Major Energy Users Inc.

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Infrastructure Victoria
Level 33
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By direct lodgement

Gas Infrastructure in a zero emissions economy
Response to Interim Report

The Major Energy Users (MEU) is pleased to respond to Infrastructure Victoria Interim Report on Gas Infrastructure in a zero emissions economy.

About the MEU

The MEU was established by very large energy using firms to represent their interests in the energy markets. With regard to all of the energy supplies they need to continue their operations and so supply to their customers, MEU members are vitally interested in four key aspects – the cost of the energy supplies, the reliability of delivery for those supplies, the quality of the delivered supplies and the long-term security for the continuation of those supplies.

Many of the MEU members, being regionally based, are heavily dependent on local staff, suppliers of hardware and services, and have an obligation to represent the views of these local suppliers. With this in mind, the members of the MEU require their views to not only represent the views of large energy users, but also those interests of smaller power and gas users, and even at the residences used by their workforces that live in the regions where the members operate.

It is on this basis the MEU and its regional affiliates have been advocating in the interests of energy consumers for over 20 years and it has a high recognition as providing informed comment on energy issues from a consumer viewpoint with various regulators (ACCC, AEMO, AEMC, AER and regional regulators) and with governments.

The MEU has already been involved in a number of discussions about the impacts of moving to a net zero carbon emissions outcome in Victoria by 2050 with a number of

different organisations, including with the Department of Environment, Land, Water and Planning (DELWP) about the transformation towards net zero carbon emissions in Victoria; the responses to DELWP address many of the same issues raised by Infrastructure Victoria.

In those discussions with DELWP and its consultants, the MEU pointed out that:

- Large industry recognises that a transition to lower carbon emissions is essential. Already many firms are already in the process of looking to reduce the carbon emissions they cause through improved efficiency, sourcing energy inputs from low emission providers and using carbon offsets.
- Many large firms need thermal energy for their processes and, to continue their operations with lower carbon emissions, they need an alternative source of thermal energy or to be able to access sufficient carbon offsets to achieve net zero carbon emissions. Further, these firms already have in place the hardware needed to convert natural gas into thermal energy so any transition from using natural gas (or a similar carboniferous source of energy) will entail considerable cost to convert their existing hardware to handle a different source of thermal energy. This same observation applies to firms that use natural gas as a feedstock, supposing they are able to convert.
- Firms that use natural gas as a feedstock and/or the thermal energy required for their processes, are already facing considerable cost pressures by the increases seen in natural gas prices over the past 3-4 years. If the costs for an alternative source of feedstock and/or thermal energy are even higher than the current prices for natural gas (noting there will be additional costs as well to convert their existing equipment), then this will lead to firms considering closure of their operations as an option to incurring costs that would make them less economically viable, even unviable.
- While some firms may consider converting their existing equipment to use another source of thermal energy, they have observed
    - If the cost is too high, some may close their operations
    - They may be prepared to carry out one conversion, but not multiple conversions which might eventuate if the mix of the source of thermal energy changes over time. For example, if it was proposed to convert to (say) a mix of 35% hydrogen and 65% natural gas (methane[1]) in the 2020s they might consider carrying out a conversion for this new mixture but if in the 2030s a new mixture was proposed with a higher proportion of hydrogen and lower level of methane, they would see the costs for a second conversion to be commercially stressful. With this in mind, the MEU considers that any change in thermal energy source needs to be carried out as a “once off” exercise[2].
- While, in some cases, electricity can be used as an alternative source of thermal energy, the costs of electricity for the same heating value are much

[1] Noting that biogas has similar properties to natural gas as both are predominantly methane
[2] The MEU notes that the conversion from town gas to natural gas was a “once off” exercise and this was accepted as not unreasonable but multiple changes to equipment would be unacceptable

higher than the equivalent costs using gas. While there is a view that electric heating can be more efficient than gas heating, the amount of efficiency saving varies considerably with the process utilised for the heat source[3] and what the heat is used for. So, a conversion to using electricity is likely to impose increased operating costs for many manufacturing entities, in addition to the costs for conversion.

