Submission to the Independent Expert Panel on the Interim Emissions Reduction Targets for Victoria (2021-2030)

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About the Climate Council

The Climate Council is an independent non-profit organisation that provides authoritative, expert advice to the Australian public on climate change. To find out more about the Climate Council's work, visit: www.climatecouncil.org.au.

We would be happy to provide a briefing or further information on the information presented within this submission: Email: info@climatecouncil.org.au.

Introduction

This submission discusses the interim emissions reduction targets for Victoria for 2021 -2025 and 2026-2030 and trajectories to reach net zero emissions in Victoria by 2050. The submission provides additional input and evidence for the Interim Targets Expert Panel to consider in developing advice for the Victorian Government on these matters. The recommendations in this document were considered in relation to the Terms of Reference and the principles of environmental effectiveness, economic efficiency, equity (intergenerational and intra-generational), flexibility, investor certainty and policy coherence. They were also considered in line with the requirements for interim targets outlined by *The Climate Change Act 2017*.

Summary of key points

1. From an environmental effectiveness and equity perspective Victoria would ideally derive its interim targets from an emissions budget that gives a likely possibility of limiting global average temperature increases to the Paris Agreement targets – i.e. well below 2°C and as close to 1.5°C as possible.
2. Downscaling this global budget on an equal per capital basis gives an emissions budget for Victorian of ca 400 Mt CO2-e. Meeting this would require extremely steep emissions reductions, reaching zero within the next few years.
3. Taking this into account, the Victorian Government should opt for targets that enable Victoria to reach net zero emissions by 2050 while cutting emissions as steeply and quickly as possible to limit cumulative emissions.
4. High ambition including complete decarbonisation of electricity in the next 10-15 years is crucial to keeping Victoria's cumulative emissions as close as possible to remaining within a 2°C budget.
5. Decarbonisation of the electricity sector by 2030 and improvements in energy efficiency would enable Victoria to meet a target for 2025 of 46% emissions reductions below 2005 levels by 2020 and 61% below 2005 levels by 2030. This would be ambitious but achievable and would set Victoria on a realistic path to achieving net zero emissions by 2050.
6. Setting sector specific targets would encourage investment and facilitate an orderly and efficient transition.

Specific emissions reduction opportunities available to Victoria include:

- Zero carbon electricity
    - Set a target for 100% renewable energy by 2030 and meet this by establishing a reverse auction for renewable energy. The ACT reverse auction approach is a proven model to decarbonise the electricity sector in 10-15 years at low cost.

- Energy efficiency
    - Set a target to increase the efficiency of buildings, appliances and industrial equipment by 2030 through strengthened building codes and other measures (by a minimum of 20% by 2030, i.e. 2% per year).

    - Adopt an energy efficiency disclosure rating scheme for existing houses at the point of rent or sale.
    - Develop a program to kick-start investment and innovation in net zero emission refurbishments and expand program for new-build houses.
    - Establish an energy efficiency scheme to directly install energy efficient devices in homes across Victoria.

- Fuel switching and electrification
    - The key to achieving emission reductions in the transport sector is to electrify transport and achieve 100% renewables in the electricity sector. Victoria should develop a transport strategy and action plan that involves:
        - Integrated transport and land use planning.
        - Setting modal shift targets for moving people out of cars and onto public transport.
        - Investing in expanding public transport coverage and services as well as active transport infrastructure (bike and pedestrian paths).
        - Providing incentives for uptake of electric vehicles and establish charging infrastructure.

7. International or national “offsets” should not be used to meet the targets.

Box 1: Case study of the Australian Capital Territory

The Australian Capital Territory (ACT) provides an excellent case study to explore how to reach net zero emissions with ambitious emissions reduction and renewable energy targets followed by action to cut emissions. The ACT legislated in 2010 to reduce emissions below 1990 levels by 2020, 80% below 1990 levels by 2050 and net zero emissions by 2060. They further set a goal of 90% of electricity consumed to be supplied by renewable energy by 2020 and to peak per capita emissions by 2013. They later extended their renewable energy target to 100% renewable energy by 2025.

