

Renew's (then called Alternative Technology Association) report, Household Fuel of Choice (2018)<sup>9</sup> showed that homes using efficient electric appliances were already cheaper to run than those using gas appliances. This gap is expected to grow as biogas and green hydrogen are expected to be more expensive than fossil gas and should be accounted for when identifying an optimum scenario for a net zero emissions gas sector in 2050.

Advisians' report, Australian Hydrogen Market Study (2021)<sup>10</sup> forecasts that 'low carbon' hydrogen will remain slightly more expensive than gas even by 2050. The gap by with efficient electric appliances will likely be even wider by then.

California's Energy Commission report, The Challenge of Retail Gas in California's Low Carbon Future (2020)<sup>11</sup> analyses different paths for decarbonisation of the gas network in California. Among some of its main takeaways is that low-carbon fuels could be 4-7 times more expensive than current Californian gas prices by 2050 and found out that scenarios with more building electrification have lower total societal costs.

### **Q3. What policies and/or regulations, if any, are needed to support the development of low carbon pathways such as biogas, green hydrogen, and carbon capture and storage?**

We urge the Victorian government to refrain from relying on carbon capture and storage as a solution to emissions from fossil fuels. CCS for decades has overpromised and underdelivered emissions reductions<sup>12</sup> while providing a lifeline to the fossil fuel industry.

Regarding low carbon pathways such as biogas and green hydrogen we consider that further evidence on their price forecast and how it compares to the cost of electrification for buildings in Victoria should be laid out. While biogas and green hydrogen might support the gas infrastructure and hard-to-abate sectors, existing evidence stacks against their wide use for a region such as Victoria where renewables are abundant and low-cost.

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<sup>8</sup> [https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness\\_Full-Study-1.pdf](https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf)

<sup>9</sup> [https://renew.org.au/wp-content/uploads/2018/08/Household\\_fuel\\_choice\\_in\\_the\\_NEM\\_Revised\\_June\\_2018.pdf](https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf)

<sup>10</sup> <https://www.cefc.com.au/media/nkmljvkc/australian-hydrogen-market-study.pdf>

<sup>11</sup> <https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf>

<sup>12</sup> <https://iopscience.iop.org/article/10.1088/1748-9326/abd19e/meta>

**What is your view on the best ways to maintain the reliability and affordability of Victoria's gas supply if natural gas use declines?**

It is important to have a managed transition. We encourage the Victorian government to have targeted retirement of sections of gas pipelines (further incentives to replace gas appliances could be geographically bounded) to reduce system and customer costs.

Targeted or zonal electrification to reduce the gas distribution infrastructure could ameliorate the impacts of the gas transition on users, but research would be needed to comprehend the scope, scale, speed and challenges of trying to manage gas distribution system costs through a gas phase out in Victoria.

**How can the use of Victoria's existing gas infrastructure be optimised during the transition to net zero emissions, over the short (10 years), medium (20 years) and long-term (30+ years)? How can the Victorian Government assist in this?**

As stated before, focusing on a managed transition could provide the best of both worlds by allowing for a fast transition while minimizing the costs on the system and users. This would also allow for optimising the use of existing gas infrastructure during the transition in zones where 'strategic' gas consumption exist (such as hard to abate sectors).

Nevertheless, it is crucial that optimising the use of existing gas infrastructure is not prioritised over the imperative to deeply reduce Victorian GHG emissions over the short term. We are amidst a climate crisis with no precedents in human history and it would be a massive failure if the Victorian government decides that there is more value in maximising the use of existing gas infrastructure than in climate action.

**What principles should apply or what measures will be needed to manage the impacts of gas decarbonisation on households and businesses?**

Just transition. It is crucial that the transition improves the standing of vulnerable Victorians to reduce energy poverty in the state and that it does not leave any Victorian behind. To ensure so it will be key that the Victorian government works actively to address barriers to the adoption of energy efficiency measures and efficient appliances.<sup>13</sup>

Equitable allocation of the transition costs. As the number of gas users decreases the costs will have to be allocated among a smaller pool of users. Paired with support for households and businesses to switch away from gas, the Victorian government could provide some economic support through the transition to those businesses that are unable to transition away from gas until the barriers for the adoption of other sources of energy are lifted for those users.

The Victorian government will also have to address the lack of timely trusted information. Victorians urgently need an information campaign, so they can be aware of the impacts of gas on their budgets, health and on the environment, and the advantages of other alternatives such as electrification.

**Q8. What policies, programs and/or regulations should the Victorian Government consider or expand to encourage households, commercial buildings and small businesses to reduce their gas use?**

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<sup>13</sup> <https://environmentvictoria.org.au/wp-content/uploads/2018/07/Energy-Efficiency-Roadmap-June-18-Final.pdf>

Firstly, the Victorian government should update planning schemes and building codes as soon as possible. The regulatory framework for buildings is outdated and is locking Victorians into gas, an expensive and polluting fuel. Specifically:

- a. Victoria's Planning Provisions and Plumbing regulations to be updated urgently so no new development is forced to connect to the gas network and no Victorian is forced to use gas appliances.
- b. The Victorian government should commit to building all-electric social housing, as it will yield the greatest benefits for residents, the energy system and for the development of the industry.
- c. A plan to require new buildings to be all-electric, or at least strongly incentivise it, should be developed to ensure that virtually all, if not all, new buildings in Victoria are fully powered by electricity by 2023.

Secondly, programs such as the replacement of inefficient heaters for heat pumps should be expanded and having a goal to at least replace the 600,000+ ducted gas heaters in Victoria that are more than 20 years old.<sup>14</sup>

Finally, the Victorian government should consider launching a new version of the Environment and Resource Efficiency Plans Program which was administered by the EPA until 2013. This program was compulsory for our 200 largest users of gas, electricity and water. A key measure of this program was the mandatory implementation of efficiency measures that have a payback period of 3 years or less.

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<sup>14</sup> <http://environmentvictoria.org.au/wp-content/uploads/2020/06/Vic-Gas-Market-Demand-Side-Study-Final-Report-1.pdf>

## APPENDIX.

### Environment Victoria's Submission to Victoria's Gas Substitution Roadmap Consultation Paper

Online submission at: <https://engage.vic.gov.au/help-us-build-victorias-gas-substitution-roadmap>

#### **To the Department of Environment, Land, Water and Planning regarding Victoria's Gas Substitution Roadmap Consultation Paper,**

Environment Victoria welcomes the opportunity to make a submission on Victoria's Gas Substitution Roadmap Consultation Paper.

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Our view is that Victoria's gas substitution roadmap should:

1. **Set a trajectory to effectively transition away from gas in the shortest possible time.** The gas industry, all through its supply chain, is a major contributor to climate change. By phasing out gas we will not only reduce our emissions from our gas consumption, but we will also prevent further emissions through the gas supply chain and reduce or avoid the local environmental impacts around gas supply projects and infrastructure.
2. **Take immediate advantage of mature and affordable technologies.** For gas uses where mature alternative solutions already exist and are capable of delivering emissions reductions, such as space- and water-heating heat pumps, their adoption should be incentivized immediately, rather than waiting for potential alternatives such as hydrogen to be market-ready. Uncertainty around the best solutions for some types of gas consumption cannot be used as a reason to delay clear no-regrets pathways such as household electrification.
3. **Drive critical amendments to planning schemes and building codes.** Technology alone will not help us reduce our emissions in line with what is needed to avoid the worst consequences of climate change. We need to update our planning schemes, building codes and plumbing regulations so these are consistent with our long-term and interim emissions targets and that these play a facilitating role in reducing emissions in the transition away from gas. At the very minimum we should immediately eliminate regulations that mandate or incentivise household gas connections. The Roadmap should also go further and set a requirement for new buildings to be-all electric. Short of a state-wide requirement for all-electric buildings, local councils should be encouraged to amend planning schemes to require all-electric buildings in their local government area.
4. **Support low-income households to transition away from gas.** Certain alternatives such as electric heat pumps have extremely low operating costs but currently have high upfront costs. Without targeted support vulnerable Victorians could end up stuck with expensive-to-run gas heaters while those who can afford it transition to cheaper, healthier and cleaner alternatives. Efforts to

substitute gas should aim to alleviate energy poverty among vulnerable Victorians rather than entrenching it. We note that the four-year heater replacement rebate scheme announced in November 2020 by the state government is targeted a low to mid income homes. We would like to see this kind of scheme expanded over time to reach more households and extend to different types of household gas appliances.

