

28 August 2019

The Committee Manager  
Legislative Assembly, Environment and Planning Committee  
Parliament House, Spring Street  
EAST MELBOURNE VIC 3002

Via email: [ClimateChangeInquiry@parliament.vic.gov.au](mailto:ClimateChangeInquiry@parliament.vic.gov.au)

## Energy Networks Australia's submission to the Inquiry into Tackling Climate Change in Victorian Communities

Energy Networks Australia welcomes the opportunity to provide this submission in response to Inquiry into Tackling Climate Change in Victorian Communities.

Energy Networks Australia is the national industry body representing businesses operating Australia's electricity transmission and distribution and gas distribution networks, with members providing more than 16 million electricity and gas connections to almost every home and business across Australia.

### The challenge

There are three main areas the energy network sector has identified that will help tackle climate change:

1. a reliable and efficient transmission network to connect renewable generation
2. optimisation of distributed energy resources (solar, wind and storage)
3. development of a hydrogen sector.

Support for the work network businesses are undertaking in these areas will help achieve the state's goal of a net zero emissions economy by 2050.

### ***Connecting utility scale renewables***

Our energy system is changing with the retirement of coal-fired power generators and increasing amounts of utility scale renewable power generation, including solar and wind in Western Victoria.

New renewable generators are not being built in the same location as retiring coal fired plants so this means upgrades and new transmission lines will be needed to connect them into the national electricity market (NEM).

Snowy 2.0, for example, provides an opportunity for excess renewable energy to be utilised and fed back to major load centres like Sydney and Melbourne at times of high demand. Transmission projects will be required to enable this.

The Integrated System Plan (ISP) is prepared by the Australian Energy Market Operator (AEMO) to develop strategic transmission infrastructure across the National Electricity Market (NEM). Emissions policies and renewable energy subsidies,

renewable energy hubs and demand centres play an important role and have a critical impact on modelling and the results of a co-optimised plan. All state and federal government policies that impact the NEM such as various trajectories of renewables should be documented by COAG and formally provided to AEMO for use in the ISP assumptions and modelling.

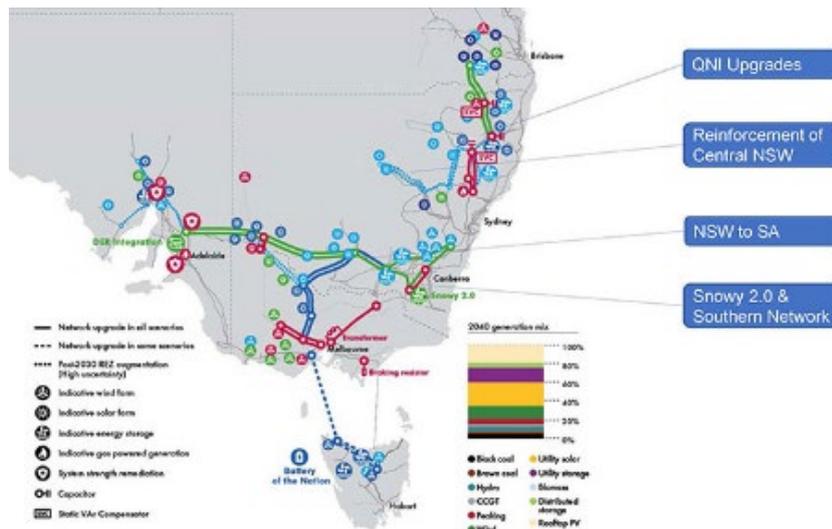


Figure 1: Major Transmission Projects (Source: TransGrid website<sup>1</sup>)

The ISP covers a range of trajectories and identifies the cost to consumers for high levels of renewable energy deployment that require energy storage and transmission assets to ensure reliability.

The Victorian Government should be cognisant of the national planning approach when developing its sectoral targets for electricity. Meeting renewable targets cannot be considered in isolation to the ability to maintain a stable power system. Long term national policy is required to ensure that there is both efficient generation and transmission investment for the benefit of consumers.

