TOWARDS 2050: GAS INFRASTRUCTURE IN A ZERO EMISSIONS ECONOMY

Submission

From: Bass Coast Climate Action Network (BCCAN)

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Preamble

Today, with reporting on the 2021 Intergovernmental Panel on Climate Change IPCC report dominating the news, the inescapable and sobering reality portrayed is that the current reliance on fossil fuel must end and end quickly if the catastrophic forecasts of climate change are not to become our manifest destiny. This reporting reaffirms the consistent message reported at every level - global, national, and state for years. It is only by looking backwards, do you find reports of the 'golden age of gas' with one exception that being the Australian Federal Government promoted 'Gas Led Recovery.'

If it was not already, it is now increasing clear, time has caught up with us and we have transcended the threshold of luxury that once allowed us to pander to those embedded vested interests, in whatever sector, that inhibit rapid movement to a decarbonised society.

Since our society is based on and completely enmeshed in the fossil fuel cycle socially, industrially, and politically, we are under no illusions as to the difficulty of divesting from features hitherto taken as central pillars of our economy. However, the timing of the Infrastructure Victoria review is such that it can make a clear concrete directive. It looks to make recommendations on long-term, State scale, strategic level gas industry investment decisions at the precise time when the portents of the wrong decisions have been exhaustively examined and detailed unequivocally.

It is a time of anything but `business as usual.' Locking Victoria into a fossil fuel intensive future has predictable outcomes. Outcomes that are all negative. Negative outcomes that are already clear. Negatives that transcend the interests of any one group.

The gas infrastructure in a zero emission economy and all the attendant apparatus of state and industry as is current in Victoria is redundant. Looking to prop up, with alternative gas sources, to eek the last value out of a system inherently 'unfit for purpose' is to try to prolong the inevitable and enrich encumbants. The contributary negligence of gas as a domestic energy supply network outweighs its benefits. The alternative of electricity is in place now and can do what gas currently does at near zero marginal cost to the householder and society. Infrastructure Victoria should plan to progressively close down the Victorian gas network as soon as possible.

BCCAN

The Bass Coast Climate Action Network (BCCAN) is, as the name suggests, a network localised in the region of the Bass Coast Shire, that is climate focused, and action orientated. We, like Infrastructure Victoria, are trying at our granular level, to assimilate and contextualise the implications of the myriad reporting's and predictions to craft a strategy helpful to our local and wider community.

Scope

In this submission we address the issue of domestic supply primarily. Commercially we understand that gas is for heating mostly and as such there will be instances where an electrical alternative is possible and practical. As such our domestic references will be in part applicable to commercial operations. We see that electricity generation will be renewables, with gas having a rapidly diminishing role as renewables continue to ramp up, policy will set the parameters and private investment will set the pace. We do not currently have the ability or breadth of experience to address the issue of gas as an industrial feedstock.

Introduction

Gas is one of the two centrally produced energy sources distributed across Victoria the other being electricity. The electrical industry is transforming. It is the energy of decentralization, efficiency, and convergence.

We make this submission at a time when gas (methane) as acknowledged in the Interim Report `Towards 2050: Gas infrastructure in a zero emissions' (The Interim Report) as an energy source for the State of Victoria that is:

- Expensive, relative to past years, when gas was sold as the cheap and cheerful energy, (domestically it is now above the export price and international parity).
- The gas network opened in 1969, it is now an aged network with 50% 40 years old, with limited opportunity to repurpose the network beyond 2040.
- Recognised as losing 14% of all production as fugitive emissions
- In winter, the maximum gas demand is three times higher than in summer, mainly due to the extensive use of natural gas for residential heating.
- Locally, gas is in production decline, with production forecast to fall 43% from 2021 to 2025
- Use of gas by over two million residential and commercial customers accounts for 53% of Victoria's total natural gas use, of which the majority is household use.
- It is mandatory for gas to be supplied to all new housing estates and as the backup booster for solar water heating and
- Gas is a recognised indoor air pollutant and a significant contributor to childhood asthma (12%) *

*'*using a gas stove indoors without proper ventilation has a comparable impact on childhood asthma to the impact of having a parent who smokes. A 2018 study estimated that exposure to gas stove emissions is responsible for 12.3% of childhood asthma in Australia'*. Kicking the Gas Habit: How Gas is Harming Our Health, The Climate Council 2021

The Interim Report makes it clear that gas as a primary energy source for Victoria will be replaced by electricity and that this will be done against a backdrop as summarised:

- the future of low or net zero emissions gases, such as hydrogen produced with renewable electricity and seawater (known as green hydrogen), and decarbonisation pathways such as CCS remains uncertain.
- The scale of the change required, and likely financial implications for energy users, suggest a clear role for government in managing affordability and equity issues associated with any transition away from gas, particularly given existing consumer concerns with energy affordability
- The Victorian gas network includes 1,900 km of gas transmission pipelines, 32,000 km of gas distribution pipelines and assets valued at nearly $6 billion. Some assets will be unusable or stranded.