## **I. Victoria's context.**

As the consultation paper points out Victoria is the largest consumer of residential gas in Australia and the largest consumer of domestic gas (excluding LNG exports), using 214 PJ per year.

This high level of gas consumption is problematic for several reasons (I) Gas is a polluting fuel and contributes around 15.8% of Victoria's total emissions; (II) Dwindling Victorian supply means that unless we drastically reduce our consumption there is pressure to either approve environmentally damaging new gas extraction projects or import terminals in Victoria; and (III) Gas is an expensive fuel which is mostly burned in inefficient households appliances, increasing the risk for many Victorians to fall into energy poverty.

### **1. Gas is a polluting fuel.**

For millions of Australians climate change is not a distant future threat but a current dangerous reality. In the last decade we have suffered what might be the worst drought in Australian history, which has ravaged our farmers and pushed the Murray-Darling river system to its limit.

This drought – exacerbated by climate change – also created the dry conditions that fueled the devastating bushfires in summer 2019/20. Lives were lost, rural communities destroyed, pristine areas of bush were lost, and an estimated three billion wild animals were killed or displaced.

These record-breaking drought and bushfires happened after a global average increase of 1.1 degrees Celsius since preindustrial times.

Policies currently in place around the world would lead to warming of almost three degrees<sup>15</sup> – an outcome that the Australian Academy of Science<sup>16</sup> says would be devastating to our people, our economy and our ecosystems.

In Victoria, observations of rising temperatures and declining rainfall are already tracking<sup>17</sup> against the worst-case scenarios. Reaching two degrees of warming would likely mean 50 degree days in Melbourne, with significant impacts on human health and productivity, to say nothing of the extreme bushfire risk.

The once-held view of gas being a 'bridge fuel' has largely been abandoned, with mainstream energy analysts acknowledging the need to transition away from gas concurrently to other fossil fuels. According to the International Energy Agency's (IEA) *Net Zero by 2050, A Roadmap for the Global Energy Sector* by

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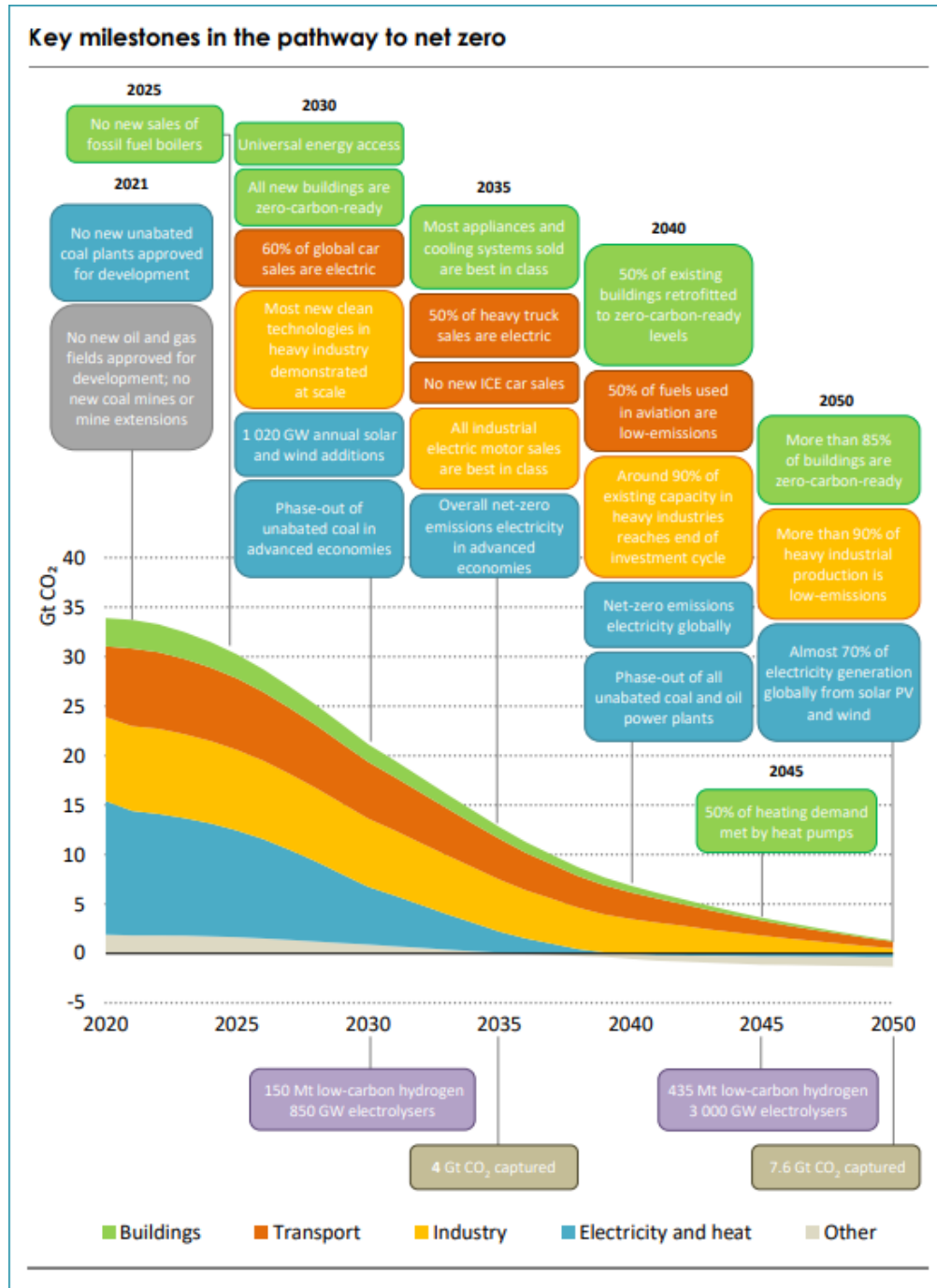
<sup>15</sup> <https://climateactiontracker.org/global/temperatures/>

<sup>16</sup> <https://www.science.org.au/supporting-science/science-policy-and-analysis/reports-and-publications/risks-australia-three-degrees-c-warmer-world>

<sup>17</sup> [https://www.climatechange.vic.gov.au/\\_\\_data/assets/pdf\\_file/0029/442964/Victorias-Climate-Science-Report-2019.pdf](https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0029/442964/Victorias-Climate-Science-Report-2019.pdf)



2050 (2021)<sup>18</sup> we need to make radical changes now to achieve carbon neutrality by 2050. These include no new gas fields approved for development from this year onwards and in buildings and ban on sales of new fossil fuel boilers need to start introduced globally in 2025 (see chart below). Advanced economies such as Victoria should be considering a ban of fossil fuel boilers ahead of the IEA’s global 2025 deadline.



<sup>18</sup> [https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector\\_CORR.pdf](https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf)

## 2. Victorian gas supply is diminishing – reducing demand can be the answer.

A big part of Victoria's gas production comes from legacy gas fields which are mostly nearing depletion. As a result, Victorian annual production is expected to materially decrease in the next couple of years. AEMO's Gas Statement of Opportunities (GSOO) 2021 shows that the anticipated Port Kembla gas import terminal in NSW will secure gas supplies in Victoria until 2029. Due to the highly seasonal gas demand in Victoria (driven by residential and commercial heating) any decrease in annual supply will be felt the most during peak consumption days during winter.

Until very recently, the approach to potential falls in gas supply was to search for new additional gas supplies. This has been exemplified by the state government's lifting, in March 2020, of the moratorium on onshore gas exploration, which was established in 2012 and renewed in 2017.