The ACT is currently on track to meet its 2020 target. Per capita peaking of emissions has also been achieved far earlier than expected (in 2005-06) and maintained. The ACT's targets have been backed by action plans outlining key activities, as well as a number of key programs to increase energy efficiency. Another key element in the ACTs emissions reduction success has been an award-winning reverse auction process and innovative feed-in structure for securing new renewable energy generation at low cost. Through this process 240 MW of new generation has been secured from solar and wind, driving down wind generation costs not just in ACT but also other states. There are many benefits to the reverse auction process in terms of reliability, effectiveness, efficiency and cost savings. An Energy Efficiency Improvement Scheme was also established to improve energy efficiency in 60,000 homes in the ACT. This will deliver almost 500 Kt CO2-e in emissions savings and an average of $1600 per household in financial savings. From 2020 onwards, the ACT will focus on implementing its Active Transport Framework and Low Emission Vehicle Strategy.

The ACTs emission reduction progress is monitored via annual greenhouse gas reports prepared in accordance with IPCC guidelines and the Minister for Environment reports on actions to address climate change. The Office of the Commissioner for Sustainability and Environment monitors the implementation of Action Plan activities through implementation status reports prepared every four months. The ACT Climate Change Council has been appointed to provide expert advice on issues related to mitigation and adaptation.

The Carbon Disclosure Project has ranked the ACT #1 in the world for emissions reductions and #3 in the world for renewable energy out of any state or region reporting to them. Victoria could significantly benefit from drawing on the successes and lessons from the ACT's journey to decarbonise electricity and move towards net zero emissions.

Form and scope of the interim targets and trajectory

Victoria's emissions reduction trajectory and interim targets should be informed by science. The 'carbon budget' approach is a simple yet scientifically rigorous tool for calculating the level of emissions reductions required to meet a given temperature target. The tool is based on the relationship between carbon dioxide emitted since pre-industrial times and increases in average surface temperature. The budget is the amount of carbon that can be spent before emissions need to be zero to prevent the temperature target from being exceeded. There are three main variables that influence the total global emissions budget: 1) the probability of reaching a specific temperature target (a higher probability of meeting a given target means a lesser budget and vice versa) 2) the inclusion of non-CO2 gases (the inclusion of non-CO2 gases decreases the budget) and 3) the possibility of feedbacks in the climate system, which may re-emit carbon thereby reducing the budget.

Various global emissions budgets have been calculated based on different assumptions about these variables. Clearly, as more carbon dioxide is emitted, the emissions budget shrinks, therefore it is important for the budget calculation to be up to date. We have calculated that based on a 66% probability of limiting temperature increases to 2°C, the current global emissions budget is 139 Gt C. This target is based on the emissions budget outlined in IPCC (2013) but updated to account for carbon that has been consumed between 1870 and 2017, factoring in non-CO2 greenhouse gases and accounting for possible feedbacks in the climate system as discussed in Steffen et al. (2018).

Victoria's emissions budget can be calculated by dividing the global emissions budget on an equal per capita basis and aggregating the equal per capita budgets for the population of Victoria. There are a number of other 'resource sharing' approaches outlined in Appendix C of the Climate Change Authority (2014), which are based on different equitable principles. For Victoria, assuming a population of ca 8 million by 2040 and a global population of ca 8 billion, we calculate the Victorian carbon budget for the 2°C target going forward to be ca 400 million tonnes (Mt) of C (emitted as CO_2-e).

As shown by Figure 1 below Victoria's emissions budget for the 2°C target is very close to being fully exhausted. To meet this target, the emissions reduction trajectory would be extremely steep.