The Interim Report paints gas as a domestic energy source in Victoria that is no longer cheap, declining in local production, that comes with the disadvantage of significant fugitive emissions from production and distribution from an aging and leaking network and significant negative health effects associated with indoor pollution from ones of its primary uses as cooking fuel. All of which is caste against new energy efficient electrical technologies more compatible with the stated aim of a net zero emissions future.

The Interim Report

The Changed Face of Domestic Energy Supply and Consumption

The Interim Report seems at best to underplay the rapidly evolving domestic energy supply and consumption landscape of Victoria. As a basis for deciding the future of domestic energy needs the review appears rudimentary in the extreme. There is no evidence or direct reference to current or projected energy budgets.

Almost weekly, new and refined versions of existing technologies are released to the domestic market. This involves both hardware and software, with many specifically targeting energy efficiency, primarily electrical energy.

Particularly given that one of the main rationales for maintaining an extensive gas distribution network (32,000 km) is to supply the domestic market and that most of that gas is used for space heating and cooking, then consideration of the competitive marketplace for gas is critical.

In considering the future of gas and its current role in providing space heating and cooking all technologies commonly available in the domestic energy supply and consumption marketplace must be considered, particularly as they offer efficiencies over and above conventional appliances. These include:

- Electric heat pumps for the provision of space heating and water heating
- Induction cooktops for cooking

Further it is critical to note that these are readily available technologies across rural and urban Victoria. Installation and service is by an established, integrated, mature industry with all electrical regulated training and compliance standards in existence now. Sales are via an established Victoria wide retail sales network. Both, heat pumps and induction cooktops are robust and cost competitive technologies that are neither new nor exotic.

For the retail customer the result is that a full electric household is more cost effective than a gas/electric household.

In addition, Australia is a global leader in domestic rooftop solar installation. In Victoria adoption penetration is high across both rural and urban areas and shows no sign of abating.

It may have been expected that any analysis of future domestic residential energy needs used in determining the future of gas in Victoria within the context of a zero-emission economy would examine, as a starting point, the energy budget of current households upon which to make forecasts and develop projected adoption curves.

Governments at all levels have had financial incentives to encourage the domestic adoption of rooftop solar and heat pump hot water, for years.

For most Victorians, electric reverse cycle split systems are the most energy efficient, lowest cost heating option available that generates the lowest greenhouse emissions. If your house has a rooftop solar PV system, the benefits of heating with electric reverse cycle systems can be even greater. Sustainability Victoria May 21, 2021.

Rising domestic building energy efficiency construction standards, decentralised domestic electrical production via rooftop solar panels, efficient electrical space and water heating and cooking appliances, emerging energy storage products like batteries, convergence with transport via electric vehicles and software products that allow the transferal and sale of electricity seamlessly and cost effectively from and into the domestic environment. All delivered to a population with a recent history of thirst for the rapid uptake of technology.

Targets Policy and Technology

On the August 10, 2021, the Prime Minister of Australia noted in relation to the IPCC report and climate change:

`*We need more performance, we need more technology, and no one will be matching our ambition for a technology -driven solution.'*

The heat pumps, induction cooktops and solar panels are among the very technologies for which the Prime Minister, in these words, advocates.

However, technology alone will not win the day. As the premise of the Act and this review attests and the terms of reference make clear, it is policy and targets, that are the other two critical steps to the pathway to success.

Consumer Behaviour and Change

One statement that stood out in the Executive Summary of the Interim Report 'Investing in energy efficiency can allow time for consumer behaviour to change,….' The Report, incautiously, touches on behavioural economics. What does it mean? For example, insulation, an electric heat pump reverse cycle space heater and a draft stopper all assist in energy efficiency. How does the act of investing in any one item influence change over time and in consideration of gas?

Price, availability, and utility of the product all influence uptake. Government incentives have been very effective in supplying incentives to make transitions happen e.g., domestic solar installation. The commercial competitive marketplace can be nimble and responsive to these induced demands. It can introduce new products, at lower prices, rapidly. Victoria is also not alone in the move to energy efficiency. Energy efficiency is a global movement. Globally commercial interests have responded, and the Victorian consumer will benefit from the international market for product and services.

