GRATTAN Institute

Victoria's proposed renewable gas target

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1 Introduction

This submission is by Tony Wood and Alison Reeve of Grattan Institute, an independent think tank focused on Australian domestic public policy. Grattan aims to improve policy by engaging with decision makers and the broader community. Grattan has advocated for gas market reforms for well over a decade.

The Victorian Government has announced a series of policies aimed at phasing out the use of natural (fossil-fuel) gas in Victoria.[1] Policy is coordinated via the Gas Substitution Roadmap. Initiatives to date have included banning new gas connections for residential properties, and requiring gas appliances to be replaced by electric ones at end of life.

But, there is a need for policy that establishes the decarbonisation pathway for those gas users that cannot use electricity, namely, some industrial users, and gas power generators.

The Victorian Government has determined that renewable gas is a prospective solution for these users, and is proposing to establish a Renewable Gas Target to encourage supply. Among the possible options canvassed in consultation last year, a renewable gas target would be the most appropriate to underwrite more supply.

This submission responds to the Directions Paper on the Renewable Gas Target, released by the Victorian Government in December 2024. It draws on our previous reports and other published material.

In section 2, we make the case for a transition away from widespread gas use, noting some of the challenges involved. In section 3, we note some lessons from the Renewable Energy Target that may apply to a future renewable gas target.

In section 4, we explore some of the broader risks to the success of the Victorian Government's proposed renewable gas target, and some particular issues with the proposed design, with recommendations to correct them.

We would welcome the opportunity to engage further with the Victorian Government on any of the matters raised in this submission.

Summary of recommendations

- Clarify the objective of the scheme, and ensure the targets selected are appropriate to deliver on this objective.
- Stress-test the proposed design to ensure it is robust to the effects of other jurisdiction's policies, falling prices for natural gas, disruption and competition in the renewable gas supply chain, and falling demand for gas.
- Limit cost recovery to industrial (tariff D) customers and wholesale market customers of gas.
- Put in place accounting measures so that these users can see how much renewable gas they used during the year. Do not attempt to physically limit renewable gas supply to these users.
- Move the first review point to 2032, to align with commercial finance terms; or limit the review to operational matters.
- Ensure that voluntary demand is genuinely additional to the target.
- Undertake policy development to determine and bring about the most efficient way to deliver gas to residual gas users in a net-zero economy (noting that this may not always be via a gas network).

1. In this submission we use the term 'natural gas' to refer to gas from fossil sources, 'renewable gas' to refer to gas from biomass or green hydrogen, and 'gas' when the context could apply to either.

2 How to eliminate natural gas use

2.1 Getting off gas is a complex task

Natural gas production and use is not Victoria's most significant source of emissions: that is the electricity industry, thanks to the state's historic reliance on brown coal power stations (Figure 2.1).

However, the Victorian Government's commitment to reach net-zero emissions by 2045 requires considering decarbonisation pathways for all sectors of the Victorian economy and minimising emissions from all sources – including natural gas production and use.

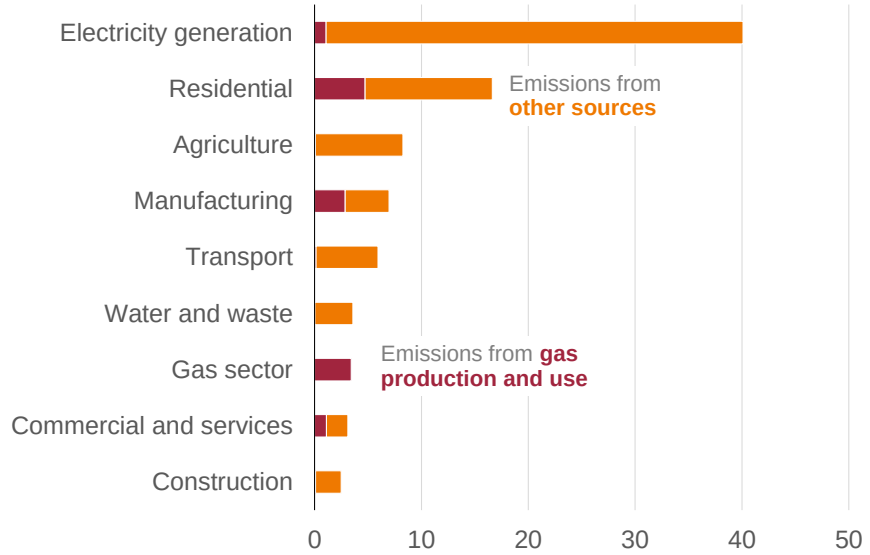
Getting off gas is as much a logistics problem as a technology problem. Most uses of gas in Victoria are small and distributed – such as household heating systems or commercial cooktops. There are only a few large users, such as gas-fired power stations.