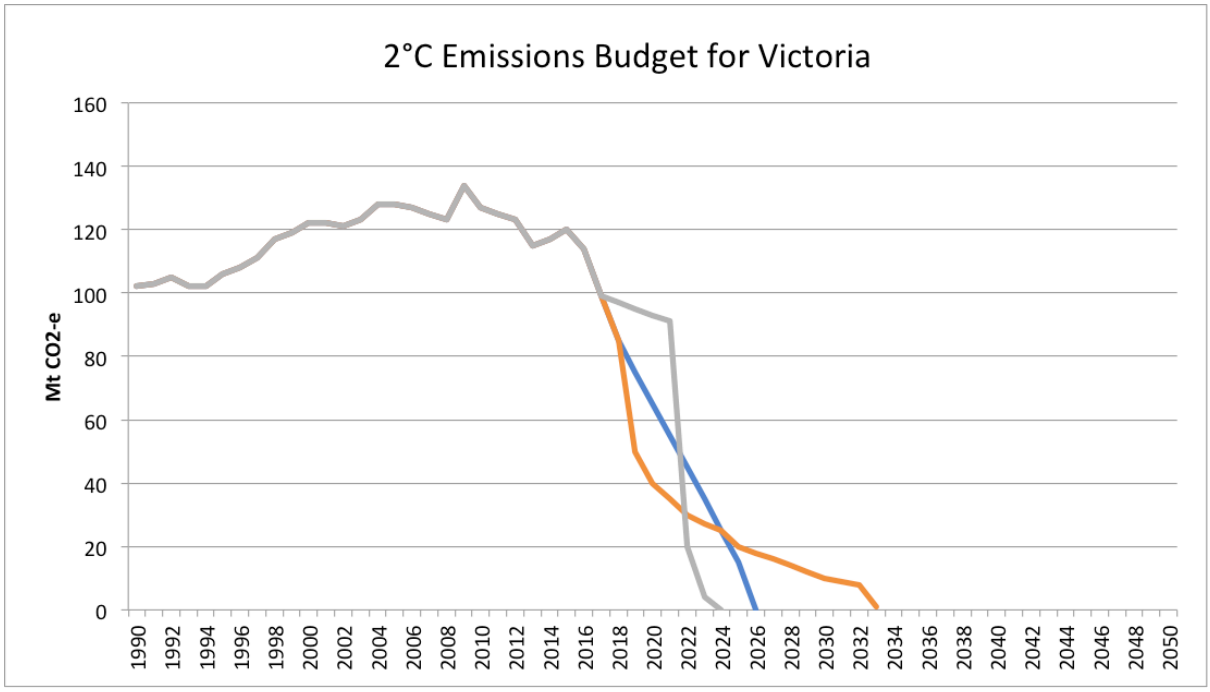

Figure 1: Three scenarios for keeping within a 2°C emissions budget for Victoria. The orange path shows high ambition earlier on, and lesser ambition later on. The blue path shows steady ambition, and the grey path shows less ambition early on. Each curve has the same emissions budget of 400 Mt C (the area under the curve). This budget is based on a global budget that gives a 66% probability of limiting warming to 2°C factoring in non-Co2 greenhouse gases and possible feedbacks (source: authors).

The three scenarios in Figure 1 above illustrate that early action is critical to limit future costs and maintain the feasibility of limiting temperature increases. All three scenarios would result in the same cumulative emissions (the area under the curve), but the grey line shows that delaying emissions reductions for just a few years significantly increases the rate at which emissions need to be reduced in the future. This could increase the costs of meeting a given emissions target and reduce flexibility in choosing how to reduce future emissions.

Unfortunately, it would be unfeasible for Victoria to achieve any of the scenarios illustrated in Figure 1. Nevertheless, Figure 1 demonstrates the importance of Victoria reducing its emissions rapidly and deeply. High ambition in the next few years will make a significant impact towards reducing Victoria's overall cumulative emissions to 2050 and remaining as close to remaining within a 2°C budget as possible. An important lesson can be drawn from Figure 1: delaying emissions reductions by just a few years can easily blow out an emissions budget.

Figure 2 (below) shows a scenario where Victoria reaches net zero emissions by 2050 while limiting cumulative CO2 emissions to 2050 as much as possible via steep near-term emission reductions. This trajectory shows a steep decline over the next 10-15 years while Victoria decarbonises its electricity sector and improves energy efficiency. This would reduce Victoria's emissions by ca 50% by 2030 compared to current levels, or by 61% compared to 2005 levels. The slope of the trajectory becomes less steep after 2030 while Victoria deals with transport emissions and stationary energy (by electrifying transport and powering this with 100% renewable energy) to 2040 and then deals with agriculture and other non-energy emissions to 2050. Despite the seemingly high ambition of this scenario, the area under the

curve in Figure 2 (i.e. the total cumulative emissions to 2050) is 1,423 Mt CO2-e, which is roughly four times the 2°C emissions budget for Victoria. The trajectory below estimates Victoria's current emissions (in 2017) being around 99 Mt CO2-e. This is based on the 2016 figure (113.9 Mt CO2-e) minus roughly 15 Mt CO2-e which have probably been eliminated through the closure of Hazelwood power station (DELWP 2017).

