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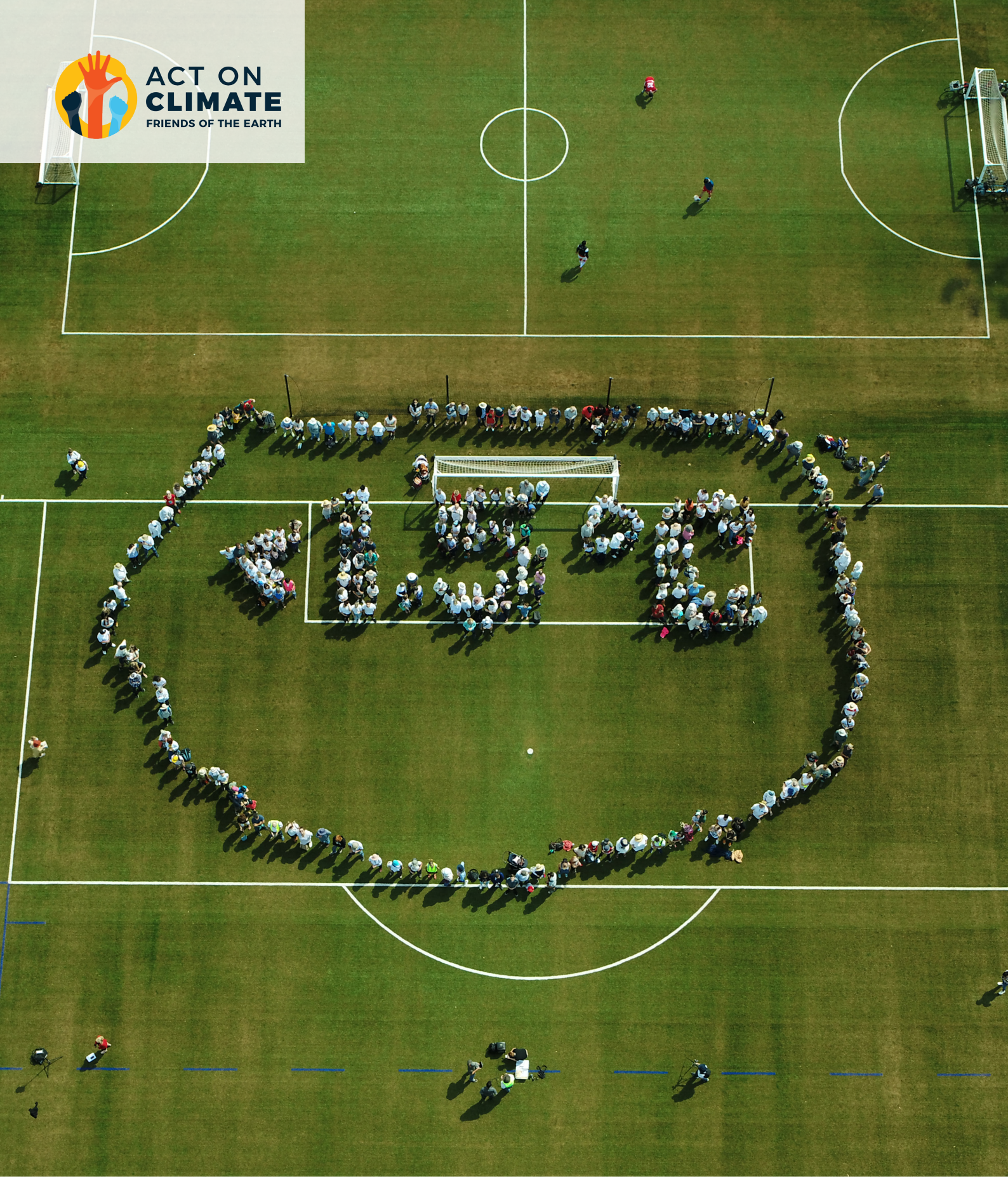

VICTORIA'S EMISSIONS REDUCTION TARGETS: LOCKING IN JOBS WITH SCIENCE-BASED TARGETS

Friends of the Earth Melbourne, 2021

VICTORIA'S EMISSIONS REDUCTION TARGETS: LOCKING IN JOBS WITH SCIENCE-BASED TARGETS

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2021

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FRONT COVER PHOTO
Hundreds of community members gather at Monash University to call for "<1.5C" to be the goal of Victoria's Emissions Reduction Targets.