While the technology to replace gas use in homes is available, and economic, changing every gas appliance in Victoria to electric will take many years, just because there are so many of them.

Then there is the problem of right-sizing the gas network. Victoria has an extensive gas distribution network, built to service millions of small users. In the future, when most of these small users disappear, there may still be a need for some gas networks, but their location, size, and even ownership will be different to today's.

The challenge for governments and network businesses is to navigate this right-sizing journey in a way that keeps the network safe and viable as it shrinks.[2] It is also possible that for some gas users, a network may not be the most economically efficient delivery option – but policy makers are yet to grapple with this question.

Figure 2.1: Electricity emissions dominate in Victoria
Emissions ($MtCO_2$-e)



Notes: $MtCO_2$-e: Millions of tonnes of carbon dioxide-equivalent. 'Transport' category refers to businesses in ANZIC category I. Emissions from private vehicles are shown in the 'Residential' category.

Source: Department of Climate Change, Energy, the Environment and Water (2022).

2. This is discussed in detail in Chapter 7 of Grattan's 2023 report, *Getting Off Gas*: Wood et al (2023a).

For most uses of gas in Australia today, there are two possible substitutes: electricity, and renewable gas. The best option depends on what the gas is being used for.

2.2 Electrification is the best decarbonisation pathway for most Victorian gas users

Electricity is the best solution for low-temperature heat (such as water heating, space heating, cooking, and drying). Efficient electric technology is able to deliver the same service with fewer units of energy.

For high-temperature heat, industrial feedstock, and power generation in some circumstances, electrification may not be the solution. Electricity can be used in some industrial processes – using an electric arc furnace to melt steel, for example. But for others, it is either physically impossible or uneconomic to substitute electricity for gas. This is particularly the case where gas is used for its chemical molecules rather than its energy content. Making ammonia, for example, uses gas for both heat and as a source of hydrogen molecules.

2.3 The role of renewable gas

'Renewable gas' can refer to biomethane[3] or 'green' hydrogen.[4]

Neither green hydrogen nor biomethane is produced or consumed in large quantities in Australia at present. Both cost significantly more than natural gas, and are likely to continue to do so for quite some time. There are also logistical challenges in delivering either to users.

This does not mean there is no role for hydrogen or biomethane in substituting for natural gas. At the moment hydrogen looks like the best bet for some industrial uses, such as steelmaking, alumina refining, and fertiliser manufacturing.[5] Significantly, Victoria does not have any of these industries.

Neither Victoria nor Australia will be able to produce enough biomethane to substitute for all current gas use. So, biomethane is likely to be most valuable for gas users where electrification is not a technical possibility and hydrogen is not an economic option.

2.4 Offsets can deal with emissions risks, but not market risk

It would be no disaster from an emissions perspective if Victoria failed to eliminate every use of natural gas. Any residual use could have its emissions offset through requirements for users to buy and surrender Australian Carbon Credit Units (ACCUs).

However, a gas market that supplies only a very small number of users with a relatively small amount of gas, including importing that gas to Victoria from northern Australia, will look very different to the current markets. Questions will arise about who pays for infrastructure, how contracts are structured, and liability if supply fails.

Gas substitution policy that fails to grapple with these questions is doomed to fail.

3. Biomethane is chemically identical to natural gas and is released when natural materials decompose. Ordinarily it would escape to the atmosphere, break down into carbon dioxide, and then be re-absorbed by plants. Capturing the biomethane and burning it releases carbon dioxide to the atmosphere, which is then absorbed by plants. Theoretically this results in no net increase in atmospheric carbon dioxide, which is why biomethane is considered 'green'.
4. 'Green' hydrogen is made by using 100 per cent renewable electricity to split water into hydrogen and oxygen. This process produces no greenhouse gas emissions.
5. Wood et al (2023b).