Transmission is a key enabler for moving to a lower emissions economy, long term stable policy is needed to ensure that investment signals and financeability can be maintained.

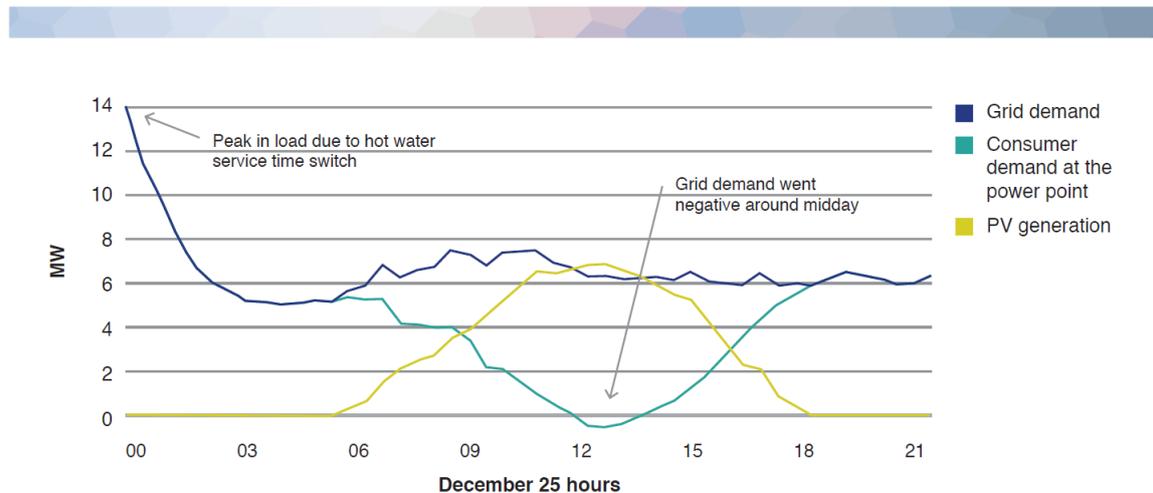
### Optimisation of distributed energy resources

Australia now has more rooftop solar installed per capita than anywhere else in the world. The electricity systems faces growing challenges as more of these systems are installed on homes and businesses. However, this also creates opportunities, but the following capabilities will be required:

<sup>1</sup> <https://www.transgrid.com.au/what-we-do/projects/current-projects/Snowy%202.0/Pages/default.aspx>

- » Enabling networks to have better visibility of where these resources are installed and how they can behave;
- » Defining networks constraints so customers can be advised on how they can export and/or import to the grid;
- » Establishing standards to community these constraints.

Higher levels of rooftop solar will change the dynamics of the demand on the grid with lower demand in the middle of the day, and potential energy imports into the grid from these distributed resources.



*Figure 2: Illustration of grid demand due to PV generation (Source: Open Energy Networks – Interim Report: Required Capabilities and recommended Action, July 2019)*

In setting sectoral targets for households, the Victorian Government should consider the network management issues and constraints identified in the AEMO and Energy Networks Australia [Open Energy Networks project](#).

### **Developing a hydrogen sector**

Our gas distribution networks manage over two million connections to Victorian households and businesses. The gas supplied through these networks provides 69 per cent of the annual energy consumption in Victorian homes. This is much higher than the Australian average of 44 per cent.

To date, the focus of decarbonisation has been on the electricity sector. Over the long-term, gas networks will have their own decarbonisation journey. New fuels, such as biogas and hydrogen, have the potential to become mainstream and complementary energy solutions that will use existing energy infrastructure.

Gas Vision 2050 outlines the industry’s journey to decarbonise the use of natural gas in homes, businesses and industry. Since the launch of the document in March 2017, many hydrogen related activities have commenced in Victorian and around the country.