In addition to the onshore gas exploration moratorium being lifted, concerns around gas shortfalls have created the conditions for gas import terminals being proposed in Victoria. While AGL's plans to build a gas import terminal in the Westernport Bay Ramsar site were rejected, there are still 2 other gas import terminals proposed in Victoria. The main argument given by the proponents, Viva Energy and Vopak respectively, is that their projects are required to meet a projected gas supply gap.<sup>2021</sup> As an aside, it is worth noting that the gas imported via these proposed Floating Storage and Regasification Units would likely come from fracking projects. While fracking is permanently banned in Victoria, allowing imported gas would effectively be supporting fracking projects elsewhere.

Despite this tendency to think predominantly about supply-side solutions, there is huge potential for improving energy security in Victoria through demand-side solutions. How policies and programs to reduce gas consumption can help avoid any forecast supply gaps.

## 3. Gas is an expensive fuel.

Since the opening of LNG export terminals on the east coast, domestic gas prices have soared, and during long periods even above global prices. This suggests that at best there is a market failure and at worst a cartel manipulating increasing domestic gas prices. Domestic consumers paid up to 71% more for gas than they should have during 2019<sup>22</sup>. This has severely impacted energy intensive industries and households which were used to Australian gas prices being below global prices.

This winter, Victorian industry has been shocked with gas prices hitting a record \$58.44/GJ (more than seven times this year's average price), for a four-hour period on Friday July 9. By contrast, wholesale

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<sup>19</sup> [https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroBy2050-ARoadmapfortheGlobalEnergySector\\_CORR.pdf](https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf)

<sup>20</sup> <https://www.vivaenergy.com.au/energy-hub/gas-terminal-project/about-our-project>

<sup>21</sup> <https://www.reuters.com/article/uk-australia-lng-imports-vopak-idUKKBN2B9009>

<sup>22</sup> <https://ieefa.org/ieefa-update-australian-consumers-paying-71-more-for-gas-on-average-than-government-inquiry-says-they-should-be-paying/>

electricity prices are at a nine-year low.<sup>23</sup> This, in turn, has impacted residential customers who saw their electricity bills fall by 4.8% during 2020<sup>24</sup>, because of increasing amounts of renewable energy. While gas prices have impacted electricity prices,<sup>25</sup> the trend is for electricity to rely less on gas as more renewables and storage come in.

The consequence is that electricity is clearly becoming the cheaper source of energy and as the percentage of renewables in the grid increases, contrary to what many commentators predicted, gas is being displaced due to its high cost. Gas powered generation is forecast to decrease by around 70% over the next five years<sup>26</sup>. This suggests that the price decoupling between electricity and gas should go further and if the current trend continues electrifying homes will become increasingly attractive from a household finance perspective.

#### **4. Victorians lack adequate information about gas.**

Victorians currently lack clear information regarding the environmental and economic impacts of gas compared to electricity in Victoria.

While studies have shown that using efficient electric appliances in Victoria is cheaper<sup>27</sup> and emits less GHG emissions than using gas appliances<sup>28</sup>, this information has yet to reach the wider public. This could be due to historical reasons such as gas being a cheap fuel prior to the opening of LNG export terminals in the east coast, and how gas appliances were a less polluting alternative to electric appliances in the absence of renewables and heat pumps and when Victoria's electricity grid had a much lower share of renewables.

We recently surveyed individuals in our supporter base to capture their perspectives and observations regarding gas in Victoria. This is not a scientific survey, nor one taken from a representative sample of the population – it is gathering views from those who care deeply about Victoria being a leader in climate change – but the findings are still telling.

Among those surveyed only 40% were aware that efficient electric appliances are cheaper to run than gas appliances.

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<sup>23</sup> <https://www.energy.gov.au/news-media/news/wholesale-electricity-prices-nine-year-low>

<sup>24</sup> <https://www.accc.gov.au/system/files/Inquiry%20into%20the%20National%20Electricity%20Market%20-%20May%202021%20report%20v2.pdf>

<sup>25</sup> <https://reneweconomy.com.au/winter-energy-price-shock-regulators-and-policy-makers-are-to-blame/>

<sup>26</sup> [https://aemo.com.au/-/media/files/gas/national\\_planning\\_and\\_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en](https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en)

<sup>27</sup> <https://renew.org.au/research/all-electric-solar-homes-save-thousands-over-gas-report/>

<sup>28</sup> <https://renew.org.au/renew-magazine/efficient-homes/emissions-intensity-of-household-electricity-vs-gas/>

## What are your thoughts on gas vs efficient electric appliances on operating costs?

Gas appliances are cheaper to run.	156	<b>11%</b>
Efficient electric appliances are cheaper to run.	576	<b>40%</b>
They are about the same.	122	<b>8%</b>
Not sure / haven't compared.	595	<b>41%</b>

Regarding the GHG emissions impact 43% of our supporters aren't aware of gas appliances being more GHG intensive than efficient electric appliances.

## What are your thoughts on gas vs efficient electric appliances in terms of greenhouse gas emissions?

In Victoria, gas appliances are better for the climate than efficient electric appliances.	85	<b>6%</b>
In Victoria, efficient electric appliances are better for the climate than gas appliances.	836	<b>57%</b>
They are about the same.	129	<b>9%</b>
Not sure.	424	<b>29%</b>

Despite this gap in knowledge those surveyed were very supportive of the Victorian developing a plan to phase out gas in Victoria.



More specifically, there is also strong support for the idea of requiring new homes in Victoria to be all-electric. It is probably safe to assume that this support would be even stronger if more respondents were already aware of the full range of benefits of electric appliances.



The gaps in knowledge among those surveyed are telling of a broader phenomenon: if these gaps in knowledge exist among environmentally minded people, they are likely to be even more prevalent among the general population. Any efforts to substitute gas as a fuel need to be paired with a strong education campaign so Victorians are fully cognisant of the advantages of replacing their gas appliances with efficient electric appliances.

## II. Comments on the proposed gas substitution pathways.

### 1. Improving energy efficiency.

Energy efficiency should be the cornerstone of Victoria’s gas substitution roadmap regardless of the chosen fuel mix to replace gas. While not a pathway to transition by itself, as it is key to not only consume less fossil fuels but to effectively phase them out, energy efficiency has the potential to reduce our

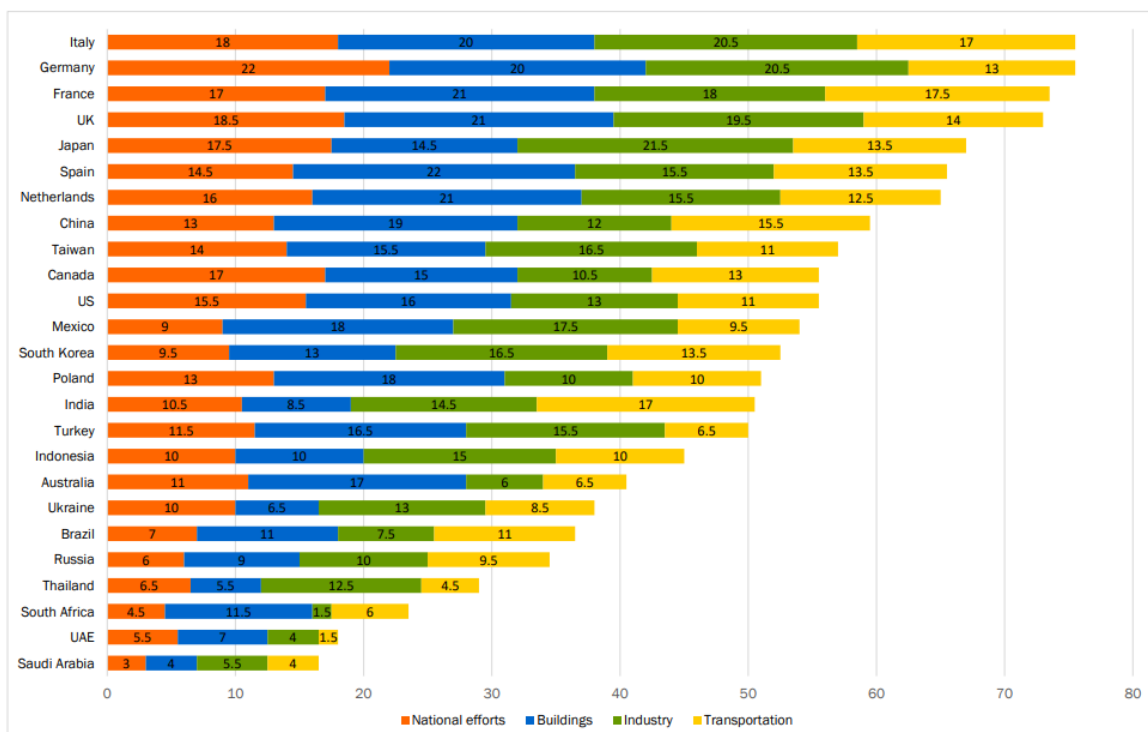
emissions, improve energy security, and support a thriving economy while delivering positive climate and social outcomes.<sup>29</sup>