3 The risks and opportunities of using industry policy to build a renewable gas sector

The Victorian Government's proposed Renewable Gas Target meets the definition of industry policy: a deliberate choice to alter the structure of an economy by encouraging resources to move into sectors that are perceived as desirable for future development.[6]

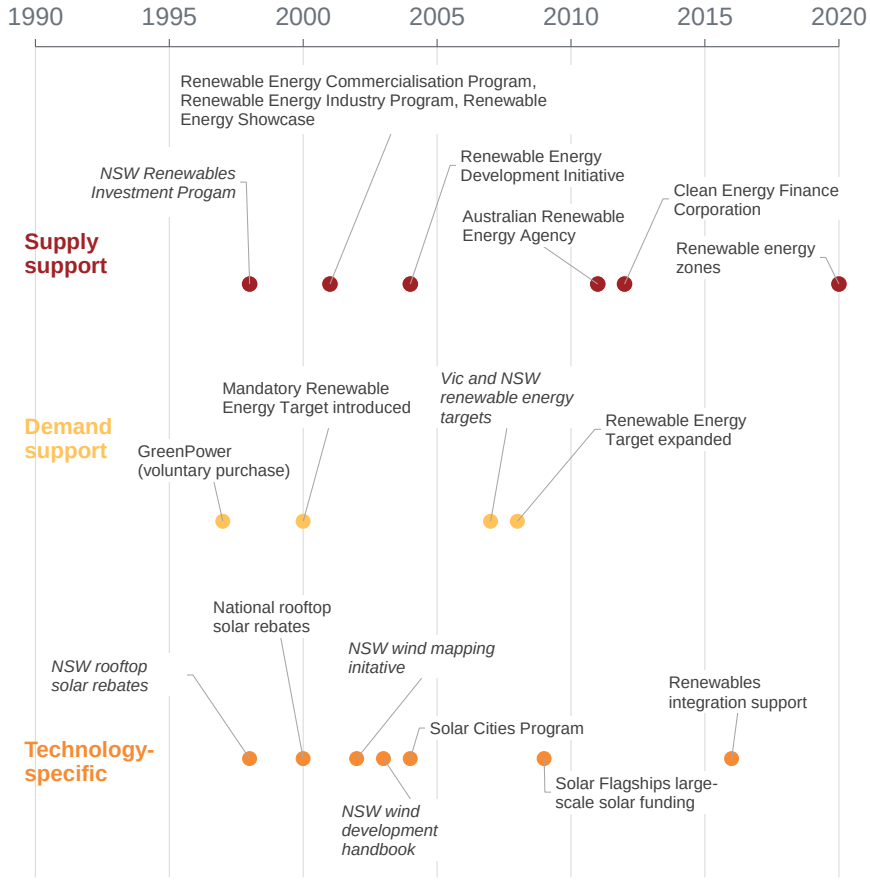
Industry policy can be controversial.[7] Critics say that governments lack the information to determine which industries to support, so the choice should be left to the market. Further, they say industry policy leads to rent-seeking, as well-connected firms use their financial power, connections, and influence to get money.[8]

However, it is also the case that markets do not generally provide adequate incentives for research and development of new technologies, because knowledge is often intangible, risky, and difficult to appropriate.

Low-emissions technologies are particularly complex and uncertain. Early investors face high costs, low returns, and the risk of competitors free-riding on their initiative. And there is a time imperative. Market forces are not good at managing structural transformations at high speed when the future is deeply uncertain.

Australia has successfully used industry policy in the past. The electricity sector is the only part of the Australian economy where deliberate industry policy has successfully brought about transformation away from carbon-intensive production.[9] The Victorian Government should learn from that process in considering a way forward for renewable gas.

Figure 3.1: Industry policy and the Australian electricity market



Notes: State policies are shown in italics. Not every policy targeting renewable electricity across the period 1997 to 2022 is shown.

Source: Grattan analysis of National Library web archive (2022).

6. Aiginger and Rodrik (2019).
7. For a longer discussion, see Chapter 2 of Wood et al (2022).
8. Rodrik (2014).
9. Noting that this transition has not been without issues, and is not complete.