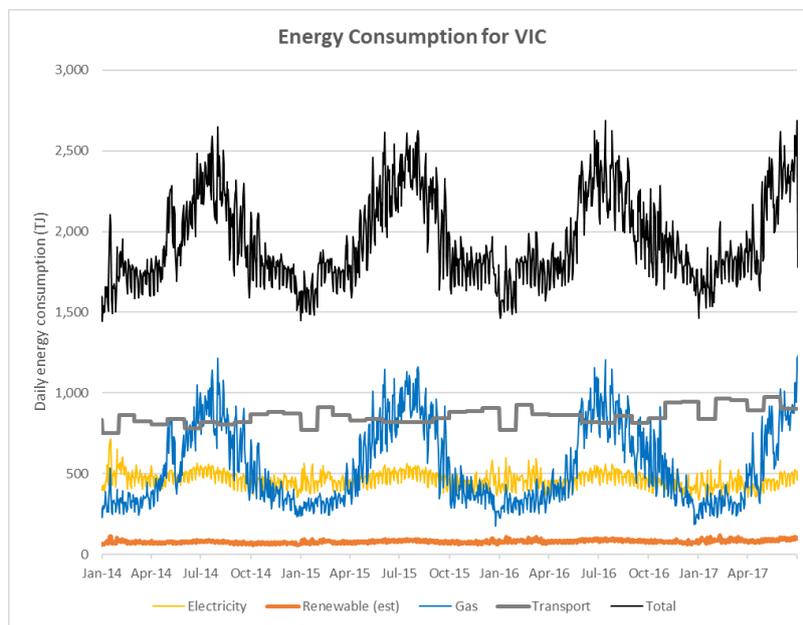
Energy Networks Australia believes that the opportunities represented by renewable gases (such as hydrogen and bio-methane) are not adequately recognised to date and should be considered when developing the policy position on developing appropriate climate targets for Victoria.

***Hydrogen as a clean fuel alternative for electricity supply and for heat in buildings***

Australia’s focus to date has been on decarbonising the electricity sector through measures such as the Commonwealth’s and state based renewable energy targets and feed-in tariffs. In many ways, these policies have also incentivised electrification while not addressing emissions from other sectors. As noted in the 2016 Climate Change Authority reports<sup>2</sup>, more work is required to reduce emissions from the other sectors.

Figure 2 illustrates Victoria’s energy consumption. The main features are:

- » Daily electricity consumption is around 500 TJ, peaking in winter. Renewable electricity generation is a subset of this, reported at 20.6 per cent<sup>3</sup> for 2018.
- » Daily gas consumption is seasonal, ranging from around 300 TJ per day in summer up to 1,200 TJ per day in winter. This seasonal load is largely a reflection of the utility of gas to provide space heating and hot water to homes and businesses during colder winter months.
- » Daily consumption for transport is between 800 and 1,000 TJ. This is fairly uniform throughout the year.



***Figure 3: Victorian Energy Consumption (source: Energy Networks Australia analysis)***

<sup>2</sup> Climate Change Authority (2016), *Towards a Climate Policy Toolkit: Special Review on Australia’s Climate Goals and Policies*.

<sup>3</sup> Clean Energy Council (2019), *Clean Energy Australia Report 2019*, pg 10.

The overall energy consumption - and the decarbonisation challenge - for Victoria is shown by the thick black line.

Decarbonising transport will highly likely involve a large-scale conversion to battery or fuel cell electric vehicles supported by biofuels in certain instances (e.g. aviation). This will place major upward demand on the electricity networks requiring investment in new electricity generation, transmission and distribution infrastructure.

### ***Hydrogen's role in heating***

Gas is used by industry as a feedstock and also as a means to provide heat. In homes and businesses, the role of gas is mainly to provide space heating, hot water and cooking services.

Decarbonising the gas consumption could be achieved through electrification. However, this would further increase the demand on the electricity networks and require even more investment to meet this demand (over and above the increased demand for transport). The seasonal consumption of gas, peaking in winter, would result in a major investment of electricity infrastructure to meet this peak demand. Gas peak demand is growing, with AEMO report Victoria set a new peak of 1,304 Terajoules on 9 August this year.<sup>4</sup> Were this to be electrified, the extra infrastructure to meet the heating peak would only be used for a small part of the year leading to inefficient investment in infrastructure.

