

Q1 - Scenario Design Concerns

We start by pointing out that neither the Victorian government's emission targets nor the timetables for the four scenarios modelled are consistent with the 1.5°C or 2°C ceilings in the pathways modelled by the IEA Special Report on net Zero Emissions by 2050, nor the IPCC Report 6. Neither timetable has considered the carbon budget essential for remaining within those ceilings, and especially the 1.5°C ceiling.

In 2014 the Commonwealth Government's Climate Change Authority calculated Australia's emission reduction targets that should be adopted to stay within the 2°C ceiling by 2050.

The CCA calculated the world carbon budget at that time and assigned Australia's fair component to be 0.97% of this budget.

It set a target for Australia to remain within that Budget, by achieving between 45% and 65% emissions reductions by 2030. The Paris Agreement was completed in 2015, with Australia adopting a target of between 26 – 28% reductions by 2030. But the government has never enabled the CCA to update the emissions targets. Recognizing that Australia will be expected to bring a stronger 2030 target to COP26 in November, a group of experienced climate scientists, together with John Hewson, formed the independent Climate Targets Panel to update the CCA's work, using the same assumptions and methodology. The Panel comprised Prof Will Steffen from the ANU, Prof Lesley Hughes from Macquarie University, Assoc Prof Malte Meinshausen, founding Director of the Climate and Energy College at Melbourne University, and John Hewson AM.

The Panel developed short and long term targets consistent with the dual temperature goals of keeping global warming well below 2°C above pre-industrial levels, and preferably, 1.5°C above the same levels. Its first report published in January this year found that it is not possible to maintain the current 2030 target, coupled with a zero emissions target at 2050, without significantly exceeding the 2°C target. Australia has used up so much of its budget that to be consistent with the 2°C target, a 2030 reduction of 50% would be needed, reaching 67% reduction by 2035 and net zero emissions by 2045¹.

The CCA had calculated that Australia's 2013 – 2050 Budget was 10,100 MT Co2e and the Panel, using updated figures, determined that that figure should be recalibrated to 10,400 MtCO2e. Between 2013 and 2020 Australia emitted 4,237 MtCO2e, leaving a remaining budget of 6,161 MtCO2e between 2021 and 2050 if Australia is to remain within the 2°C limit.

To limit warming to 1.5°C or less, the task is much greater, requiring a reduction of 74% by 2030, and net zero by 2035. In budget terms, between 2013 and 2050 the available budget is 3,521MtCO2e. Averaging that over 37 years requires that annual emissions be reduced from 538.9 MtCo2e (produced in the year ending March 2019) to 95.2 MtCo2e (note that this is a linear calculation of the average annual reduction– reductions should be higher for near-term years, tapering to zero by 2050).

¹<https://www.climatecollege.unimelb.edu.au/files/site1/docs/%5Bmi7%3Aami7uid%5D/ClimateTargetsPanelReport.pdf>

Victorian emissions in 2019 were 17.25% of Australia's²; that leaves a total annualised budget for Victoria of approximately 16.42MtCo2e between 2021 and 2050. In 2019, the last year for which figures are available Victoria's emissions were 91.3 MtCo2e, falling from 94.60 MtCo2e in 2018³.

The significance of these figures is twofold. First, Victoria's current level of annual emissions is over five times its allowable budget for the 1.5°C ceiling. Second, it is not sufficient to simply set a 2050 zero emissions target, if along the way emissions cumulatively exceed the Budget ceiling. And International, Australian (assuming zero emissions by 2050) and Victorian targets are all well in excess of this ceiling. Australia's current trajectory will lead to well over 3°C, and Victoria's target of between 45% to 50% reduction by 2030 would mean that it is still producing approx. 60MtCo2e4 annually by then – well above the 16.42MtCo2e allowed by the 1.5°C budget.

Q2 - Optimum Scenario

Given PECAN'S position that full electrification is the only way to minimise total destruction of Victoria's carbon budget our preferences are directed to Scenarios A and B. However we are aware of criticisms raised in the Roadmap consultation about the limitations of the scenario design process, in not giving sufficient weight to demand reduction and energy efficiency measures.

In an indication of how rapidly technology and preferences are moving, the Northmore Gordon⁴ study commissioned last year by Environment Victoria did not include heat pumps in its survey of electrification methods to reduce domestic energy usage. This year there are many heat pump alternatives available in the market, both air and ground sourced, with more efficient models anticipated, to widen the range of possible applications.