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge the Traditional Custodians of the lands and waterways in the area now known as Victoria. We pay respect to their Elders past, present, and emerging, as well as to all First Nations communities who significantly contribute to the life of the area. Sovereignty was never ceded.

FOREWORD

Victoria is facing multiple crises. The COVID-19 pandemic, economic disruption, and the climate emergency. Leadership from the state government is needed to deal with them effectively and protect communities across the state.

The COVID-19 pandemic has reminded governments and the public about the need to listen and act on the best available science. The government's decisions—despite requiring great sacrifice from Victorians—have proven to be both popular and effective.

The Andrews government saved lives and livelihoods by taking this approach to the public health emergency presented by the pandemic. It has shown a similar respect for science by its intention to revive our economy with strategic public investment in a Clean Recovery.

Our response to the climate crisis must also be based on the best available science.

Before the pandemic hit, Victoria was devastated by the catastrophic bushfires of summer 2019/20. Lives and properties were lost. Businesses and communities were shut down. Smoke haze blanketed communities across the state and affected thousands. Billions of native animals perished and forest ecosystems were destroyed.

The horrific summer was a clear sign that the climate crisis is not a future threat but is here and now.

It was no surprise that, following the bushfires, we saw an upsurge in community concern about climate change and awareness of the consequences of failing to act.

Despite the Federal Coalition government's lack of performance on climate, the Victorian government has bent the state's greenhouse gas curve downwards and set the direction for zero emissions.

It has achieved this by rebuilding the Victorian *Climate Change Act (2017)*; legislating a Victorian Renewable Energy Target and a permanent ban on unconventional gas extraction; repowering

Melbourne's trams with solar energy; establishing Solar Victoria to help householders access rooftop solar and storage; and supporting Community Energy Hubs, among other initiatives.

The Melbourne Metro Tunnel now under construction; pilot of zero-emissions buses; commitment to transition Victoria away from native forest logging by 2030; and record-breaking investment in energy efficiency, will maintain the downward trajectory.

Visionary projects such as the Suburban Rail Loop and the Energy Innovation Fund—which will kickstart a jobs-rich offshore wind and green hydrogen industry—will deliver deep emissions cuts in the long term.

The Andrews government's forthcoming decision on interim Emissions Reduction Targets presents an opportunity to build on this momentum—one that should not be squandered.

It's a chance to accelerate our economic transition towards zero-emissions and secure jobs-rich industries of the future such as green hydrogen and offshore wind.

It is vital that Victoria—as a progressive state with a large population and strong manufacturing base—leads efforts to tackle the climate crisis.

The best way for Victoria to achieve this is for the government to show political leadership and set world class, science-based Emissions Reduction Targets.