A more practical and cheaper alternative is to decarbonise the gas network and to continue using existing gas distribution infrastructure. Many reports have indicated this is a lower cost option, with analysis by the Australian Gas Infrastructure Group and Deloitte Access Economics showing that the decarbonisation of the gas networks in Victoria could be achieved at 40 per cent less cost than the electrification of the gas load.

Other international studies<sup>5</sup> have also shown that the cost of electrification is higher than the cost of decarbonising gas networks. For example:

- » A 2016 study by KPMG<sup>6</sup> for the UK found that converting gas networks to hydrogen would have an incremental cost of between £4,500 to £5,000 per household up to 2050 while electrification would cost between £12,000 and £14,000.
- » In a 2018 report for the American Gas Association, the average cost of US greenhouse gas emissions reductions through policy-driven residential electrification would range between US\$572 and US\$802 per metric ton of CO<sub>2</sub> reduced, which is significantly higher than renewable gas which was less than US\$100 per metric ton.

---

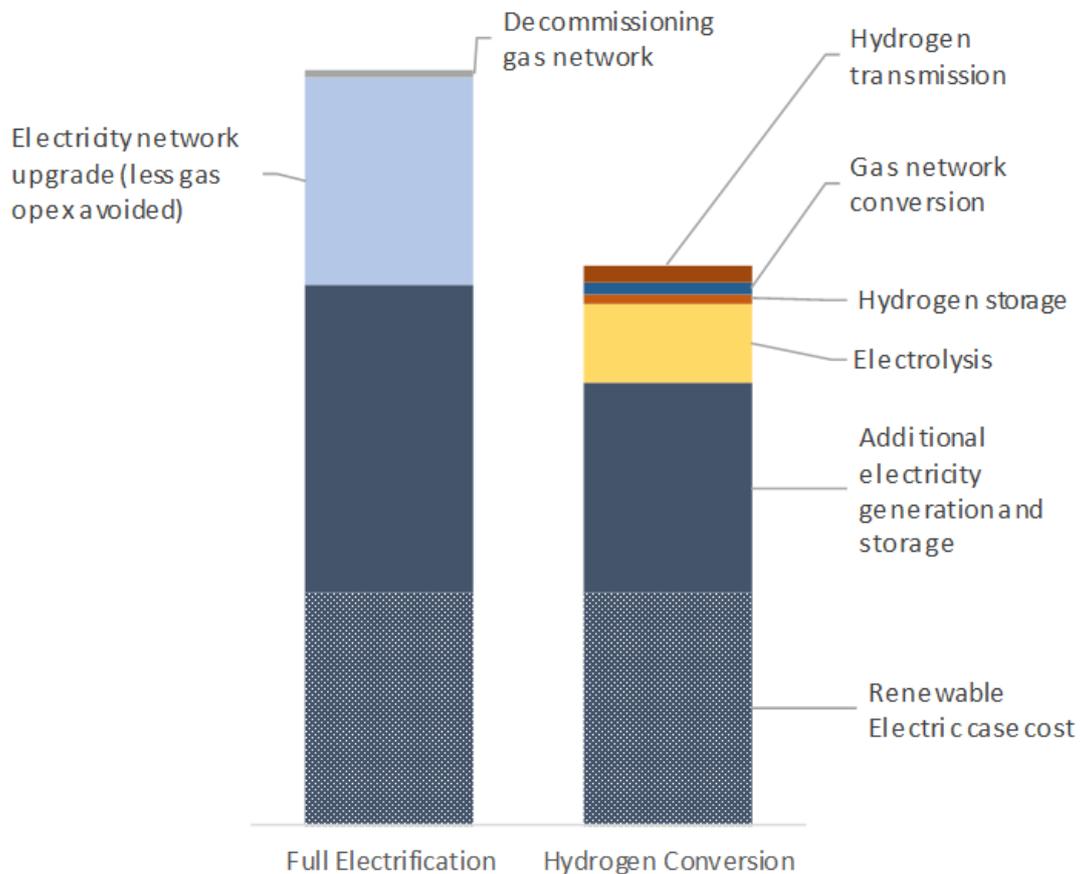
<sup>4</sup> <https://energylive.aemo.com.au/News/Gas-demand-record-Victoria>