The energy efficiency measures modelled in the four scenarios are described as “moderate” or “small”, and as pointed out in Alan Pear's submission to the Roadmap, severely underestimate the gains that can be made in this area.

We repeat the recommendation made in our submission to the Roadmap, that the modelling carried out by Doris Engineering needs to be reworked to comprehensively incorporate the full range of energy efficiency, demand reduction and full electrification measures in scenarios A and B. Alongside this modelling, we note that AEMO has published its intention to model energy efficiencies and electrification in the ISP 2022 scenario collection:

The design of the Rapid Decarbonisation sensitivity would mirror much of the Export Superpower scenario....and would target a rapid pace of change affecting the energy sector consistent with strong global action in limiting temperature rise to 1.5°..... but would require greater investment in other technologies..... particularly electrification and energy efficiency⁵.

Q3 - Low Carbon Pathways

Biogas can be produced from landfill or by crop waste or other organic waste sources. Its more widespread use is limited by three factors – it is not in widespread commercial use at

²<https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-2019/state-and-territory-greenhouse-gas-inventories-data-tables-and-methodology>

³ Ibid

⁴ <http://environmentvictoria.org.au/wp-content/uploads/2020/06/Vic-Gas-Market-Demand-Side-Study-Final-Report-1.pdf>

⁵ <https://www.aemo.com.au/-/media/files/major-publications/isp/2021/2021-iasr-consultation-summary-report.pdf?la=en> (p25)

present, and depends on commercial levels of waste materials being available; it can be converted into biomethane but as outlined in Q2 we do not support this process as it assumes continuation of existing natural gas infrastructure. Its use will probably be limited to locations where source materials are readily available – sewage farms, landfill, some industrial locations like paper manufacturing.

Green hydrogen is in a quite different category and is recognized globally as a renewable energy resource which can replace natural gas and metallurgical coal in many commercial and industrial applications. Massive investments are underway worldwide to bring down the cost of green hydrogen to more competitive levels of around \$2 kg (\$16.70 GJ); Australia is recognized worldwide as having major advantages in solar, wind and other renewable resources to supply hydrogen for export at competitive pricing. The Commonwealth, Victorian and other State govts are supporting research and trial projects; applications like direct electricity production, transport, fertilizer and steel production are in prospect, and hydrogen exports into Asia will be in demand to replace current exports of natural gas. Key policies and trials under the Victorian Govt's Renewable Energy Industry Plan should be supported and developed in light of ongoing outcomes, including the Hydrogen for Industrial Users Program, hydrogen hubs being developed within Victoria's Renewable Energy Zones, and the Victorian Hydrogen Hub education program between Swinburne University and CSIRO.

Carbon Capture and Storage is difficult to support, as outlined in Q2. Its added costs, of capture, transport and storage are all unavoidable and represent an intrinsic problem, with incalculable amounts of leakage along the way. It is still being trialed in a number of locations in Victoria but it is not a new technology and its continued boosting has functioned more as a way of sustaining the belief that the continuation of fossil fuel burning can proceed despite unacceptable emissions, than as a realistic way of dealing with those unacceptable emissions – in short it functions as the main plank of the fossil fuel's industries greenwashing armory. Under an optimum electrification policy which we support its use should be minimized. A brief history of Gorgon in WA is illustrative.

Q4 - Maintaining Reliability and Affordability of Victoria's Gas Supply

It is important that the transition out of gas is conducted in a phased and planned process. As emphasized in our Roadmap submission, highest priority should be given to energy efficiency measures, especially focused towards vulnerable households where old and inefficient gas appliances are increasing the volume of gas used and the costs to those households; it may be important to increase assistance available through the Household Energy Savings and the Energy Services Agreement programs to households and commercial entities respectively. These programs join together efficiency measures with the installation of new and more efficient appliances and could be strengthened to facilitate more rapid electrification of homes and businesses; the savings would be enhanced by full electrification, enabling avoidance of gas service charges. Priority should also be given to

early shutdown of those parts of the gas reticulation system which are oldest and most in need of upgrades, or conversely are most affected by diminishing demand.