Cam Walker
Friends of the Earth Melbourne,
Campaigns Coordinator

KEY FINDINGS

- The Victorian Labor government is **on track to beat its voluntary commitment of reducing emissions by 15-20 percent (below 2005 levels) by 2020**. The state is on a trajectory to achieve a 22 percent reduction.
- If Victoria maintains its current 'Business-as-Usual' rate of decarbonisation, then **the state is on a trajectory to deliver an emissions reduction of 37 percent by 2025 and 52 percent (below 2005 levels) by 2030.**
- The quickening pace of emissions reductions since 2017 has brought forward the estimated date of achieving net-zero emissions from 2047 to 2046. **The state is now on track to achieve this outcome four years ahead of the legislated deadline of 2050**.
- However, **Victoria's current 'Business as Usual' emissions reduction trajectory would exhaust a 1.5°C-compliant carbon budget by 2034**.
- Based on the current emissions reduction trajectory, the state could extend a 1.5°C carbon budget to 2050—the legislated deadline for net-zero emissions—with an **emissions reduction of 57 percent by 2025 and 75 percent (below 2005 levels) by 2030**.
- University of Melbourne's Climate & Energy College analysis finds **Victoria's emissions are the lowest level in more than 30 years** due to the accelerating rollout of renewable energy.
- University of Melbourne's Climate & Energy College modelling shows **Victoria can achieve an emissions reduction of 75 percent by 2030**—a target consistent with a 1.5°C carbon budget.
- University of Melbourne's Climate & Energy College modelling shows **the electricity sector can deliver the greatest emissions abatement potential in the short term**, followed by the direct combustion and transport sectors. The land-use and agriculture sector combined can drawdown emissions.
- University of Melbourne modelling finds the initiatives to deliver **emissions reductions consistent with a 1.5°C trajectory would create an estimated 53,900 jobs and $51.7 billion worth of investment**.

Introduction

The Andrews government will soon set Victoria's Emissions Reduction Targets for 2025 and 2030.

The Intergovernmental Panel on Climate Change warns of catastrophic impacts if global warming cannot be kept to 1.5°C or below. Victoria can expect intensifying bushfires, droughts, heatwaves, extreme weather, and rising sea levels.

With the Federal government's ongoing climate and energy policy failure, communities, unions, civil society, and the business sector are looking to state governments to show leadership.

Friends of the Earth analysis of Victoria's historic emissions reduction performance shows that the Andrews government has accelerated the rate of decarbonisation.

If Victoria maintains the current rate of decarbonisation, then the state is on a trajectory to deliver an emissions reduction of 22 percent (below 2005 levels) by 2020, 37 percent by 2025, and 52 percent by 2030, and achieve the legislated target of net-zero emissions by 2046—four years ahead of the legislated requirement. See Graph 3.

However, Victoria must increase its ambition to achieve Emissions Reduction Targets inline with a 1.5°C carbon budget. Independent advice to the Andews government, led by former Australian Minister for Climate Change, Greg Combet, shows a cut of 43 percent by 2025 and 67 percent (below 2005 levels) would be needed to have any chance at meeting a 1.5°C trajectory.[1] The Combet report shows that a target of 45 percent by 2030 would exhaust the 1.5°C carbon budget by 2030. See Graph 2.

Taking Victoria's accelerating pace of emissions reductions into account, a 57 percent reduction by 2025 and 75 percent reduction by 2030 would provide a longer tail for Victoria to deliver zero-net emissions by 2050 (within a 1.5°C carbon budget, with the knowledge that earlier emissions reductions will be easier to achieve). Refer Graph 5.

Friends of the Earth commissioned the University of Melbourne's Climate & Energy College to conduct modelling on Victoria's ability to achieve an emissions reduction of 75 percent by 2030 as well as the jobs and economic benefits that this would bring. This target was selected on the basis that deep emissions cuts and 1.5°C carbon budget represents a position shared by key stakeholders from the union movement, social services sector, and environment groups (Climate Council, Environment Victoria, and Friends of the Earth Melbourne). It is aligned with the recommendations of the Climate Targets Panel.[2]

This report presents modelling that Victoria can deliver emissions reductions consistent with a 1.5°C carbon budget, identifies the sectors where emissions abatement opportunities can be found, and jobs and economic benefits would flow, from a science-based Emissions Reduction Target of 75 percent below 2005 levels by 2030.

The University of Melbourne modelling finds achieving emissions reductions consistent with 1.5°C emissions trajectory is possible with a range of strategies across different sectors. The delivery of a science-based Emissions Reduction Target would create at least 53,900 jobs and $51.7 billion worth of investment.