- Many processes require higher temperatures than can be readily achieved through a conversion to electrical energy so, despite the higher cost of electricity for providing thermal energy, electrical energy cannot deliver the high temperatures needed for some processes. This means that retention of these industries would require an alternative to provide this high temperature thermal energy. A similar observation applies to firms that use natural gas as a feedstock.
- There have been discussions on having a blended gas/hydrogen mix provided, possibly as an interim measure. The MEU points out that implementing a blend beyond ~20% hydrogen will have impacts on the ability to transport the blend in steel pipes[4] and also require end users to convert their existing equipment to manage higher concentrations of hydrogen in any mix in addition to adjusting burner configurations.
- There will be considerable cost to convert the existing steel pipelines and metal fittings in the gas networks to accommodate the existence of high concentrations of hydrogen and, under the existing regulatory rules, the costs for this conversion would be passed onto consumers, increasing prices for transporting the new fuel.
- Most firms requiring significant amounts of natural gas for thermal energy operate on a continuous basis so the provision of thermal energy must be also continuous. This tends to militate against forms of thermal energy that are not guaranteed to be available on a continuous basis over many days and weeks at a time[5].

The clear import of these observations is that either an alternative to gas must be found to provide many firms with a source of energy that can provide the benefits that natural gas (or other methane source such as biogas) can provide or these firms will cease operations in Victoria. While hydrogen is touted as an alternative to natural gas, a process for the generation of hydrogen to a price equivalent to gas has yet to be identified and, even if it is identified, there still remains the challenge of its distribution. Again, while use of the existing gas infrastructure has been touted as the solution for the transport of hydrogen to the many end users requiring thermal energy, there are many technical issues (such as embrittlement in steel pipes) that have to be addressed before this can occur.

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[3] For example, electricity radiant or convective heating is an option rather than conductive or convective heating using combustion gases or a heating medium such as steam or heated air.
[4] For example, hydrogen embrittlement of steel
[5] Such as thermal energy from solar/thermal sources which can be limited in supply over periods of continuous cloud cover like occurs in Victoria in winter

In the case of replacing natural gas as a feedstock, the MEU points out that to use hydrogen as a feedstock (if technically feasible) will require major changes to processes to allow this to occur and each firm will have unique requirements to convert their existing facilities to use hydrogen. As a result, they will face considerable costs to convert.

The MEU considers that Infrastructure Victoria should seek advice from existing users of natural gas (using gas for either feedstock or thermal energy) to assess their ability to convert to another form of feedstock/energy and the costs likely to be incurred if such a conversion is technically possible. This will inform Infrastructure Victoria as to the extent of the challenge facing the continued use of the existing gas infrastructure as part of achieving the net zero carbon emission target. This will provide a clear view as to both the future use of and continuing need for the existing gas infrastructure.

The MEU notes a number of assumptions implicit in the Interim Report that the MEU has concerns with:

- Carbon capture and storage (CCS) is often touted as a solution for carbon emissions. The MEU is unaware of any CCS process that is yet commercial and any that might have potential to be commercial, seek to capture the carbon dioxide at its point of generation, where the carbon dioxide is at its highest concentration. If CCS process does become commercial, there are considerable costs involved in its establishment and operation at existing facilities generating carbon dioxide. Further, the ability to transfer the carbon emissions captured at their place of generation to the place of storage becomes a further ongoing cost as well as the ongoing costs for the storage. These additional CCS costs will have to be added to the increasing costs for gas transport (noted below), possibly leading to the total of all costs making continued operations unviable.
- The Interim Report identifies that some of Victoria's existing gas pipeline assets could be considered to be nearing the end of their life. While agreeing that some assets are quite old, there is an expectation of their owners that these assets still have considerable life, extendable by careful management. Equally many pipeline assets are still relatively young and have considerable life remaining.

  The MEU considers that Infrastructure Victoria needs to discuss directly with the asset owners (APA, AGIG and Ausnet) at what time they consider the older existing assets will have to be replaced. Equally, significant elements of the gas assets are still quite young and have considerable life remaining. With this in mind, the MEU considers that considerable portions of the existing gas transport assets will still be used and useful after the target date of 2050 for achieving net zero carbon emissions.

  The MEU considers that Infrastructure Victoria has taken an unnecessarily bleak view of the potential for the existing gas assets to be used and useful after achieving net zero emissions and must get a better understanding of the likely remaining lives of the gas infrastructure assets.