Energy efficiency can slash household, commercial and industrial energy bills, make homes more climate resilient, and reduce the pressure on the system by reducing peak energy demand. In words of the International Energy Agency:

***“Energy efficiency can therefore play a crucial role in ensuring both long- and short-term energy security in a cost-effective manner.***

***Energy efficiency also reduces the likelihood of supply interruptions; the only energy source that cannot be interrupted is the energy that is not used.***<sup>30</sup>(emphasis added)

Further, despite significant recent efficiency policies in Victoria<sup>31</sup>, relative inaction from state and federal governments have left Australia severely lagging when it comes to energy efficiency. According to the American Council for an Energy-Efficient Economy (ACEEE) Australia ranks as the worst-performing major developed economy among the 25 largest energy users in the world. The upside of this reality is that there is vast room for improvement and for households and businesses to reap the benefits of a consuming energy in a smart way.



2018 International Efficiency Scorecard (American Council for an Energy-Efficient Economy 2018)

<sup>29</sup> <https://www.iea.org/topics/energy-efficiency>

<sup>30</sup> <https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/energy-security>

<sup>31</sup> <https://www.premier.vic.gov.au/making-victoria-renewable-energy-powerhouse>

Victoria is ahead of other states in that we already have a broad approach to improving household and commercial energy efficiency, through the Victorian Energy Upgrades program. We welcome the new targets that have been set for the program through to 2025, as well as the revision of emissions factors that will mean the VEU will no longer incentivise gas appliances. We continue, however, to mourn the loss of the Environment and Resource Efficiency Plans Program that was administered by the EPA until its early sunset in 2013. Participation in the program was compulsory for our 200 largest users of gas, electricity and water, and led to significant energy savings and bill savings for facilities that took part. A key element was mandatory implementation of efficiency measures that have a payback period of 3 years or less. An interim review of the program found that many facilities would not have implemented any efficiency measures were it not for the assistance of the EPA through the program.

Despite its multiple benefits, several barriers hamper the adoption of energy efficiency such as lack of adequate information, upfront costs, split incentives between landlords and tenants.<sup>32</sup> The National Construction Code 2022 is a critical opportunity for embedding improved energy efficiency in new homes. The Residential Tenancies Regulations (2021) are a step in the right direction, but a more comprehensive approach to improving the energy performance of rental homes is warranted. We look forward to the next steps in the government's commitment to introduce further energy efficiency standards for rental homes.

Another issue with energy efficiency – beyond the building shell - is the appliances themselves. Many household gas appliances are manufactured in Victoria. While we do not want to encourage the installation of additional gas appliances, it would be worth investigating whether the efficiency standards for gas appliances manufactured in Victoria could be improved. We have no information about how the efficiency of locally manufactured appliances compares with international standards or best practice, but this is something we should be leading on. Elsewhere in the submission we note that the government should support those local manufacturers to shift into the production of efficient electric heat-pump appliances.

## **2. Electrification.**

The push for electrification in the building sector is gaining momentum around the world with countries like the UK, Netherlands, more than 47 councils in California (USA), and the ACT taking steps to fully electrify buildings or at least some gas uses in buildings.

Mandating new buildings to be all-electric has gained momentum around the world as it is the most straightforward path to zero-carbon-ready buildings<sup>33</sup> (i.e. buildings that without any changes to itself or its appliances will become net-zero once the energy supply is carbon neutral). As our electric supply becomes increasingly decarbonised all-electric homes will reduce their emissions. Further, beyond climate mitigation, all-electric buildings have gained momentum due to other advantages over dual fueled homes.

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<sup>32</sup> <https://environmentvictoria.org.au/wp-content/uploads/2018/07/Energy-Efficiency-Roadmap-June-18-Final.pdf>

<sup>33</sup> A zero-carbon-ready building is highly energy efficient and either uses renewable energy directly, or uses an energy supply that will be fully decarbonised by 2050, such as electricity or district heat. IEA (2021) [https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector\\_CORR.pdf](https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf)

Energy costs in all-electric homes are lower than in households connected to the gas grid<sup>34</sup>, and recent reports have shown that gas appliances negatively impact human health, with the impact of gas cooking on childhood asthma being comparable to those of a smoking household<sup>35</sup>. Finally, mandating new buildings to be all-electric would further enhance energy security by putting a ceiling on residential and commercial gas consumption. According to AEMO, “*Tariff V consumption is forecast to increase, due to the number of new connections in the low-density population growth corridors on the fringe of Melbourne and regional towns that are expected to continue to install mainly gas appliances.*”<sup>36</sup> In the context of potential gas supply challenges, it makes sense to stop doing things that make this challenge more difficult - that is, allowing the on-going expansion of residential gas connections.

The viability and attractiveness of all-electric homes provides a clear path to address both climate challenges and energy security challenges.

But the potential for electrification goes beyond the building sector. As the prices of renewable electricity and electric equipment decrease the industry sector could take advantage of affordable and, in the near future, a low greenhouse gas energy source. According to consulting firm Mckinsey, almost 50% of energy consumed by industry could be already electrified<sup>37</sup>.

A further analysis of industrial gas use should be done in Victoria to understand how much of gas uses by industry in the state is used for feedstock, and how much corresponds to low (<100°C), medium (100-400°C), high (400-1000°C) and very-high (>1000°C) temperature heat. With that evidence in hand, it will become clear how much of Victoria’s industrial gas use can be cost-effectively electrified and what kind of incentives will be required to ensure we fully harness the electrification potential. As a reference, according to Beyond Zero Emissions’ *Electrifying Industry* report, Australia could reduce our greenhouse gas emissions by up to 8% by electrifying industry’s heat uses.<sup>38</sup>

### 3. Substituting natural gas with hydrogen.

Hydrogen has also gained momentum around the world. Different levels of government looking to take advantage of Australia’s abundant energy sources have developed Australia’s National Hydrogen Strategy<sup>39</sup> and Victoria’s Renewable Hydrogen Investment Plan<sup>40,41</sup> looking to tap into the potential of Australia to become a global leader in the emerging hydrogen economy.

One of the main risks around hydrogen is that some could consider it to be a clean fuel despite it being produced in a carbon intensive way. Hydrogen produced through brown coal gasification and from gas

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<sup>34</sup> [https://renew.org.au/wp-content/uploads/2018/08/Household\\_fuel\\_choice\\_in\\_the\\_NEM\\_Revised\\_June\\_2018.pdf](https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf)

<sup>35</sup> <https://www.climatecouncil.org.au/wp-content/uploads/2021/05/Kicking-the-Gas-Habit-How-Gas-is-Harming-our-Health.pdf>

<sup>36</sup> [https://aemo.com.au/-/media/files/gas/national\\_planning\\_and\\_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en](https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en)

<sup>37</sup> <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/plugging-in-what-electrification-can-do-for-industry>

<sup>38</sup> <https://bze.org.au/wp-content/uploads/2020/12/electrifying-industry-bze-report-2018.pdf>

<sup>39</sup> <https://www.industry.gov.au/data-and-publications/australias-national-hydrogen-strategy#:~:text=Australia's%20National%20Hydrogen%20Strategy%20sets,The%20hydrogen%20strategy%3A&text=outlines%20an%20adaptive%20approach%20that%20equips%20Australia%20to%20scale%20up%20quickly>

<sup>40</sup> <https://www.energy.vic.gov.au/renewable-energy/victorian-hydrogen-investment-program>

<sup>41</sup> To support the goals of this program the Victorian government has developed two grants programs, the Renewable Hydrogen Business Ready Fund and the Renewable Hydrogen Commercialisation Pathways Fund <https://www.energy.vic.gov.au/renewable-hydrogen/renewable-hydrogen>



relies on carbon capture and sequestration (CCS) to claim to be carbon neutral. This fact alone should raise questions regarding their viability as mitigation options as CCS has not lived up to its promises<sup>42</sup> - exemplified by the recent demonstration of Chevron's failure to capture and inject underground at least 80% of the carbon from the Gorgon LNG development.<sup>43</sup>

Further, even if CCS finally succeeded and emissions were mitigated, other environmental impacts of the fossil fuel industry would advise against this approach. In the Latrobe Valley, coal mining has already created significant geo-technical stability, water pollution and mine rehabilitation challenges, to the point where it is unclear whether or how any kind of satisfactory rehabilitation outcome can be achieved. Further, any potential coal-to-hydrogen industry would need to take on the rising financial burden of these rehabilitation requirements. For these reasons, we do not think there is any value in pursuing the production of hydrogen from brown coal.