Finally, this report was written in the context of sustained Federal government failure on climate policy. With greater leadership and resourcing from the Federal government, Victoria could go further and faster when it comes to reducing emissions.

1 Combet, G., Stephenson, L.,and Whetton, P. (2019), Independent Expert Panel: Interim Emissions Reduction Targets for Victoria (2021-2030) Final Report <https://www.climatechange.vic.gov.au/reducing-emissions/interim-targets>

2 The Climate Targets Panel (2021), Australia's Paris Agreement Pathways: Updating the CLimate Change Authority's 2014 Emissions Reduction Targets

The Climate Crisis & Science-Based Targets

We are now facing a climate emergency. Record-breaking land and ocean temperatures, bleaching of the Great Barrier Reef, rapid melting of polar ice caps and glaciers, and catastrophic bushfires demonstrate that the planet is already too hot.

In its Special Report on the Impacts of Global Warming of 1.5°C (SR15 report), the Intergovernmental Panel on Climate Change (IPCC) warns of "catastrophic" impacts if global warming exceeds the 1.5°C threshold.[3]

All levels of government must make climate action a top priority to protect communities and the natural world from intensifying impacts. It is essential to eliminate greenhouse gas emissions from the global economy as soon as possible.

The Intergovernmental Panel on Climate Change says that global emissions must halve by 2030 to have any chance at limiting global warming to 1.5°C.[4]

A 2020 report by Breakthrough - The National Centre for Climate Restoration warns that global warming is a decade ahead of IPCC projections. "A comparison of results from the latest generation of climate models suggest 1.5°C may be only five-to-seven years away." The authors recommend a target of zero emissions by 2030 and commence carbon drawdown as quickly as possible.[5]

New research by the Climate Targets Panel—a group of eminent climate scientists—shows an emissions reduction of 74 percent by 2030 would be required for Australia to deliver a Paris-compliant target for 1.5°C.[6]

Global Context - Momentum Builds for Increased Ambition

Global efforts to tackle the climate crisis have gained fresh momentum in 2020. The globe's largest economies and Australia's largest trading partners are ramping up commitments to cut emissions.

The election of Joe Biden will see the United States—the world's largest economy and second largest emitter—re-enter the Paris Agreement. The incoming administration was elected with a commitment to decarbonise the US electricity sector by 2035, invest $2 trillion in decarbonising the economy, and achieve net-zero emissions by 2050[7]. It will announce its increased 2030 Emissions Reduction Target on Earth Day, 22 April 2020.

Japan and South Korea have commited to net-zero emissions by 2050, and China, the world's biggest emitter, second largest economy and Australia's largest trading partner, has committed to net-zero emissions before 2060.[8]

Momentum is building elsewhere too. The European Union increased its ambition and will cut emissions by 55 percent below 1990 levels by 2030.[9] The EU has launched public consultations on a Carbon Border Adjustment Mechanism (or carbon border tax) on imports from high-emitting countries.[10]

3 IPCC (2019), Special Report: Global Warming of 1.5°C <https://www.ipcc.ch/sr15/>

4 IPCC (2019), Special Report: Global Warming of 1.5°C <https://www.ipcc.ch/sr15/>

5 Breakthrough Centre for Climate Restoration (2020), Climate Reality Check 2020: Impacts, Risks, Actions <https://www.climate-realitycheck.net/download>

6 The Climate Targets Panel (2021), Australia's Paris Agreement Pathways: Updating the CLimate Change Authority's 2014 Emissions Reduction Targets <https://www.climatecollege.unimelb.edu.au/australias-paris-agreement-pathways>

7 Foley, M. and Harris, R. (2020), 'Biden's climate goals turn up the heat on Morrison', The Age <https://www.theage.com.au/politics/federal/biden-s-climate-goals-turn-up-heat-on-morrison-20201108-p56ckz.html>

8 Foley, M. and Harris, R. (2020), 'Biden's climate goals turn up the heat on Morrison', The Age <https://www.theage.com.au/politics/federal/biden-s-climate-goals-turn-up-heat-on-morrison-20201108-p56ckz.html>