Australians adopt technologies with speed. If the adoption of mobile phones, then smart phones and mobile internet, and household consumer durables like flat screen televisions are any indicators as to how fast the Victorian population will adopt new household energy related technologies, then it can be expected that adoption will be equally as rapid and all pervasive.

The change from one energy source to another for the consumer is manifest daily in the appliances they use. These are not recent technologies, heat pumps are a variation on refrigeration, the most reliable home appliance of them all. Price is a very compelling argument, with a universally predictable response. Availability is also highly influential, if gas is not conveniently available then adoption is far less likely.

If nothing else COVID-19 has taught us all the malleability of the Victorian population's behaviour in response to the needs of the time. The manifestations of the climate crisis are clearer to the average Victorian from their own weather and media than is the invisible microbe. The Interim Report would appear to disassociate decisions to move from gas from the broader, highly compelling climate crisis narrative abroad in the community. The global scale crisis can overwhelm us but at the household scale we have proven that we can overcome our relative impotence and act within our household if only to illustrate to our children our concern for their future. Look no further than our remarkably consistent rates of recycling. Victorians have shown that with leadership and incentive, it is hardly insurmountable problem for us to embrace the effort, the cost and the inconvenience at the scale of change inherent in replacing old appliances for new.

Fast change is necessary, not implemented overnight like a COVID-19 lockdown, nor as radical or onerous as a 3-month lockdown with 8 pm curfew and 5 km movement limit but change of energy supply involving changes like appliances. All is relative and the types of changes to domestic energy consumption away from gas is logistically workable, limited perhaps by industry capacity. But like with development of the domestic solar panel installation industry a whole new branch of work can be adapted rapidly within the standards and training structures that already exist. The electrical service and supply industry proved that with leadership and incentive the response can be rapid. A greenhouse led recovery no less.

Victorians have proven to have a great capacity to absorb and respond positively to change, one that recent experience has proven, and the change away from gas are positive household scale actions. Do this to help the greater good, new for old and they will costs less to run where is the argument?

The Old Network

The inherent, and rising with age, relative cost of keeping a 40-year-old gas network operationally safe, is not considered in The Interim Report. It is If it needs no maintenance because of inherent degradation, why would the whole thing be redundant by 2040 and why were the gas pipes being replaced in my friend's inner urban street recently? Nor, by association is mentioned the disruptive effect and not inconsequential cost of pipe replacement works on residents, road uses and other members of society.

The saying `the best process is no process,' is famously quoted and requoted by Elon Musk and the significance is not lost to the gas network which is on the cusp of change. No maintenance is the best maintenance. Just turn it off. Replacing an old network requiring maintenance with an already in-place alternative network (electricity) at no substantial added marginal cost has to be an attractive economic proposition for the disrupted society, the government and industry alike.

Rather than the redundancy of the aged gas network being a stranded asset the positive perspective would have the turning off the gas supply to it as the convenient, disposal of a redundant system at no cost. This is the most efficient shovel ready greenhouse gas response available and not one shovel is needed. It even comes with a built-in sequence target the oldest first.

Convergence and the Pace of Change

We have the future of gas in consideration at a time with a changed and rapidly evolving domestic energy landscape. It is not just a time of change from centralised to decentralised energy production patterns, but it is also a time of convergence. A convergence of energy previously separated, now conflated, of domestic energy production, of domestic energy consumption and of domestic transportation energy, with electricity the common energy. With convergence of technologies comes rapid change. Recent examples suggest more exponential than linear. Mobile phones, where in 2007, battery storage, touch screens and computing efficiencies came together in the smart phone and industry leaders Nokia, Blackberry and Motorola lost.

Electrification of everything is happening. It is the time of electric production, storage, and transport convergence. Gas has lost.

The issue at hand with this review is not, if there will be uptake of the all-electric household, but when. With the issue of significance being the underestimation of the speed at which uptake will occur.

At the start of the Brief set out in the Terms of Reference guiding The Interim Report it seeks a contextual whole of economy approach:

The Victorian Climate Change Act 2017 establishes a system of coordinated, whole-of-economy actions to achieve a net zero emissions target by 2050.

The issue is contextual. In the context of what else is happening, in this The Interim Report is limited. Gas, particularly in the domestic energy sphere is just one part of a many changes that are disrupting 'business as usual' and unless the issues of convergence are

recognised the Victorian government will not achieve its stated vision made in the first line of the Brief:

The Government has a vision for Victoria as Australia's cheapest, cleanest energy jurisdiction.