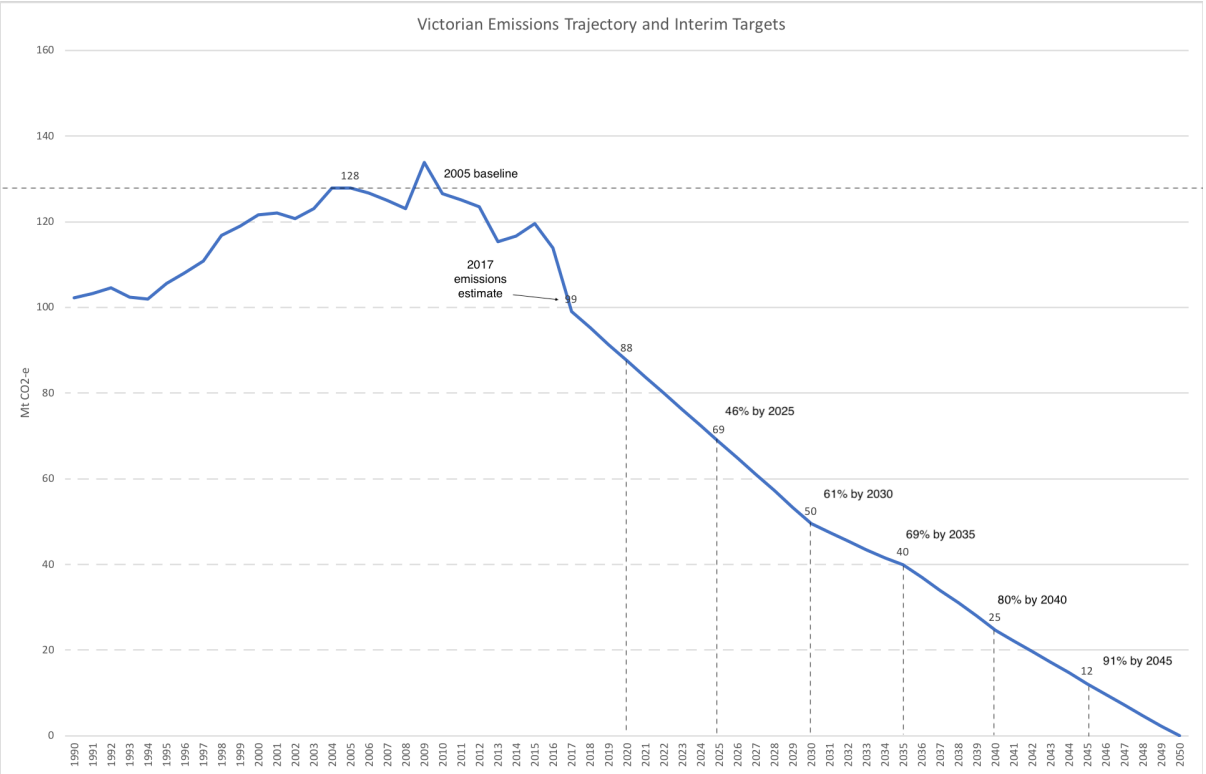

Figure 2: Scenario showing ambitious yet feasible emissions reduction trajectory to reach net zero emissions by 2050 (source: authors).

In the scenario illustrated above, Victoria's interim target for 2025 is 46% below 2005 levels and the 2030 target is 61% below 2005 levels. These targets are feasible, albeit ambitious. The ACT decarbonised its electricity sector within a decade and renewable energy is cheaper and more efficient now then it was when the ACT started. Furthermore, Victoria can draw on the knowledge and lessons learned by the ACT through this process. The ACT did this by developing an innovative reverse auction process that has delivered renewable energy at low cost. Through the reverse auction process, the ACT has lowered the cost of new wind generation, thereby helping the other states. The reverse auction for wind generation beat the lowest prices in other states by more than 10%. The ACT also embraced energy efficiency through a dedicated program. The step transition to renewable energy has been delivered at a household cost that will peak at $4.67 per week by 2020 (ACT Government 2016).