Currently the production of hydrogen is responsible for around 830 million tonnes of CO<sub>2</sub> emissions per year, equivalent to the CO<sub>2</sub> emissions of the United Kingdom and Indonesia combined<sup>44</sup>. The hydrogen industry is expected to double by the end of the decade.<sup>45</sup> The current GHG emissions of the still-nascent hydrogen industry show the importance of directly developing green hydrogen rather than creating a larger hydrogen market built around fossil-fuel produced hydrogen with the hope that renewable hydrogen will eventually displace it. Nevertheless, the abundance of renewables in Victoria and Australia raises questions on the extent to which hydrogen will be locally competitive as a clean 'fuel' for some applications.

Green hydrogen produced by renewable-energy-powered electrolysis of water, the only true clean hydrogen alternative, is not a commercially available product yet. Green hydrogen prices are expected to drop as the technology matures and economies of scale develop, going from around \$3.88 per kilogram to \$2.81 per kilogram by 2030 according to the Clean Energy Finance Corporation. While this cost decrease is encouraging, according to CEFC green hydrogen will not be cost competitive to hydrogen produced with fossil fuels and without CCS until 2045 and will not achieve cost parity with natural gas before 2050.<sup>46</sup>

According to the same report, towards 2030 hydrogen **may** be commercially viable for 'mining vehicles' while out to 2050 hydrogen **may** be commercially viable for light vehicles, heavy haul rail, aviation regional, ferries, natural gas network (commercial and residential), international aviation and ammonia. From this report it follows that while hydrogen might become a valuable global commodity, it might not be an affordable alternative to replace our gas consumption in a timeline compatible with our need to reduce our GHG emissions.

Nevertheless, green hydrogen does not only compete with gas or other types of hydrogen. Even in a scenario where green hydrogen production costs decrease dramatically it will remain more expensive than electricity. In effect, hydrogen conversion losses during its production (hydrolysis efficiency is around 70%) and investment costs hydrogen will remain more expensive than the electricity it would be produced

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<sup>42</sup> <https://iopscience.iop.org/article/10.1088/1748-9326/abd19e/meta>

<sup>43</sup> <https://www.theguardian.com/environment/2021/jul/20/a-shocking-failure-chevron-criticised-for-missing-carbon-capture-target-at-wa-gas-project>

<sup>44</sup> <https://www.iea.org/reports/the-future-of-hydrogen>

<sup>45</sup> <https://resourceworld.com/hydrogen-production-to-double-by-2030/#:~:text=Global%20hydrogen%20production%20is%20forecast,from%20%24177.3%20billion%20in%202020.>

<sup>46</sup> <https://www.cefc.com.au/media/nkmljvkc/australian-hydrogen-market-study.pdf>

with. The likely high costs of hydrogen compared to electricity for final customers should be properly assessed as achieving clean but affordable energy is one of the key issues of the gas substitution roadmap is to transition the Victorian economy efficiently and equitably (emphasis added).

Further, scaling-up hydrogen production could have other unintended consequences and negatively impact the natural environment. Renewable hydrogen requires large amounts of water as every kilogram of hydrogen requires 9 kilograms of water to be produced. This risk has been highlighted by the UK's Climate Change Committee on its Independent Assessment of UK Climate risk.<sup>47</sup>

Due to the challenges that hydrogen faces and the need to rapidly decarbonise the gas sector, hydrogen should be reserved for those sectors of the economy that cannot be cost-effectively electrified. In words of Dr. Felix Matthes, Research Coordinator for Energy and Climate Policy at Öko-Institut we should strive for "As much electrification as possible, as much hydrogen as necessary".<sup>48</sup>

All of this said, we encourage the Victorian government to keep supporting the development of a local green hydrogen industry to take advantage of our abundant and low-cost renewables. According to the Hydrogen Council, hydrogen will be a competitive decarbonisation alternative in parts of the globe where consumers don't have clean power alternatives or where they prove more expensive.<sup>49</sup>

#### **4. Substituting natural gas with biogas.**

Biogas could help lower greenhouse gas emissions from some of the hardest sectors to decarbonize and support the transition away from fossil gas. While questions remain regarding its scalability and commercial viability, we encourage DELWP to fully assess the opportunities provided by this fuel – again noting that the potential future development of biogas should not cause the delay in the electrification of buildings.

A cautionary note would be that the production of biogas should be limited to collecting methane from landfills, sewage plants, animal manure and food waste. Other source of biogas such as energy crops could induce undesired land use changes.<sup>50</sup>

#### **5. Emerging technologies.**

For Victoria to thrive under a carbon neutral economy we should be able to harness new technologies and we should be prepared to support the development and adoption of promising new technologies. In any case this should be considered only for those uses which neither electrification nor hydrogen seem adequate.

Technology openness is key to achieve the best decarbonising pathway. In fact, some emerging technologies might prove cost competitive in the future, potentially complementing (and even competing with) electrification, energy efficiency and hydrogen. But as we urgently need to craft a plan to

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<sup>47</sup> <https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/>

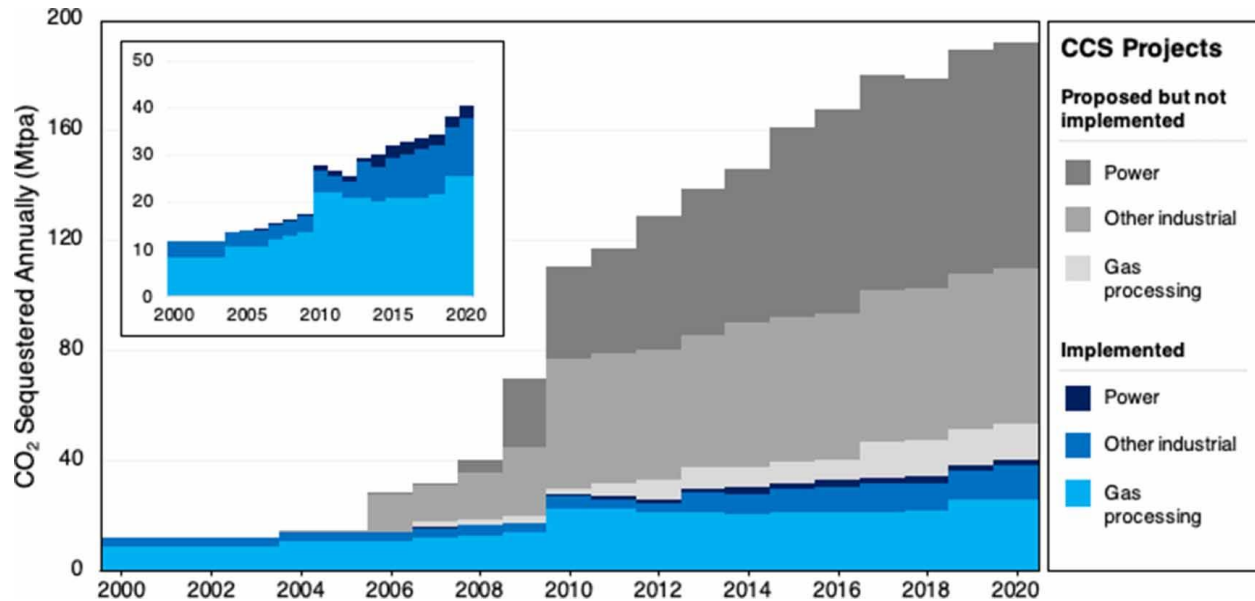
<sup>48</sup> <https://www.volkswagenag.com/en/news/stories/2021/01/as-much-electrification-as-possible-as-much-hydrogen-as-necessary.html#>

<sup>49</sup> [https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness\\_Full-Study-1.pdf](https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf)

<sup>50</sup> <https://energysustainsoc.biomedcentral.com/articles/10.1186/s13705-019-0227-y>

decarbonise gas, we cannot seriously assess technologies for which there is no clear timeline for them to be cost competitive.