Q5 - Decarbonisation Pathways

Electricity Grid development is proceeding rapidly as the NEM moves from a centralised basis to more distributed and localized energy availability. The new CEO of AEMO sees the NEM as needing to be able to run without interruption with 100% renewables by 2025.⁶ For Victoria in particular the recent commitment to building Project Energy Connect, the interconnector linking Wagga Wagga via Red Cliffs⁷ to SA, together with the Marinus interconnector from Tasmania to the NEM through Victoria will enhance grid capacity and reliability. The 2 gigawatt Star of the Sea off shore wind project as well as offshore wind projects off Tasmania, as long as environmental impacts prove positive, need to be accelerated. And as described above, strong action to improve energy efficiency together with more efficient electric appliances with smart management and more localized battery storage will all enable some increase in electricity usage to be better managed.

PECAN is a member of the Metropolitan Community Power Hub which it is anticipated will foster a number of neighbourhood batteries in several locations. As more local-scale batteries come into operation across Victoria, together with more domestic batteries and EV takeup, a more resilient grid is gradually being developed.

Q6 - Optimising Existing Gas infrastructure

Given our support for maximum degasification, it is imperative that the transition to renewables is made as quickly as possible. Delay means more cumulative emissions, more uncertainty for consumers, and will enable strong gas industry forces to maintain and increase pressure for continuation of the gas grid. Proposals to optimize the gas grid out to 2050 must not be contemplated.

However this needs strong government intervention requiring unequivocal commitment to rapid degasification. It raises many political issues and questions around private ownership and shareholder value; we note that the United Workers Union argues for public and social ownership of key components of the energy system. The Victorian government faces many obstacles in the degasification process; Infrastructure Victoria's discussion paper identifies many community ill-founded beliefs and misunderstandings about the size and importance of the gas industry and its contribution to employment numbers and Australia's GDP, based to a large extent on the claims of the Gas industry over many years, and now embodied in *Gas Vision 2050*.

The technological capacity exists for more rapid electrification of Australia's energy system than that incorporated into the four scenarios which were examined. An enormous amount of work carried out by AEMO and the CSIRO has been directed towards grid electrification,

⁶ <https://reneweconomy.com.au/new-aemo-boss-wants-australias-grid-to-handle-100-pct-renewables-by-2025/>

⁷ <https://www.abc.net.au/news/2021-05-31/sa-nsw-electricity-interconnector-gets-approval-from-regulator/100177928>

and together with domestic and commercial uptake of solar PV, Victoria has a head start in moving towards full electrification. Decarbonizing would be a much more straightforward process if Victorian and Australian govt objectives were harmonized.

Q7 - Measures Needed to Manage Gas Decarbonisation in Households and Businesses

Mention is made under 5.2.2 of the report of 'the ability for society to adapt to the degree of change necessary to move to the reality of a zero-carbon economy' (p32). It identifies gaps in 'the current knowledge base amongst consumers' and states that 'Infrastructure Victoria will seek to fill some of these gaps in understanding by commissioning our own research and analysis in the next phase of this work'.

However, the report does not give sufficient attention to the State Government's role in convincing the population of Victoria of the need for a rapid transition away from gas use to a renewably based energy system. While the report declares 'Each of our four scenarios assume a radical change in energy sources by 2050' there is not a commensurate recognition of the kind of changes in public understanding and action necessary to make 'the radical changes' proposed. There is an urgent need to widely disseminate why the switch away from gas is necessary and how this can be done.

The Infrastructure Victoria Report does acknowledge the Necessity for State Government community engagement

All future scenarios represent change. The Victorian Government will have a key role in building community knowledge and engagement on these changes. Consumer engagement in decision-making is critical from the outset as they will bear much of the transition burden. End-users will need to be ready for new energy sources, either upgrading appliances for electricity or hydrogen. The community will also need to be engaged on risks, benefits and safe use.

However, how crucial this engagement is and extensive it needs to be should be given greater prominence in government planning. Without convincing the many groups invested in gas that a rapid transition is necessary and possible, it is unlikely the transition will occur. Gas companies could well publicly oppose the transition and mount public campaigns to persuade the population that they will lose out from the transition. The companies will very likely enlist the support of workers in the industry unless there is a clear transition available for workers (see the excellent United Workers Union submission to this Inquiry). The State opposition will almost certainly support the gas companies and could possibly win an election on the back of a concerted campaign of opposition to the transition. The Federal Coalition Government, if it remains in government, given its capture by the gas industry, will also tie funding to State government support for the continuation of gas use, as it has already done.