The Scenarios

The only true alternative to gas is electricity in the time frames needed. It is a mature technology with an established network and regulatory standards in place now. Electricity has made gas obsolete. The climate crisis has accelerated its demise. Of all the scenarios the all-electric Scenario A has the only potential for success.

The approach taken to this review severely misjudges and therefore inhibits the development of real-life, time and space scenarios. The timelines and scenarios fail at the outset. They give insufficient weight to the speed of adoption inherent in convergence.

The scenario alternatives as portrayed, invalidate the practical pathways of adoption at the outset, making them effectively meaningless. Conflating the real-world established technology of electricity with technologies that are conceptual, undeveloped, and globally untested at the scale and timeframes required does this report a disservice. This includes hydrogen (of various varieties) and biogas

Then there is the CCS, Carbon Capture and Storage and agroforestry. Both are failed approaches. Strawmen set up as some sort of solution. CCS is beyond our technological suite of understanding to discuss in any detail, but agroforestry is well within our field of endeavour.

Agroforestry for mitigating CO2 production is dubious in concept. Agroforestry has been found wanting and difficult to implement in recent Victorian practise. Agroforestry in this context is a complete furphy. Writing agroforestry into the scenarios has compromised the veracity of the work. Just a sample of the potential points that this assertion brings up in relation to the scale, timeframes, and coordination required to make this work. It illustrates no understanding of the recent history of Victoria's efforts since at least the 1990's to affect the adoption of agroforestry by government in to the privately owned agricultural estate of Victoria. It illustrates no idea of the narrow rainfall and production parameters in which it has succeeded and gives no heed to how climate change will further narrow the area of availability, increase the risk of failure and therefore the cost. It is an impractical throwaway line which recognises nothing of the difficulty entailed in establishing and keeping trees alive over the many hundreds of landholdings for, I assume, to be effective, in perpetuity? Not to mention wildfire.

Recommendations

In adopting Scenario A and in recognition of the shutdown of the gas network that it entails at least for domestic consumption it is suggested that replacement policies be for both bottle and network gas supplies. These actions and priorities are made to address the low hanging fruit issues that include fugitive emissions, indoor pollution and accommodate reduced local production.

Suggested Priorities and Ares of Actions

Priority	Target for gas	Area of Action	Electric
1	0	New house gas appliance installation including where gas is available	Mandate all electric,
2	0	Stop gas supply extensions, (no network growth)	
3	0	Stop gas supply for new estates (no network growth)	
4	0	Existing home cooking (replace) Prioritise low socio economic, social and community housing.	Install new appliances
5	0	Existing home space heating (replace) Prioritise low socio economic, social and community housing.	Install new appliances
6	0	Existing home hot water (replace) Prioritise low socio economic, social and community housing.	Install new appliances
7	0	Stop existing home gas lines needing renewal (network reduction)	Install new electric appliances instead
8	0	Close the existing network. Prioritise the most maintenance heavy, the oldest, leakiest, or the most distance sections first (network reduction)	Target affected households to install new appliance first

Conclusion

Victoria has two centrally produced and distributed energy sources. Grid electrical connectivity is virtually ubiquitous and domestic solar panel installations are prolific and continue to grow. Electrification, added by developments in decentralised renewable production, storage and transport is only growing in pace. Gas by contrast is in decline. The issue is the managed decline.

At this time, we are at what has been described as one of the great decades of change where the convergence of technologies will be totally disruptive of established paradigms. By the end of the decade decentralised domestic electricity production and storage will allow many to charge their electric cars (if they still own one) and software will optimise sale of power to the grid (if we still have a State-wide grid). Travel as a service, may replace car ownership for many. Gas for domestic use will be finished, overwhelmed by electricity, certainly for cooking and space heating it will be a relic of a past age.

The Interim Report fails to grasp the urgency of change. It fails to heed the instructive lessons of recent technology adoption within the household, with or without government financial incentives. In the coming decade new technologies such as the electric car or new versions of established technologies such as the heat pump will be adopted because of the compelling economics alone.

We have taken attempted to suggest an approach that prioritises change to address social equity in managing the decline. This is the intent. In practice, given our resources and the central focus of this submission it is open to question.

A dreadful unintended consequence of this review that must be avoided at all costs is for government intervention to impede and prop up incumbency that further imperils the climate and disadvantages the individual directly and collectively.