3.1 Lessons from the Renewable Energy Target

The key policies that developed the renewable electricity industry are summarised in Figure 3.1 on the previous page, and we discuss their respective roles in detail in Chapter 2 of our 2022 report, *The Next Industrial Revolution*.[10]

In this section, we focus on lessons from the Renewable Energy Target.

When introduced in 2000, the federal Renewable Energy Target aimed to achieve an additional 2 per cent of electricity coming from renewables by 2008, by making it mandatory for electricity retailers to purchase a percentage of renewable electricity each year. At the time, this represented a doubling of post-1997 renewable electricity production.[11] Additional state-based targets were introduced in 2007, and the national target was expanded in 2008 to 20 per cent of electricity by 2020 – a goal that was achieved in 2019.

3.1.1 Why did the RET work?

Four factors contributed to the RET being a successful policy to underwrite development of an industry capable of supplying a large amount of Australia's electricity: it was a long-term policy; it used a market-driven approach; international cost reductions; and the unique nature of electricity compared to other energy sources.[12]

The original RET was legislated to run for 12 years (2000 to 2012). In 2008 this was extended to 2020. This length of time guaranteed that new generators would have markets for their certificates.

While there were some periods of uncertainty (for example, reviews of the scheme in 2006-7 and 2014, and the 2011 split into the Small-scale Renewable Energy Scheme and the Large-scale Renewable Energy Target), much of the scheme architecture has remained for 25 years. However, it is notable that periods of uncertainty about the scheme's future lead to downturns in investment.

An obvious strength of the RET was the use of markets to drive a least-cost outcome. This contrasts to approaches taken in other countries, such as feed-in tariffs, which may have delivered similar industry growth, but at higher cost to those economies.

Australia rode the wave of cost reductions driven by larger countries' moves towards renewables, particularly the growth of wind in Denmark and the UK; and the growth of solar deployment in Germany and solar manufacturing in China.

And Australian households enthusiastically adopted rooftop solar, well beyond the levels that modelling predicted.

The electricity market has some unique characteristics that allowed the RET to succeed. Firstly, it is almost impossible for electricity users to substitute away from using electricity if prices rise. This means that the base over which costs of the RET were spread remained stable over time. And second, there was little need for new infrastructure to support new generation to achieve the RET target of 20 per cent renewable energy.[13]

3.1.2 Unforeseen outcomes and adverse consequences

The RET experience shows it is not easy to forecast how market-based policies will play out.

10. Wood et al (2022).
11. Parliament of Australia (2000).
12. Other policy measures as shown in Figure 3.1 on the preceding page, especially financing, also supported its success.
13. This is partly because demand did not grow (so existing transmission was adequate for demand), and partly because renewable resources were close to existing transmission, or were so good that new transmission could be justified (for example, on the Eyre Peninsula). As the share of renewables has risen beyond the RET target, this is no longer holding true, hence the current need to build new transmission.

Modelling in 1999 predicted that most of the new renewable electricity capacity would draw on bioenergy and waste, with nothing from solar and very little from wind. In the end, wind and solar took nearly 100 per cent of the target.[14]

This modelling was also premised on a forecast that demand for electricity would grow, such that renewables would be used to meet new demand. This did not happen. Instead, demand flat-lined, and pushing in new renewable supply began to undercut market share for coal and gas generators.[15]

Finally, poor co-ordination between state and federal policy lead to state policies distorting investment signals, so that the RET was no longer achieving least-cost outcomes. For instance, generous feed-in tariffs for rooftop solar skewed renewables development away from (cheaper) large-scale solar and wind, necessitating splitting the RET into the SRES and the LRET in 2011. And state renewables targets meant renewables developed in some states and not others, rather than letting it happen in the places with the best resources.

3.2 Where renewable gas differs from renewable electricity

There are a number of factors that affect gas differently to electricity, which will affect how these lessons from the RET can be applied.

Most obviously, demand for gas is shrinking, and the Victorian Government's policy is to shrink it further. This means a reduced user base over which to spread the costs of a renewable gas target, and an increasingly expensive network to deliver the gas. Hence, the costs to gas users may grow over time, even if the cost of producing renewable gas falls.