It is not hard to find evidence for the likelihood of this. One need only be reminded of the campaign by mining companies to prevent the super profits tax the Federal Labor Government attempted to introduce; the claims by the Federal Coalition Government that we would 'lose our weekend' if targets for transport electrification were put in place.

No matter how 'rational' a transition to a renewable based energy system appears to be when viewed from an engineering and conventional economic perspective, without recognising, anticipating, and countering the powers coalescing to oppose the transition, the transition may well not succeed. Nor is it likely that regulations on their own, without a well disseminated accompanying persuasive story of their necessity, will work – simply because the regulations will be exploited and countered by proponents of gas to build opposition to government proposing them.

Public community education, promotion, and persuasion is thus not an add on to the real work of planning the transition that engineers and economists undertake but should be seen as a necessary aspect for the transition to occur at all.

Public education would need to be planned in terms of phases, diversity of audiences, and resources devoted to it.

Various campaigns to engage diverse audiences should be designed that would draw on available national and international research in the field and would be undertaken through all media, including broadcast media.

Local Government should be encouraged and resourced to facilitate campaigns. Universities, TAFE, Adult Community Education providers and schools also should be resourced to develop appropriate curriculum. The cost of this activity might seem considerable, but once recognised as critical to the transition at all occurring, may not seem so high.

The need to adequately resource 'building community knowledge and engagement on these changes' cannot be overemphasised.

The report in fact underemphasises the importance of community mobilisation to bring about the transition; it also underemphasises the role that State government can play in leading and shifting community understanding and action.

Q8 - Policies to Discourage Gas Use

In the first place building codes and planning systems must be upgraded to give notice that new buildings do not require gas connection, as has already happened in the ACT, which plans to be completely off gas by 2045. Current expansion of the Ginninderry housing development in the ACT is providing all electric housing, and the Suburban Land Agency is providing \$10,000 rebates to all-electric housing builds. There are \$4,000 grants towards electric batteries and other incentives for EVs.

The three elements of education, incentives and regulation must be pursued together. Community education programs, properly developed and sustained, can make a compelling case with emphasis on the savings and benefits involved – in energy costs, emissions reductions, and health benefits⁸. More incentives may be required to encourage households and businesses to replace gas HWSs and space heaters with heat pumps through the

⁸ <https://www.climatecouncil.org.au/resources/invisible-danger-gas-asthma-children/>

Victorian Energy Upgrade program. And regulation is likely to be required in a number of areas – ensuring that the gas grid is properly maintained and safe, and free from leakages; ensuring that as more households transition away from gas, additional costs are not passed on to continuing customers, especially those more vulnerable to cost increases, and updating plumbing policies which now require, for example, gas-boosted solar hot water.

Q9 - Supporting Energy Switch from Natural Gas to Lower Energy Sources

Larger industrial users are in most cases more likely to be able to make informed choices about switching from natural gas to low emissions sources or feedstocks. There may be some instances where companies with large gas usage continue without examining the opportunities or need for change – the 5% of consumers using 15% of total gas consumption. There may need to be targeted attention to this group of companies.

The problems are greater for smaller operations, where technical advice is more difficult to obtain and is often only available from manufacturers. There may also be a vacuum in expertise and specific applications at government level. Putting these situations together, advisory assistance, information and education will need to be available to these companies, and greater expertise will need to be developed within relevant government departments and agencies. And these smaller companies may need targeted incentives, as inertia and business as usual attitudes are often at work.

RECOMMENDATIONS

Rework scenarios to include their respective carbon budgets progressively, and to incorporate the impacts of optimum energy efficiency measures, demand reduction and electrification.

Announce degasification policy as early as possible, accompanied by comprehensive education programs directed towards households, businesses and industry.

Update Victoria's building and planning codes to enable full degasification as early as possible.

Develop appropriate regulatory measures to support grid safety and affordability with particular attention to vulnerable households.

Alongside education and information programs, develop advisory services for households and businesses.

The State government should extend the the Victorian Energy Upgrades program to enable energy efficiency measures to be accessible to a wider range of household and businesses, and to incorporate stronger incentives and regulatory measures relating to hot water services and heat pumps especially for vulnerable households .

The State government must develop a comprehensive and long term program to assist workers and businesses affected in the transition.

Jack Halliday, Peter Moraitis, Rob Davis, for PECAN, August 16, 2021