9 European Commission (2020), State of the Union: Commission raises climate ambition and proposes 55% cut in emissions by 2030 <https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1599>

10 European Commission (2020), Commission launches public consultations on energy taxation and a carbon border adjustment

When it comes to global leadership, Denmark[11] and Scotland[12]—countries with a comparable population to Victoria—are way out in front with targets to reduce emissions by 70-75 percent by 2030. The United Kingdom as a whole has committed to a 68 percent reduction by 2030.[13]

These developments put pressure on Australia to increase its level of ambition on emissions cuts at the COP26 in Glasgow—the first UN meeting where countries are expected to increase the ambition of their Paris 2030 targets.

The Andrews government can highlight the Federal government's ability to increase Australia's Nationally Determined Contribution by adopting science-based Emissions Reduction Targets for Victoria.

National Context - State & Territories Lead on Climate

The failure of Federal climate and energy policy has meant states and territories have needed to step up and show leadership.

The Australian Capital Territory is the national leader on climate with a legislated target to reduce emissions by 65-75 percent below 2005 levels by 2030.[14] South Australia has committed to cut the state's emissions by more than 50 percent by 2030.[15]

New South Wales and Queensland are committed to deliver a 30 percent reduction by 2030. While this level of ambition is barely better than the Federal government's, recent renewable energy announcements indicate that these jurisdictions will out-perform their stated goal.

The Andrews government would be among the national leaders if it were to make Victoria the first state in the federation to adopt a target of 65-75 percent—matching the Australian Capital Territory's level of ambition. It would be among the global leaders if it adopts a target of at least 75 percent.

mechanism <https://ec.europa.eu/taxation_customs/news/commission-launches-public-consultations-energy-taxation-and-carbon-border-adjustment-mechanism_en>

11 Timperley, J. (2019) 'Denmark adopts climate law to cut emissions 70% by 2030', Climate Home News <https://www.climatechangenews.com/2019/12/06/denmark-adopts-climate-law-cut-emissions-70-2030/>

12 Scotish Government (2020), Climate Change: Reducing Greenhouse Gas Emissions, <https://www.gov.scot/policies/climate-change/reducing-emissions/>

13 United Kingdom Government (2020), UK sets ambitious new climate target ahead of UN Summit, <https://www.gov.uk/government/news/uk-sets-ambitious-new-climate-target-ahead-of-un-summit>

14 Australian Capital Territory Government (2019), ACT Climate Change Strategy 2019-25 <https://www.environment.act.gov.au/__data/assets/pdf_file/0003/1414641/ACT-Climate-Change-Strategy-2019-2025.pdf/>

15 Government of South Australia (2020), Climate Smart South Australia: South Australia's Greenhouse Gas Emissions <https://www.environment.sa.gov.au/topics/climate-change/south-australias-greenhouse-gas-emissions>

JURISDICTION	EMISSIONS REDUCTION TARGET 2030
SCOTLAND	75%
DENMARK	70%
AUSTRALIAN CAPITAL TERRITORY	65% - 75%
UNITED KINGDOM	68%
EUROPEAN UNION	55%
SOUTH AUSTRALIA	50%
NEW SOUTH WALES	30%
QUEENSLAND	30%
WESTERN AUSTRALIA	Same as Federal govt target
TASMANIA	Same as Federal govt target
NORTHERN TERRITORY	Same as Federal govt target
AUSTRALIA	26% - 28%

TABLE 1: SPECTRUM OF AMBITION - EMISSIONS REDUCTION TARGETS 2030

State Context - Victorian Climate Policy

The election of the Andrews government in 2014 was a turning point for Victorian climate policy. In its first term of office, the Labor government signed the *Paris Pledge for Action*[16] to limit global warming to well below 2°C, signed the *Climate Leadership Declaration*[17] to limit warming to 1.5°C, and set about rebuilding the Victorian *Climate Change Act*.