Shrinking demand could also mean a shrinking network. A renewable gas target is premised on there being a network into which renewable gas can be added, which means there are little-to-no extra delivery costs. But if the network becomes unviable, the design of a renewable gas target would have to be rethought, because there would no longer be an easy link between suppliers and users.

Then there is substitutability. As noted in Section 2.2 on page 4, most gas users already have an economic alternative to using gas: upgrade to electricity. If gas prices rise, this incentive only increases. This will further reduce the base over which costs are shared.

Finally there is the diversity of gas uses. Appliances and equipment that use electricity are not affected by where the electricity comes from, because an electron is an electron. A renewable electricity target had no effect on the technical performance of electrical equipment.

However, not all molecules of renewable gas are chemically identical to natural gas, and not all equipment that uses gas can deal with this difference. For example, engines that use compressed natural gas cannot handle hydrogen in the mix; and gas users that use natural gas as feedstock may not want these impurities either. Renewable gas can also burn at a hotter temperature and a longer flame length, affecting the performance of gas equipment.

These differences point to the need for careful design, which we discuss in Chapter 4 on the following page.

14. McLennan Magasanik Associates (1999) and Clean Energy Regulator (2022).
15. This was a good outcome from an emissions-reduction perspective, but a poor outcome for electricity system reliability because there was (and still is) no policy for dispatchable capacity to supply the other services provided by coal and gas generators.

4 Designing a renewable gas target

To give the renewable gas target the best chance of succeeding, the Victorian Government should first clarify the policy's objective, and potentially adjust the amount of the target. It should stress-test the design against external factors that could help or hinder its success: gas prices, supply chain disruption, and falling demand.

Cost recovery for the target should be limited to industrial gas users and gas power generators, because these are the ultimate beneficiaries of a larger renewable gas industry. It is inequitable and inefficient to expect households to pay for the scheme.

It is not physically possible to achieve the Victorian Government's desired outcome of limiting use of renewable gas to industrial users and gas power generation. Instead, this should be achieved virtually. The scheme should be designed so that voluntary demand for renewable gas is genuinely additional.

The scheme review should be adjusted so that it does not create uncertainty about the policy's future that may hinder renewable gas suppliers in securing finance.

Finally, the government must grapple with how to pay for declining gas networks, an issue that is already pushing up gas bills. The public tend to blame rising electricity prices on renewables, even when the cause lies elsewhere. The same could easily happen to renewable gases if governments do not get on the front foot.

4.1 Clarify the objective

The objective of this policy is not clear. If the intent is to use a form of industry policy to build a renewable gas industry capable of serving the needs of residual gas users in a net-zero Victorian economy, then we would have expected a policy with a higher target.

Instead, the targets proposed are low, and seem to have been chosen because they have the smallest bill impacts, rather than with the size of a future industry in mind.

We don't have a view on the 'right' number for a target, other than that it should underpin the development of an industry that is large enough to be viable without subsidies in the longer term. It seems unlikely that this can be achieved with a target that meets only 6 per cent of projected demand in 2035; particularly when, at that date, there will only be 10 years left to develop a viable industry to meet Victoria's target of net-zero emissions by 2045.

If the objective is only to support early-stage commercialising of renewable gas supply, then a target is not the right instrument.

The Victorian Government should clarify its objective, and change the target to match.

4.2 Stress-test the policy

Certificate-based schemes harness market power to push down the overall cost of achieving a target, while still closing the cost gap between renewable and non-renewable gas. Thanks to numerous other schemes, Australian energy retailers are very familiar with certificate-based schemes, as are investors.

However, a market-based approach will only deliver the least-cost outcome within the circumstances that affect the market. There are a number of factors outside the proposed scheme that could affect future costs, and the Victorian Government should stress-test its proposed design against these and publish the results before finalising the policy.

4.2.1 Policies in other jurisdiction could affect costs

Experience with the RET shows that other state or federal policies can skew the market towards particular sources of certificates, leading to reduced investment in cheaper sources and driving up costs.[16] The hydrogen tax credit, currently proposed by the Federal Government, could do this.