- In addition to the direct costs involved, the assumption that the pipeline assets will used less and less as the decarbonising process continues creates five quite critical concerns:
    - Firstly, what is the expectation for delivering energy to industries that cannot convert to electricity for their thermal and feedstock needs? If no thermal energy is available, these end users will have to close their operations.
    - Secondly, as gas usage declines, the cost of gas transport will rise leading to fewer customers causing further increases in costs and so on[6]. This will make the cost of delivered gas rise, putting more commercial pressure on gas using firms, potentially forcing closures
    - Thirdly, while there has been discussion on the recovery of capital for gas transport assets via the regulatory processes should their assets become redundant, how does Infrastructure Victoria see the gas asset owners recovering their sunk capital if there are insufficient end users to fund the recovery of gas asset sunk capital?
    - Fourthly, there also needs to be recognition that each of the gas consuming facilities have considerable assets that will become redundant in the event that gas (or an equivalent) is no longer available. The question of how gas end user asset owners recover their sunk capital remains unanswered.
    - Fifthly, addressing the challenge for managing the transition to net zero carbon emissions needs to recognise the benefits of "value adding" that occurs on supplies of gas used for manufacturing compared to the value Victoria would receive if these industries closed due to the high costs of conversion or closure in the absence of a substitution of fuel.
- There has been significant discussion that there could be a conversion of gas to hydrogen and the MEU sees that this is an option that must be assessed in more detail. This raises two critical issues:
    - To what extent can the existing gas infrastructure be used for transporting hydrogen, noting the significant technical issues in doing so with steel pipe[7].The MEU points out that similar discussions about the future use of gas transport assets are being held overseas and there is significant expectation that they will be repurposed rather than impose considerable cost by effectively closing them down.
    - The current target price for production of commercial supplies of hydrogen (ie $2/kg) is too high to be comparable in price to natural gas and that the production of biogas will be even more expensive and unlikely to be sufficient in quantity to meet the needs of industry. Unless a commercial alternative to gas is identified, then those

[6] Often described as the network death spiral
[7] For example, see https://www.cnbc.com/2021/07/30/renewable-hydrogen-can-travel-through-existing-pipelines-ceo-says-.html

industries unable to convert to electricity from natural gas will have to cease operations if gas is no longer available and delivered to their facilities.

The MEU is very concerned that there has been little analysis about the cost impacts on network charges of the various proposals made for transitioning the gas supply systems to a lower emission environment (such as blending with hydrogen, biogas[8], etc):

- While there is a view that converting gas use to electricity might be a solution to emissions reductions, the MEU points out that the conversion will have a major impact on the growth of electricity infrastructure. This in turn will increase electricity transport costs and, even though electricity might be a more efficient source of thermal energy than natural gas, as the increase in demand for gas spikes in winter (especially in Victoria), increasing the capacity of the electricity network to accommodate the resulting increase of electricity demand in winter to offset the lower gas usage, will result in significant unused capacity in the electricity network at other times of the year. Decreasing utilisation of the electricity network will increase costs for the supply of electricity on a per unit basis. As transport costs for electricity is a significant proportion of the delivered cost of electricity, the cost of delivered electrical energy on a per unit basis will increase for all as a result of this conversion.
- There has been little, or no, assessment made of the impact on gas transport of converting gas usage to electricity. There are two significant cost impacts on delivered gas prices that need to be assessed:
    - As the amount of natural gas used for feedstock and thermal energy purposes decreases, the price per unit of gas from network charges will increase, recognising that the gas infrastructure will remain as is and gas networks will still be entitled to recover a return of, and return on, the capital they have invested, even if the assets are under-utilised.
    - Gas asset networks have expected economic lives of 60-70 years yet with the likely reduction of the life over which the asset owners expect before their assets are no longer required for gas transport, is leading to observations by owners of gas infrastructure about increasing the return of their capital (ie via accelerated depreciation) as they seek to have their sunk capital paid back by the time gas is no longer used and the gas infrastructure becomes redundant. This cost impost could be avoided (or minimised) if the gas assets continue to be used, albeit with an alternative product being transported.

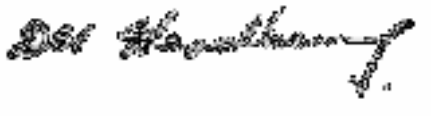
  The impact of both of these will lead to even higher prices for delivered gas on firms that are already incurring high gas prices and increasing the considerable operating costs pressures they are now facing. Further,

[8] It needs to be recognised that to all intents, biogas is much the same as natural gas in terms of content

increases from higher network charges will exacerbate these cost pressures, potentially leading to closures in the nearer term.

The MEU is keen to continue to assist the Infrastructure Victoria identify the options available and to dicuss the continued use of a gas infrastructure that is still used and useful in a post zero emissions environment. We hope that this response is sufficiently comprehensive for your immediate needs. However, if there is a need to discuss this response further in more detail, please contact our Public Officer (David Headberry) on [redacted] or [redacted]

Yours sincerely



David Headberry
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