There are benefits to Victoria in adopting an ambitious target. Victoria has a highly emissions intensive electricity sector, which contributes a large proportion to its overall emissions. The availability of cost-effective technologies to reduce emissions in the electricity sector means that it will be possible and cost-effective for Victoria to make significant inroads towards net zero emissions over the next decade.

An emissions reduction target floor should be implemented but no upper limit. Setting an emissions floor provides confidence in terms of environmental effectiveness and offers sufficient guidance to business and industry, whilst allowing flexibility to increase ambition as new technologies are developed.

The deep decarbonisation approach recommended by Climate Works (2014) shows the benefits of adopting strong energy efficiency, followed by emissions reductions in the electricity sector, followed by emissions reductions through fuel-switching in the transport and stationary energy sectors, followed by addressing non-energy emissions. Although the pathways for emissions reductions will overlap, this chronology roughly makes sense in terms of available technologies and cost-effectiveness. This also follows the order of the most emitting sectors in Victoria: electricity (50%), transport (20%), stationary energy (16%), agriculture (12%), industrial processes (4%), fugitive emissions (3%) and waste (2%). The land use sector was calculated as being a net sink of carbon emissions in 2016 (DELWP 2017).

Emissions Reduction Opportunities in Victoria

Zero carbon electricity

Victoria currently has a renewable energy target of 25% of electricity generated from renewable sources by 2020 and 40% by 2025. As previously mentioned, Victoria could feasibly achieve a target of 100% renewable energy by 2030, but to do so the interim 2020 and 2025 targets would also need to be increased. Combined with aggressive energy efficiency this would enable Victoria to achieve an overall emissions reduction target of 61% below 2005 levels by 2030.

Storage technologies are available now and at rapidly decreasing costs. Victoria also has a significant advantage in the sense that it already has a massive battery in the form of hydropower from Tasmania. Pumped hydropower using renewable energy could be used as an effective energy storage technology for Victoria. Tasmania is aiming for 100% of its energy to be generated by renewable sources (including hydropower) by 2022.

The technical potential and technology exists to achieve this level of abatement in the electricity sector, which will in turn unlock the substantial amounts of abatement through electrification in buildings, transport and industry, which are key to meeting the net zero goal by 2050. Without shifting from coal to renewables, abatement through electrification of transport and industry will be impossible.

Progress in renewable energy needs to be combined with a planned transition away from coal by 2030, or emissions reduction targets will not be met. Victoria has three remaining brown coal-fired power plants, all located in the Latrobe Valley: Yallourn, Loy Yang A and Loy Yang B. These plants are between 21 and 43 years old. Yallourn's license is due to expire in 2026 and it is imperative that it is not extended.

Energy efficiency (buildings, industry and transport)

Significant gains in energy efficiency can be made in many end-use sectors through improving and optimising residential and commercial buildings, building practices and construction materials, industry, equipment, production processes and value chains, smart urban design, vehicle technologies and passenger and goods transportation. In particular, many opportunities exist for improving the energy efficiency of buildings (residential and commercial), which are responsible for roughly one quarter of all end-use emissions from electricity. At present there are a number of barriers to net zero emissions buildings, which government policies and strategies could help to overcome. Policies and strategies must incentivise energy efficient design and retrofitting in both new buildings and existing stock.

The following strategies and activities could be considered:

- Set a target to increase the efficiency of buildings, appliances and industrial equipment by 2030 by a minimum of 20% (around 2% per year).
- Implement best practice in energy efficiency in building codes or set a target year for all new houses to be net zero emissions. California has set a target for all new houses to be net zero emissions by 2020.
- Introduce mandatory energy efficiency disclosure at the point of lease or sale of existing buildings. In this way, investments in energy efficiency will begin to be reflected in house and rental prices, incentivising investment. The Australian Capital Territory has implemented such a scheme.
- Develop a program to support net zero emission house refurbishments for existing houses. The Energiesprong Initiative in the Netherlands (which has now spread to several other countries) developed a model for how to bring about zero net emissions housing retrofits that incur zero upfront costs to tenants and are instead paid for over time in 'energy saving' bills that are equivalent to energy bills. Sustainability Victoria could kick-start real innovation in the housing sector if a similar model was followed.
- Establish an energy efficiency program to directly install energy efficient devices in homes across Victoria (as was done in the Australian Capital Territory through their Energy Efficiency Improvement Scheme).