4.2.2 Natural gas prices can go down as well as up

The International Energy Agency is forecasting that up to 45 per cent will be added to global LNG supply in 2025-26. This will push down global natural gas prices, which have a direct impact on wholesale gas prices in Australia. The IEA's view is that prices could fall 80 per cent from 2022 levels by 2030.

Lower prices for natural gas will exacerbate the cost difference with renewable gas. This could increase the cost of achieving the target.

4.2.3 The renewable gas supply chain may be vulnerable to disruption

Capacity to achieve the target will be linked to the price and availability of renewable electricity (for hydrogen-making) and the price and availability of biological waste (for biomethane).

For example, if the price of electricity is higher than forecast, the cost of hydrogen will be higher too. If droughts reduce the amount of agricultural waste available as feedstock, then the cost of biomethane will be higher.

Then there are alternative markets for hydrogen and biomethane that may emerge, and which may be willing to pay more for these gases than are the gas retailers. Sustainable aviation fuel is one such example, methanol is another.

4.2.4 Gas demand may fall faster than expected

The Victorian Government has not released any modelling outlining the sensitivity of scheme costs to the number of gas users shrinking faster than current forecasts. With the Federal Government now pumping more money into home electrification assistance, this risk is increasing.

Faster gas decline would lead to higher per-user costs. One way to reduce this risk is to exclude the sector most likely to shrink (households) in the first place. The case to exclude households is discussed further below.

4.2.5 These factors have implications for target design

The Directions Paper proposes setting the target in absolute (petajoule) terms, rather than as a percentage. This has implications for who bears the cost if any of the above risks begin to manifest.

An absolute target provides more certainty to potential project developers, and means consumers bear the risk of the factors above. But, it relies on the Government being able to pick the 'right' number. If the Government chooses a number that is too high, consumers are potentially paying for an oversupply of renewable gas, and artificially propping up a market.

Using a percentage target means certificate producers bear the risks, because the demand for certificates fluctuates with the demand for gas. This reduced certainty may affect their capacity to secure finance. But it also prepares them for the day when subsidies are withdrawn and they have to manage for competition and demand fluctuations.

16. See, for example, the impact of generous feed-in tariffs for rooftop solar in delaying investment in large-scale renewables projects: Council of Australian Governments (2012).

Risk allocation could be balanced by publishing an indicative long-term target trajectory, based on percentages, with fixed petajoule targets linked to this trajectory in the short term.

Finally, whichever design is chosen for a target, an allowance should be made for gas users who are able to make their own renewable gas on-site, for their own use and/or to sell to others. A percentage target will automatically adjust because self-provision will show up as reduced gas demand. A petajoule target will need these gas users to create and surrender certificates.

4.3 Limit cost recovery to industrial and large market customers

The Victorian Government has raised two models for recovering the costs to gas retailers of purchasing renewable gas certificates to meet the target: costs recovered from all gas consumers (preferred); or costs recovered from industrial users and gas power generators only.

As noted above, the low target means low cost pass-through to gas users. However, this does not mean the basis for cost recovery is unimportant. It's important to get the 'who pays' question right from the start, because adjusting it later (for example at the proposed three-year review point) will mean repeating the political fight.

The beneficiaries should shoulder the cost of developing the industry. The ultimate beneficiaries of a renewable gas industry are:

- Industrial gas users that do not have the option to replace natural gas with electricity
- Gas power generators that require a substitute fuel to keep operating.
- (Indirectly) all electricity users, who benefit from the back-up role that gas power generation plays in a high-renewables grid.

This means the costs should be recovered from industrial gas users, and gas power generators (and electricity consumers, via cost-pass through on electricity prices). This would also align the cost-recovery basis with the preferred position that the gas only be used by these consumers.[17]

Gas users who have the option to upgrade to using electricity (households, commercial users, and some industrial users) do not benefit directly from a renewable gas industry, because for these users, electricity is already a more economic choice. Recovering costs from these gas users would be asking them to pay twice: once via electricity prices; and once via their gas bill.[18]

As we noted in our 2023 report, *Getting Off Gas*, about half of Victorian consumers will find it difficult to upgrade from gas to an all-electric home, either because they rent their home, they have a low income, they do not have access to sufficient capital, or because they live in a multi-unit building. If the cost of a renewable gas target is spread over all consumers, these households will pay a disproportionate share over time – to build an industry that ultimately has no direct economic benefit to them.

