



**To Victoria's Gas Substitution Roadmap Consultation,  
The Victorian Department of Environment, Land, Water and Planning (DELWP)  
C/- Gas.Roadmap@delwp.vic.gov.au**

**29 July 2021**

## **RESPONSE BY AUSTRALIAN INSTITUTE OF ARCHITECTS**

To whom it may concern,

The Australian Institute of Architects (the Institute) is pleased to see the Victorian Government set out on a pathway to strategically reduce the emission of greenhouse gases, and particularly carbon dioxide, through its Gas Substitution Roadmap.

The Institute places a very high value on action to reduce the impacts of climate change. In 2020 the Institute invited all of its 12,000 members in Australia (and our International Chapter) to take an ambitious step of commitment to a zero-carbon journey<sup>1</sup>. We note that:

- Australia's buildings generate 23 per cent of Australia's carbon emissions.
- Australia's building sector can deliver up to 28% of Australia's 2030 emissions reduction target.
- Architects are uniquely placed to help lead the transition to a carbon neutral future.

The Institute has called on the Australian Government to establish a national plan towards zero carbon buildings by 2030 that can be supported and led where appropriate by state and local government.

Our Institute's advice on sustainability in Victoria is led by the Victorian Chapter's Sustainable Architecture Forum who have assisted the preparation of this response. Members of the SAF are also currently representing the Institute as members of the Advisory Group and the Expert Working Groups informing the DELWP on the Environmentally Sustainable Development Roadmap.

Victoria's Gas Substitution Roadmap Consultation paper demonstrates that Victoria is the largest consumer of gas in the east-coast market accounting for more than one-third (37%) of domestic (local) gas consumption and with 61% of this occurring in residential and commercial (non-industrial) settings.

There is also a compelling case laid out in the consultation paper of the potential to replace current carbon-dioxide producing gases with low-carbon and renewable gases such as hydrogen and bio-methane, as well as exploit carbon-capture and storage. The consultation paper points out the need to upgrade the existing gas networks / infrastructure for pure hydrogen, as well as an interim strategy of injecting hydrogen to lower CO<sub>2</sub> emissions of existing natural gas without the need to upgrade current infrastructure. Biomethane – created by scrubbing CO<sub>2</sub> from biogas is also put forward as an interim solution.

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<sup>1</sup> <https://www.architecture.com.au/about/carbonneutral>

Despite the potential sourcing of biomethane from renewable biogas that does not involve unlocking carbon from fossil sources, the consultation paper does not acknowledge that like natural gas, methane is still a carbon containing molecule. Burning one molecule of methane in the presence of oxygen releases one molecule of CO<sub>2</sub> and two molecules of H<sub>2</sub>O (water).

The longer-term objective to convert to hydrogen, manufactured by electrolysis, will still rely upon on renewable electricity sources (e.g. wind, solar, hydro, tidal) in order to have "green" credentials. Sufficient renewable electricity production needs to be created equivalent to the petajoules of energy expected to be consumed from the burning of hydrogen.

The paper also recognises that two important pathways to abate gas-related CO<sub>2</sub> emissions are one of reducing overall energy consumption and another to promote electrification. Given the number of years it may take to refine or optimise hydrogen technologies and upgrade infrastructure, electrification seems to be a very important solution as it is capable of being implemented immediately.

There is a now large selection of electrification alternatives for appliances, for use in residential settings:

1. Induction cooktop versus gas cooktops
2. Electrical Heat pump versus gas or electric element hot water heaters. Victorian government rebates are currently available. Heating water comprises approximately 25 percent of household energy use in Australia
3. Electrical Hydronic heating that runs on heat pumps or air conditioning systems that runs on solar panels, or green power versus gas.

Our main recommendation is consistent with the consultation paper's intent that the Victorian Energy Upgrades (VEU) program should be used to support households and businesses to transition to zero gas use through a focus on electrification.

However the VEU program, as it currently operates, needs to be reoriented.

For example, the VEU program still provides substantial subsidies to upgrade older hot water services to gas-heated storage or instantaneous water-heater appliances. The subsidies for more expensive heat pump units are only marginally higher than for their equivalent size gas units<sup>2</sup>. Upgrades from electric (resistive element-based) hot water services to gas storage or instantaneous units attracts subsidies of \$420, \$810 and \$1,020 respectively for small medium and large units, while upgrading to a heat-pump hot water unit attracts subsidies of \$540 and \$870 only for small and medium units.