Further, ‘technology openness’ should not be used as pathway to support technologies such as Carbon Capture and Storage which for decades has overpromised and underdelivered while providing a lifeline to the fossil fuel industry.<sup>51</sup>



Global proposed vs. implemented annual CO<sub>2</sub> sequestration (main figure), and global implemented annual CO<sub>2</sub> sequestration by type (inset). Both are in million tons of CO<sub>2</sub> per annum (Mtpa). More than 75% of proposed gas processing projects have been implemented. The corresponding figures for other industrial projects and power plant projects are approximately 60% and 10%, respectively

A prime example of the CCS industry failure is Chevron’s Gorgon LNG development. To be approved Gorgon LNG committed to store 100 million Tonnes of greenhouse gas emissions in one of the plants biggest CCS facilities. Five years later, the CCS facilities have not delivered, and Gorgon LNG failed its obligation to offset 80% of its GHG emissions.<sup>52</sup>

## 6. Addressing fugitive emissions.

Addressing fugitive emissions is important as all greenhouse gas mitigation alternatives should be pursued and we should address GHG emissions from the gas sector which in Victoria amount to up to 17% of the gas sector total emissions.

A key consideration is that measures to address fugitive emissions should be seen as a transitory measure and only adopted in the absence of a better decarbonisation alternative. For example, fugitive emissions arising from end uses (due to ageing and inefficient domestic appliances or its inefficient use) would be better addressed by replacing said gas appliances with efficient electric appliances rather than just marginally reducing the emissions from gas appliances.

<sup>51</sup> <https://iopscience.iop.org/article/10.1088/1748-9326/abd19e/meta>

<sup>52</sup> <https://www.ft.com/content/428e60ee-56cc-4e75-88d5-2b880a9b854a>

Nevertheless, this should not be considered a pathway but a mitigation effort. Fugitive emissions are only an issue for as long as gas is produced and consumed in Victoria, and the substitution roadmap ultimate goal should be to fully transition away from gas.

### **III. On the consultation paper's key issues**

#### **1. Maintaining electricity reliability**

Based on the overwhelming evidence it seems clear that a big portion if not virtually all residential and commercial buildings will end up electrified, and we need to plan accordingly. The implications on electrical infrastructure and the management of additional electrical are correctly stated as a key consideration for the Roadmap.

In any case the cost associated with improving the electricity grid should not be considered in isolation but against the total cost of upgrading the gas network and appliances so they can run on hydrogen while also considering the impact on customers of using an expensive fuel. Among the scenarios modelled by Infrastructure Victoria, by 2040 between 40% and 75% of gas pipelines will be decommissioned and between 80% and a 100% will be retired by 2050.<sup>53</sup> The cost of upgrading the energy system should be seen as whole rather than just evaluating the costs of maintaining electricity reliability.

Further, any network augmentation that needs to be approved for cost recovery by the Australian Energy Regulator will require a clear government policy direction. This introduces something of a Catch-22: without clear policy that the grid needs to be upgraded to accommodate greater electrification, the AER may not approve cost-recovery approaches, which means the grid isn't appropriately upgraded, which means governments may feel less confidence in creating policy that drives electrification. The Roadmap should set a clear enough direction for the future of Victoria's electricity network that regulators can approve investments in grid upgrades.

#### **2. Transitioning to more sustainable gaseous fuels with minimal disruption to end-users.**

The way we consume energy is changing dramatically. With the adoption of either electrification or hydrogen appliances there will be some level of disruption for end-users, so transitioning to more sustainable gaseous fuels should not be treated as necessarily having less disruption to end-users.

Further, converting the gas networks to accommodate more sustainable gaseous fuels should not be a framed as a desirable outcome but a mere possibility. If there is an environmental and economic case to do so the pipelines will be upgraded, otherwise the energy transition cannot be a second-fiddle concern to the interests of gas pipelines owners and operators.

#### **3. Maintaining the reliability, affordability and safety of gas supply.**

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<sup>53</sup> <https://www.infrastructurevictoria.com.au/wp-content/uploads/2021/07/Gas-Infrastructure-Advice-Interim-Report-FINAL-4.pdf>

As stated above, and acknowledged by the consultation paper, Victorian gas demand is highly seasonal, with winter demand being around 3 times that of summer, driven by space and water heating. Hence, targeted efforts to reduce our reliance on gas space and water heating would yield the highest bang for buck – from both emissions and gas supply security perspectives.

Phasing out gas for these uses should be the urgent priority as it will also support the reliability and affordability of gas for those uses that cannot be easily electrified such feedstock demand in manufacturing such as in plastics and alumina production and for high temperature industrial processes.

Analysis carried by Environment Victoria in March 2021 found that the Victorian government's program to replace 250,000 residential heaters over the next four years alone would reduce our daily winter gas consumption by 33-35 TJ/d - enough to avoid shortfalls in 1-in-2-year events<sup>54</sup> by 2024 as forecast in AEMO's 2020 Victorian Gas Program Report.<sup>55</sup> Our analysis also found out that disconnecting 600,000 gas heaters would balance energy demand even in a 1-in-20-year peak demand scenario by 2024. This type of program would eliminate the rationale behind gas import terminals whose main selling point is their ability to add flexibility to gas supply, lower winter gas consumption could be met with existing supply capabilities.

Considering the investment cycle of gas projects, together with the urgent need to reduce our emissions so Victoria does its fair share in global efforts to limit climate change to no more than 1.5 degrees of warming, it is imperative that Victoria looks further into tapping into this energy security opportunity. Reducing winter peak demand will also likely prevent price shocks such as those of early July when gas reached \$58.44 a gigajoule.

According to analysis by energy efficiency specialists Northmore Gordon (2019)<sup>56</sup>, commissioned by Environment Victoria, the state of Victoria could reduce its gas consumption by 98 to 113 PJ by 2030 through efficiency and electrification using existing technology and targeted economic support. This would benefit households, commercial users and industry. Possible solutions were tested against criteria relating to ease of implementation, cost and applicability. Some of the lower-cost and easier to implement measures such as replacing ageing ducted gas heaters, using existing air conditioners for space heating and promoting heat pump hot water systems, would address the key challenge of ensuring supply reliability during winter.