4.4 Ensure industrial customers and gas power generators can account for their use of renewable gas

The Victorian Government's stated position is that renewable gas will be used only by industrial customers and gas power generators.

This is not physically feasible with the gas network Victoria has today.

17. As noted in Section 4.4, it is not *physically* possible to achieve this outcome, but it is possible to achieve it in an accounting sense.
18. We have been unable to determine whether any cost-benefit analysis of a renewable gas target included higher electricity costs for residential customers.

Gas power generators and industrial users take gas from either the transmission or distribution networks. Largely, they take a continuous 'flow' of gas – that is, they don't store batches of gas on-site for intermittent use. For part of this flow to come from renewable gas, renewable gas delivery must be able to mimic a flow. And this flow must not be allowed to go to households.

There are three options to stop renewable gas flowing to households, none of which are practical:

- Build a separate network for renewable gas, servicing only gas power generators and industrial customers. This would be ridiculously expensive and quickly redundant.
- Only allow renewable gas to be injected into networks where all the customers on that network are industrial facilities or gas power generators. This would leave out many users, and may not even be possible.
- Deliver renewable gas by truck, with users temporarily not using network gas while they take the gas from the truck. The logistics of this would be untenable.

The alternative is to treat this as an accounting problem and ignore the physical system. Renewable gas could fed into the network at whichever point is convenient. Gas power generators and industrial users would receive a monthly/quarterly/yearly estimate of how much renewable gas they 'consumed' *as if* all the renewable gas had flowed to these users and none to households. In essence, this would function like a renewable power purchase agreement in the electricity market.

Further, the Government could prohibit retailers from telling household customers that they are using renewable gas, unless these customers are voluntarily paying extra for it (more on this below).

4.5 Align the review point with commercial finance norms

The scheme design presented in the Directions Paper includes a review point at 2030, three years after the scheme commences. It's sensible to have a review, but this short time between scheme start and review point may reduce the efficacy of the scheme.

As the Directions Paper points out, the cost gap between renewable and fossil gas is high. For early renewable gas projects to be viable, they will need to give their financiers certainty of revenue over the terms of their debt finance – probably five years or more on standard commercial debt.

A three-year review point that includes the level of the target may mean project proponents can only get contracts to sell three years' worth of certificates, because there would be no certainty that the target would continue after 2030. This may be insufficient future revenue certainty to underwrite many projects.

We recommend the review point be moved out by two years, to 2032, to match commercial finance terms; or that the review after three years only consider operational matters.

4.6 Ensure voluntary demand is genuinely additional

The Directions Paper does not canvass issues around voluntary demand, but it seems from the stakeholder engagement events that there may be some interest among some users. If experience in electricity is anything to go by, the future quantum of voluntary purchase is likely to be very small.

Given the Victorian Government's policy to move as many gas users as possible to electricity, voluntary uptake of renewable gas should be handled carefully, to avoid prolonging gas use and to avoid misleading consumers.

Alongside the target, the Victorian Government should require that, if retailers create 'green gas' products where users pay a premium, the retailer must acquire and surrender additional certificates beyond the legislated obligation. This way voluntary purchases of 'green gas' will be genuinely additional.

4.7 Reforms are urgently needed for a declining network

Once constructed, the cost of running a gas network is much the same regardless of the number of users. As the user base declines, network businesses could increase prices to maintain their revenue, and those consumers who can't leave due to financial or technical reasons will pay higher and higher bills. The alternative is for the network business to see decreasing revenue with no way to recover.

Gas network owners are already asking the Australian Energy Regulator for accelerated depreciation allowances to bring forward future revenue to now. This will push up gas costs, particularly for households.

While accelerated depreciation provides a little breathing space for gas network owners, it isn't a long-term solution.

Accelerated depreciation applies only to physical assets. If the number of gas users is shrinking, and networks are no longer expanding, operations and maintenance costs become a larger part of the network businesses' cost bases. These costs don't change much with the number of users.

It remains an urgent policy priority to reach agreement with network businesses to to safely and fairly reduce the size of the gas network so that it serves the residual gas users in a net-zero economy.

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