More disconcertingly, subsidies to upgrade to efficient reverse cycle heating appear to be only available for upgrades from other forms of electric (element) heating and/or cooling<sup>3</sup>. There are subsidies to upgrade from gas room heaters or ducted gas heaters, but only to other more efficient gas counterparts. There are not subsidies, for example, to upgrade from a gas room heater to a reverse cycle unit, nor from a ducted gas heating system to a reverse cycle unit or ducted reverse cycle system. Nor do the subsidies, for the indicated amounts, appear to subsidise upgrades to multipoint non-ducted reverse cycle units.

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<sup>2</sup> <https://www.victorianenergysaver.vic.gov.au/save-energy-and-money/victorian-energy-upgrades/save-with-these-energy-efficient-products/hot-water-systems>

<sup>3</sup> <https://www.victorianenergysaver.vic.gov.au/save-energy-and-money/victorian-energy-upgrades/save-with-these-energy-efficient-products/heating-and-cooling>

From an energy consumption perspective, these upgrades may appear to make some sense. They are nevertheless contradictory to the intent of removing fossil fuel derived gas appliances, with high CO<sub>2</sub> emissions, from residential use. The VEU program presents a perfect opportunity to encourage households to make a single step transition to electric appliances that can source their electricity from a range of renewable sources with low or no CO<sub>2</sub> emissions.

This matter is particularly important as the consultation paper reports that 74% of residential gas use in Victoria is consumed for space heating and would therefore appear to be where the largest reduction in residential gas consumption might be achieved. Continuing to incentivise households today to install brand new gas appliances with even conservative lifespan estimates of 15 years makes little sense and should be urgently reviewed.

When architects are working with clients, especially in residential alterations and upgrades projects, it is sometimes difficult to assist clients to make a choice from an older technology that they may be very familiar with, to a newer technology. It would greatly incentivise positive environmental choices if the subsidies were more effectively targeted to send the right signal to consumers.

As the demand for electricity increases through the electrification of appliances (and possibly even some industrial processes), increased renewable electricity generation capacity will be required (as it would for renewable hydrogen production) together with storage.

Storage options may include batteries alongside kinetic energy (e.g. pumped water storage for hydroelectricity), thermal storage and even thermo-chemical storage, to power steam turbines and, of course, hydrogen as a form of chemical storage.

As the uptake of electric vehicles increases, electric vehicle users could be incentivised to participate in schemes to use the larger batteries in their vehicles to support storage where the vehicle has surplus storage to their users' usual driving requirements.

Households and other property owners are currently incentivised through solar panel and battery subsidies and feed-in tariffs to contribute to renewable electricity production and storage. The Victorian Government, as a matter of good policy, that encourages everyone to participate in the reduction of greenhouse gases, could also consider how technologies can be expanded and incentivised to non-homeowners who rent.

For example, the use of plug in battery storage systems would permit renters to store cheaper off-peak power for later use or distribution into the grid. These batteries could be regarded as an appliance and renters might receive subsidies through the Victorian Energy Upgrades program.

The purchase of renewable green electricity could also be subsidised for renters and other residential (or even commercial) owner-occupants of buildings who are not permitted or able to viably install solar panels (e.g. apartments with little useable roof space).

In these situations, occupants might be encouraged to purchase green electricity from neighbourhood or large-scale green-power schemes. Large scale schemes have the added advantage of sending market signals to large scale electricity generators to make longer term investments in capital and infrastructure upgrades.

In conclusion, the Australian Institute of Architects supports the Victorian government's endeavours to reduce the consumption of natural gas, which generates CO<sub>2</sub>, by Victorian households and in commercial and industrial applications.. 'Green' hydrogen (splitting water) potentially holds an important place in certain industrial settings and as a possible means of storage. Green hydrogen technology should, therefore, continue to be progressed, in-lieu of

carbon capture-based options. However, the most rapid path to reducing gas consumption is using technologies with an established market presence – electrification.

We encourage the Victorian Government to urgently review the settings for the Victorian Energy Upgrades program to promote electrification for all users and discourage retention of gas appliances, particularly in the residential setting.

Thank-you for taking the time to consider our brief response to this important and commendable initiative.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Tim Leslie', with a stylized, cursive script.

Tim Leslie, FRAIA  
State Manager, Victoria  
Australian Institute of Architects