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<sup>54</sup> [http://environmentvictoria.org.au/wp-content/uploads/2021/03/EV-Briefing-Paper\\_Household-gas-heaters\\_1-March-2021-1.pdf](http://environmentvictoria.org.au/wp-content/uploads/2021/03/EV-Briefing-Paper_Household-gas-heaters_1-March-2021-1.pdf)

<sup>55</sup> [https://aemo.com.au/-/media/files/gas/national\\_planning\\_and\\_forecasting/vgpr/2020/2020-vgpr-update.pdf?la=en](https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2020/2020-vgpr-update.pdf?la=en)

<sup>56</sup> <https://environmentvictoria.org.au/2020/06/03/victorian-gas-market-demand-side-measures-to-avoid-forecast-supply-shortfall/>

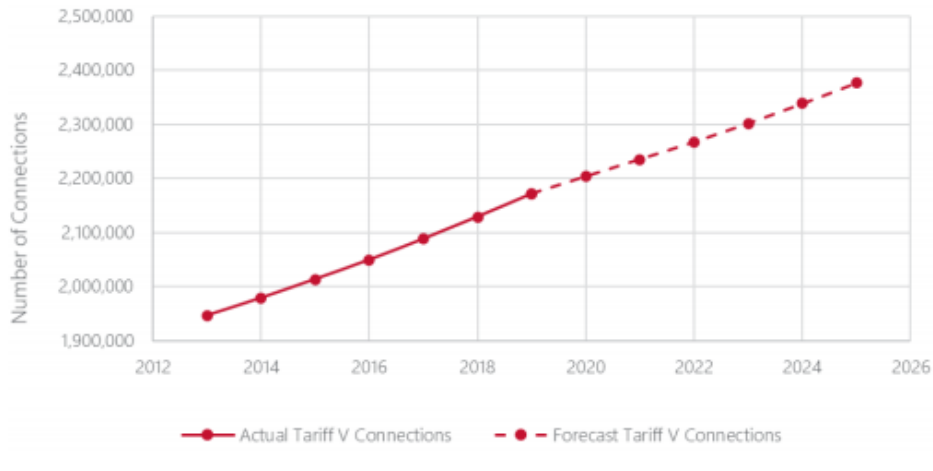
#	Technology	Sector	Ease of implementation	Cost	Applicability	Anticipated gas reduction (PJ/annum)
1	Replace ageing ducted gas heating systems	Residential	Easy	Low-Moderate	Broad	48 PJ
2	Improving building insulation <sup>8</sup>	Residential	Easy	Low	Broad	> 10 PJ
3	Use existing air-conditioners for space heating	Residential	Very easy	Zero cost	Some	5-15 PJ
4	Heat pump hot water	Residential	Easy	Low	Broad	10 PJ
5	Heat pump space heating	Commercial	Moderate	Moderate	Broad	7.75 PJ
6	Industrial gas efficiency	Industrial	Easy	Low	Broad	2.5 PJ to 5.5 PJ
7	Renewable process heating	Industrial	Moderate to hard	High	Some	13.6 PJ
8	High temperature heat pumps	Industrial	Moderate	Moderate	Some	1 PJ to 3.5 PJ
9	Induction cooktops	Residential	Easy	Moderate	Some	0.5 PJ
<b>Total gas demand reduction</b>					<b>98.35 PJ to 113.85 PJ</b>	

Summary of gas demand reduction measures. (Northmore Gordon 2020)

Further analysis should be done to assess the upgrades required by the electric grid to cope with increased demand, but the report shows the great potential for demand side measures to transform the way we consume energy within the next decade.

This would not be new for Victoria but accelerate an existing trend. In 2021's Victorian Gas Planning Report, AEMO forecast Tariff V (residential and commercial users) consumption to decrease by 4.6% by 2026 due to increased energy efficiency and the use of electric appliances in new high-density developments. This decrease would have been larger if it weren't for an increased number of connections to the gas network (see the chart below from the VGPR).<sup>57</sup> This highlights the importance of preventing or discouraging new household gas connections: even as individual gas users consume less, the growth in the number of users is offsetting existing efforts to manage gas demand.

<sup>57</sup> [https://aemo.com.au/-/media/files/gas/national\\_planning\\_and\\_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en](https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/vgpr/2021/2021-victorian-gas-planning-report.pdf?la=en)



Historical and forecast DTS Tariff V connections, 2013-2015 (AEMO 2021)

#### 4. Supporting Victoria’s workforce, industry and the institutions that support them.

The transition away from gas will most likely end up in a reduction in the percentage of energy that comes from gaseous fuels as electrification will replace a big share of current gas uses.

We encourage the Victorian government to invest in the Victorian TAFE and Training system to ensure those who currently work with gas pipes and appliances are ready to work with electric alternatives and low emissions gaseous fuels.

For gas-related work in households, we have anecdotal evidence that the growth in electrification will pose few problems to plumbers. The plumbing industry is becoming increasingly specialised, with gas-fitters being a smaller and smaller specialisation.

On the appliance manufacturing front, we encourage the Victorian government to work with local producers of gas appliances to help them move into producing efficient electric appliances.

We also urge the Victorian government to assess the impact on jobs of different alternatives to decarbonise the gas sector and the timeline of those impacts so an evidence based just transition plan can be developed so no Victorian gas worker is left behind. This might be required regardless of government intervention as existing gas fields are quickly depleting and conventional gas reserves are limited.<sup>58</sup>

#### 5. Managing uncertainty in the transition.

Managing uncertainty is key to climate policy. Nevertheless, solutions which have already been shown to be technically and economically viable should be prioritised and developed. We suggest the Victorian government should accelerate adoption of technologies and regulations when evidence is clear such as for electrification of residential and commercial space and water heating, and to adopt a precautionary and staged approach to decarbonising gas for those areas where evidence is not settled or where

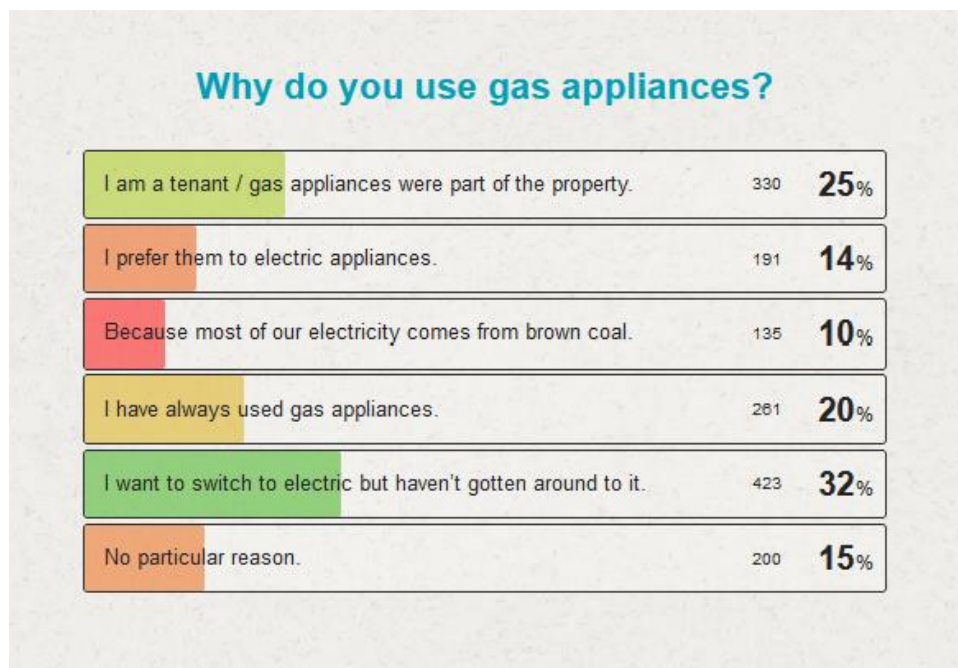
<sup>58</sup> [https://earthresources.vic.gov.au/\\_\\_data/assets/pdf\\_file/0020/613091/VGP\\_PR05-161926-Low-res.pdf](https://earthresources.vic.gov.au/__data/assets/pdf_file/0020/613091/VGP_PR05-161926-Low-res.pdf)

alternatives are not mature. Gas consumed in manufacturing such as in plastics and alumina production and for high temperature industrial processes might benefit from the latter approach.

Victoria's 'no regrets' approach and the objective of managing uncertainty in the transition are compatible with quick and targeted action such as stopping the expansion of the gas network and supporting the electrification of residential and commercial gas uses. This makes sense for reasons that transcend climate mitigation efforts. Electrifying these uses can deliver lower utility bills and eliminate health impacts associated with gas appliances, on top of liberating enough gas for hard-to-switch industries which will require it during the transition.

Regarding consumer preferences, it is crucial that current preferences regarding gas usage are not taken as immutable, especially when Victorians have been exposed to disingenuous marketing efforts by the gas industry, regarding gas' climate credentials<sup>59</sup>, how it is "guaranteed to make your food taste better"<sup>60</sup>, and even how it will provide superior hot showers.<sup>61</sup>

In a survey of our supporters (see chart below), there was certainly no strong preference for gas appliances. Indeed, the largest share of respondents want to switch to electric. Many are tenants of rental properties and don't get a say. We believe that consumer preferences will change rapidly.