As well as driving down energy bills and reducing emissions, energy efficient homes can reduce health risks posed by heatwaves if heavy grid demand causes blackouts to occur.

Electrification and fuel switching (transport and stationary energy)

Once the electricity system is decarbonised, direct combustion of fossil fuels in transport and in buildings and by industry needs to be replaced by electrification or lower carbon energy carriers synthesised from electricity generation (e.g. hydrogen). Moving too quickly towards electrification of transport and stationary energy – before the electricity system is decarbonised - could increase emissions. For these reasons, it makes sense to first decarbonise electricity and then tackle emissions from transport and stationary energy.

Steps the Victorian government could take to reduce emissions in these sectors include:

- Integrating transport and urban planning policies including increasing urban density and zoning more areas for mixed use developments to reduce need to travel.
- Setting modal shift targets for moving people out of cars and onto public transport (relevant for Melbourne) and back these with strategies and actions.
- Encouraging consumers to purchase electric vehicles via incentives such as providing free parking and free charging, and waiving tolls and free registration.
- Ensuring that all public transport is powered by 100% renewable electricity (this is inevitable if electricity is decarbonised by 2030).

Reducing non-energy emissions: agriculture, waste and LULUCF

Non-energy emissions include emissions from agriculture, waste and the land use, land use change and forestry. These emissions can be reduced through process improvements, material substitution, best practice farming and avoiding land clearing and promoting reforestation.

Other cross-cutting opportunities

- One opportunity would be to set up an investment fund similar to the Clean Energy Finance Corporation to support renewable energy projects. This fund could also support projects to cut emissions in other sectors such as transport.
- There are a number of local councils within Victoria that are making significant progress to cut their emissions (for example, the councils that have signed up to the Cities Power Partnership are Darebin, Moreland, Port Phillip, Strathbogie, Yass Valley, Booroondara, Greater Dandenong, Mornington Peninsula and Hepburn). Continuing to provide grants to support council level emissions reduction activities and supporting knowledge sharing activities between councils would be beneficial.
- There is an opportunity cost in investing in infrastructure that will be operational for decades but is not conducive to a net zero emissions trajectory. For example, the money being spent on rolling out gas pipelines to new housing developments in Victoria would be better spent on renewable energy. Switching from direct combustion to electrification fuelled by renewable energy will be needed to reach net zero emissions by 2050, making this infrastructure redundant in around ten years.

Key barriers to reducing Victoria's emissions by 2025 and 2030

- The Federal Government's proposed National Energy Guarantee could be a significant hindrance to Victoria in achieving its targets. Either the targets need to be significantly strengthened or the NEG should be scrapped to enable the states to get on with pursuing their much more ambitious emissions reduction targets.
- The lack of federal emissions standards for vehicles could prove to be a significant barrier for cutting emissions in the transport sector. Fuel efficiency standards are set by the Federal government.
- Although states have their own building codes, most states have based their building codes on the National Building Codes. The National building codes need to be improved to mandate better energy efficiency.

Offsets

The Panel has indicated they are seeking advice on whether international or national offsets should be allowed to achieve the emissions reduction targets. The Climate Council recommends that offsets should not be allowed. This is for two reasons:

1. Allowing offsets would delay the transition to a low carbon economy in Victoria. As transition is inevitable and necessary, this simply puts off reducing emissions.
2. The scientific credibility of land-based offsets is dubious at best. From a scientific perspective, greenhouse gas emissions emitted through fossil fuel combustion should not be offset by land carbon. This is simply because of the different timescales involved in the cycling of carbon, and the fact that vegetation and soils are part of a fast carbon cycle. Furthermore, there have been numerous issues associated with land carbon offsets schemes, including trees dying and not being replanted. Offsetting fossil fuel emissions by paying for renewable energy elsewhere is an improvement. However, without ensuring that this renewable energy capacity has permanently displaced the use of an equivalent amount of fossil fuels, this is also dubious.

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