<sup>5</sup> <https://www.energynetworks.com.au/news/energy-insider/electrify-gas-should-we-or-shouldnt-we>

<sup>6</sup> KPMG (2016), *2050 Energy Scenarios - the UK gas networks role in a 2050 whole energy system*

The outcomes from these studies are different from those by pro-electrification lobbyists, such as Renew or ASBEC<sup>7</sup>, as they account for overall systems costs resulting from the extra investment required for electrification, which organisations like Renew and ASBEC ignore.

Energy Networks Australia recommends that the Victorian Government consider the potential opportunities presented by hydrogen in the built environment when developing its emissions targets and associated policies.

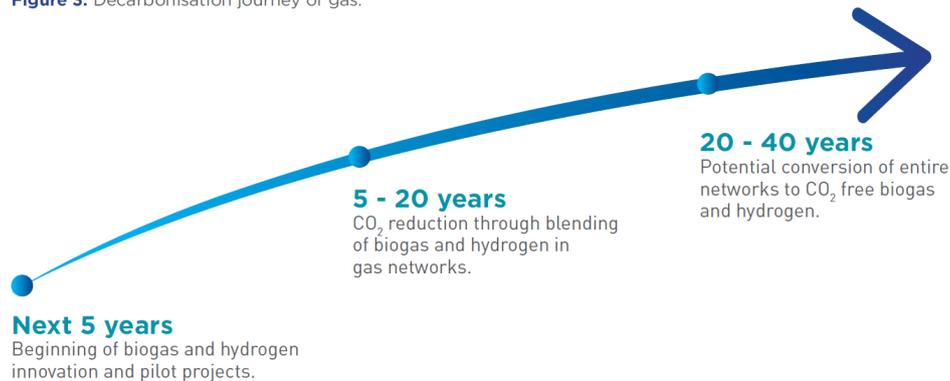


*Figure 4: Relative cost comparison of decarbonisation pathways for Victoria (source: AGIG and Deloitte Access Economics Analysis<sup>8</sup>)*

<sup>7</sup> The Australian Sustainable Built Environment Council

<sup>8</sup> <https://www.energynetworks.com.au/news/energy-insider/hydrogen-powered-future-tops-full-electrification>

**Figure 3:** Decarbonisation journey of gas.



*Figure 5: Pathway to decarbonise gas networks (Source: Energy Networks Australia, 2017).*

## Recommendations

Energy Networks Australia recommends:

1. the Victorian Government must consider total system costs when considering how any emissions targets will affect the energy sector
2. the Victorian Government should be cognisant of the national planning approach to transmission when developing its sectoral targets for electricity and approval of renewable generation projects
3. the Victorian Government should consider the network management issues and constraints identified in the AEMO and Energy Networks Australia Open Energy Networks project in relation to distributed energy resources
4. the Victorian Government should continue to support renewable gas (including biogas and hydrogen) related research, development and demonstration activity both in Victoria and more broadly across the nation
5. the Victorian Government should consider the potential opportunities presented by hydrogen in the electricity supply, the built environment and industrial sectors when developing its sectoral emissions targets and associated policies

We welcome the ongoing opportunity to be involved in the development of Victoria's climate change targets and associated policies.

If you have any other queries, please contact Dr Dennis R Van Puyvelde, Head of Gas on [dvanpuyvelde@energynetworks.com.au](mailto:dvanpuyvelde@energynetworks.com.au) or 02 6272 1548.

Yours sincerely,

**Andrew Dillon**

CEO