The Victorian government should ensure that Victorians have access to reliable information regarding the real costs (for their budgets, their health and planet) of the gas industry. We are confident that many Victorians would be supportive of transitioning away from gas once they fully understand the consequences of its use for the climate and their utility bills. This would be in line with Victorian's attitude

<sup>59</sup> <https://www.theguardian.com/environment/2021/jun/30/climate-crimes-oil-and-gas-environment>

<sup>60</sup> [https://www.houzz.com.au/ideabooks/148692599/thumbs/serious-about-cooking-5-reasons-why-gas-is-the-way-to-go?fbclid=IwAR135xN7ljCibjvrlfqPP-EcaQC\\_0wtA9LFdrzcjTXfmK1RAMxhNvzZ50](https://www.houzz.com.au/ideabooks/148692599/thumbs/serious-about-cooking-5-reasons-why-gas-is-the-way-to-go?fbclid=IwAR135xN7ljCibjvrlfqPP-EcaQC_0wtA9LFdrzcjTXfmK1RAMxhNvzZ50)

<sup>61</sup> <https://www.theguardian.com/environment/2020/jul/04/steamy-showers-australian-instagram-influencers-post-natural-gas>



regarding climate change, with 78% thinking that climate change is an issue that requires urgent action now, 4 in 5 willing to take action to help tackle climate change and 9 in 10 believing that State Government should be taking action on climate change.<sup>62</sup>

A key point to manage uncertainty will be to develop the right regulatory framework for buildings. If Building Codes (such as the National Construction Code) and Planning Schemes incentivise or mandate new developments to be net-zero-ready, meaning they will be carbon neutral as soon as we reach net zero emissions electricity generation, it will be easier to implement the transition away from gas.

A first, and urgent step will be to eliminate existing regulations which force developments to connect to the gas network or households to use gas appliances. These regulations go against Victoria's interests as they increase the demand of gas in times when gas availability and affordability are a concern, lock Victorians into a polluting and expensive fuel, and potentially create a liability for the Victorian government to support these households in the future to transition away from gas.

The Victorian Planning Provisions mandate residential developments to connect to the gas network 'where available'.<sup>63</sup> Further, plumbing regulations in practice force solar water heaters to be gas-boosted when 'reticulated gas supply from a gas company is available'.<sup>64</sup> Fixing these regulations should be treated as a matter of the utmost urgency, regardless of the final approach to decarbonising the gas supply. Every additional home connected to the gas network today creates a headache tomorrow, especially when the evidence for new homes shows that all-electric is the most cost-effective option.

The next priority will be to update regulations so new developments in Victoria are, at the very least, net-zero-ready. In Victoria this would mean all-electric buildings as they would not require any kind of upgrade or further investment (from a household perspective) to become carbon neutral once Victoria's electric grid become fully powered by renewables. Updates should be made to ensure that no new buildings connect to the gas network by 2023 the latest, except in exceptional circumstances. In any case, the Victorian government should adopt a policy of supporting leading councils that choose to develop planning schemes amendments that go beyond these suggestions or that execute them in shorter timelines. These would create an opportunity to test-drive these reforms and would prepare the broader populations for the changes needed to decarbonise Victoria's residential and commercial energy consumption.

## 6. Just transition.

It is key that the transition away from gas is taken as an opportunity to alleviate energy poverty and reduce the impact of utility bills on vulnerable Victorians.

We suggest a staggered approach:

1. Electrify social housing at no cost for residents and ensure that all new social housing is all-electric, starting with Victoria's Big Housing Build. Retrofitting social housing could also be part of Victoria's

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<sup>62</sup> <https://assets.sustainability.vic.gov.au/susvic/Report-Climate-Change-Victorians-Perceptions-of-Climate-Change.pdf>

<sup>63</sup> <https://www.planning.vic.gov.au/schemes-and-amendments/browse-planning-scheme/planning-scheme?f.Scheme%7CplanningSchemeName=vpps>

<sup>64</sup> [https://content.legislation.vic.gov.au/sites/default/files/c9944133-841f-370f-9721-4645cbe0eae0\\_18-149sra003%20authorised.pdf](https://content.legislation.vic.gov.au/sites/default/files/c9944133-841f-370f-9721-4645cbe0eae0_18-149sra003%20authorised.pdf)

economy reactivation and to increase the workforce capacity to deliver the wide scale retrofitting that will be required to reduce our gas reliance.

2. Establish different levels of rebates to replace gas water heaters and cooking devices similarly to existing plan to replace inefficient gas heaters so those Victorians who don't want to support the gas network can fully electrify their homes.
3. Provide low-cost financing for households in higher income levels.
4. Establish a regulatory reform to building standards, establishing a timeline to phase out gas appliances, paired with targeted support to reduce the costs of acquiring electric appliances

#### **IV. Regarding framework assessment**

Overall the outcomes framework and multi-criteria assessment are adequate. Nevertheless we think is important to add a dimension of 'intergenerational justice' to the outcome framework measure of 'Affordability and equity'. Interventions, such as upgrading the electricity network to accommodate greater electrification, that could demand a higher initial investment could deliver access to cheaper fuels in the long-term and deliver greater benefits for future generations. There is an additional intergenerational justice point – that the opportunity to preventing catastrophic global warming is in the next decade. Failing to take this opportunity now, even if it comes with costs, will saddle future generations with almost unimaginable consequences.

Regarding 'Social licence' it is crucial that the Victorian government does not overly focus on the current level of community and consumer acceptance of alternatives to gas. The community perception of alternatives to gas will depend on their level of understanding of the economic, climate and health benefits of these alternatives. In this space the Victorian government main role is to provide reliable and accessible information to the community as the benefits of substituting are such that the community will most likely come aboard.

## Conclusion

We welcome the Victorian government efforts to develop a plan to phase out fossil gas, as doing so is crucial for Victoria's climate ambitions. But the chosen pathway, the speed of the substitution, and the impact of this program on vulnerable Victorians will determine whether the Roadmap is fit-for-purpose. For the Roadmap to fully live up to its potential we urge the Victorian government to:

1. **Urgently update planning schemes and building codes.** The regulatory framework for buildings is outdated and it needs to be urgently modernised to better serve Victoria's climate and energy policy. Specifically:
  - a. Within this calendar year the Victorian Planning Provisions and Plumbing regulations should be updated so no new development is forced to connect to the gas network and no Victorian is forced to use gas appliances.
  - b. Concurrently the Victorian government should commit to building all-electric social housing as it will yield the greatest benefits for residents, the energy system and for the development of the industry.
  - c. A plan to require new buildings to be all-electric, or at least strongly incentivise it, should be developed to ensure that virtually all, if not all, new buildings in Victoria are fully powered by electricity by 2023.
2. **Set a strong substitution target for 2030.** Aiming to substitute at least 50% of existing gas consumption with a particular focus on replacing gas space heating would deliver multiple benefits. Taking rapid action will not only contribute to Victoria's efforts to reduce its GHG emissions, but it will also rapidly reduce our reliance on gas, helping to increase energy security and benefiting those users that cannot easily switch off gas. To reach this target the Roadmap will have to promote the rapid adoption of tried and tested technologies for the next decade (with a focus on electrification) rather than to wait for alternatives which are not technologically mature or commercially viable. Analysis by Northmore Gordon, referred to above in this submission, has already mapped out a series of steps that will cut gas consumption by at least 50% by 2030.
3. **Take full advantage of the opportunity to address energy poverty in Victoria.** We encourage the Victorian government to see the Gas Substitution Roadmap as an opportunity to tackle energy poverty in Victoria. The Victorian Government has already addressed this point in existing energy efficiency and heater replacement programs, but much more can be done.
4. **Help Victorians prepare for a rapid shift away from gas.** There is an information gap that exists for many Victorians, and the government should take steps to fill this information gap. It should also support any upskilling of the installation workforce and a transition for gas extraction workers and appliance manufacturers.

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