In 2017, the strengthened *Climate Change Act*— with its legislated target of zero-net emissions by 2050 and requirement of interim Emissions Reduction Targets every five years—took effect.

Former Federal Minister for Climate Change Greg Combet was appointed to provide independent analysis of climate science and make recommendations on the first two interim Emissions Reduction Targets. The 'Combet Report' recommended a reduction of emissions of 32-39 percent below 2005 levels by 2025 and 45-60 by 2030. It is suggested that these targets will endeavour to limit global warming to "well below" 2°C. The Combet Report acknowledges "climate science clearly demonstrates that a 1.5°C world would be much safer, with significantly lower impacts than 2°C of warming." It shows that, on a straight line basis, a cut of 43 percent by 2025 and 67 percent (below 2005 levels) would be needed to have any chance at meeting a 1.5°C trajectory.[18]

The Andrews government announced a voluntary Emissions Reduction Target of 15-20 percent below 2005 levels by 2020. It originally committed to announcing the interim Emissions Reduction Targets in 2018, but extended the process. The announcement on the 2025 and 2030 targets was meant to occur

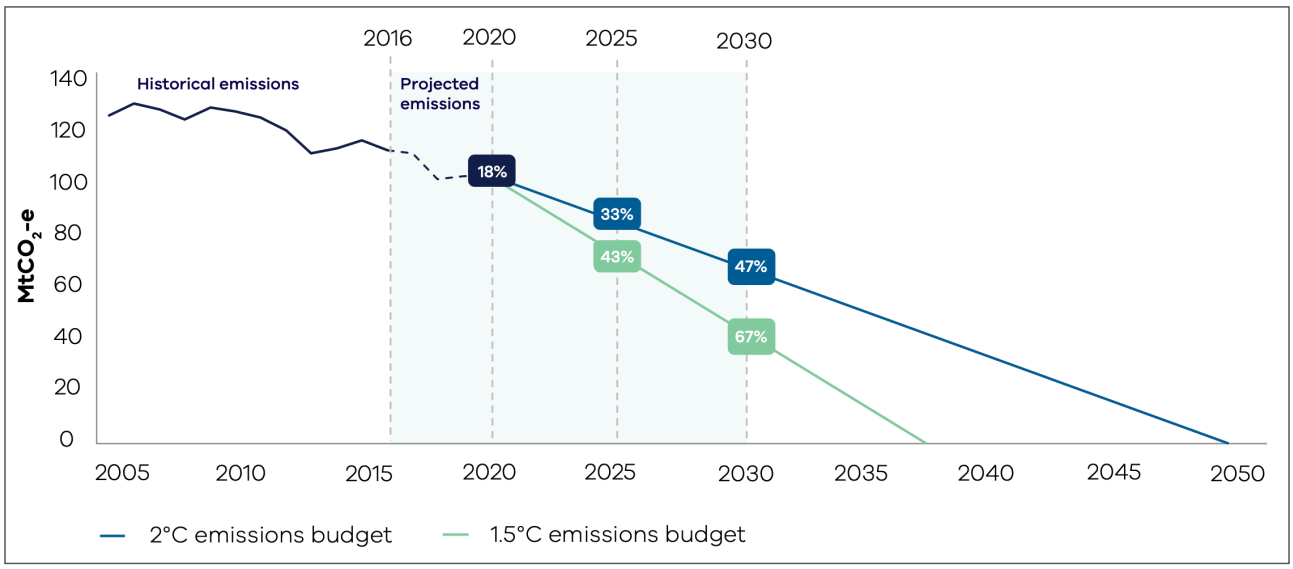
16 University of Cambridge Institute of Sustainability Leadership (2015), Paris Pledge for Action: Victorian State Government <http://parispledgeforaction.org/signatory/state-government-victoria/>

17 Victorian Government (2018), Climate Leadership Declaration <https://www.climatechange.vic.gov.au/media-releases/climate-leadership-declaration>

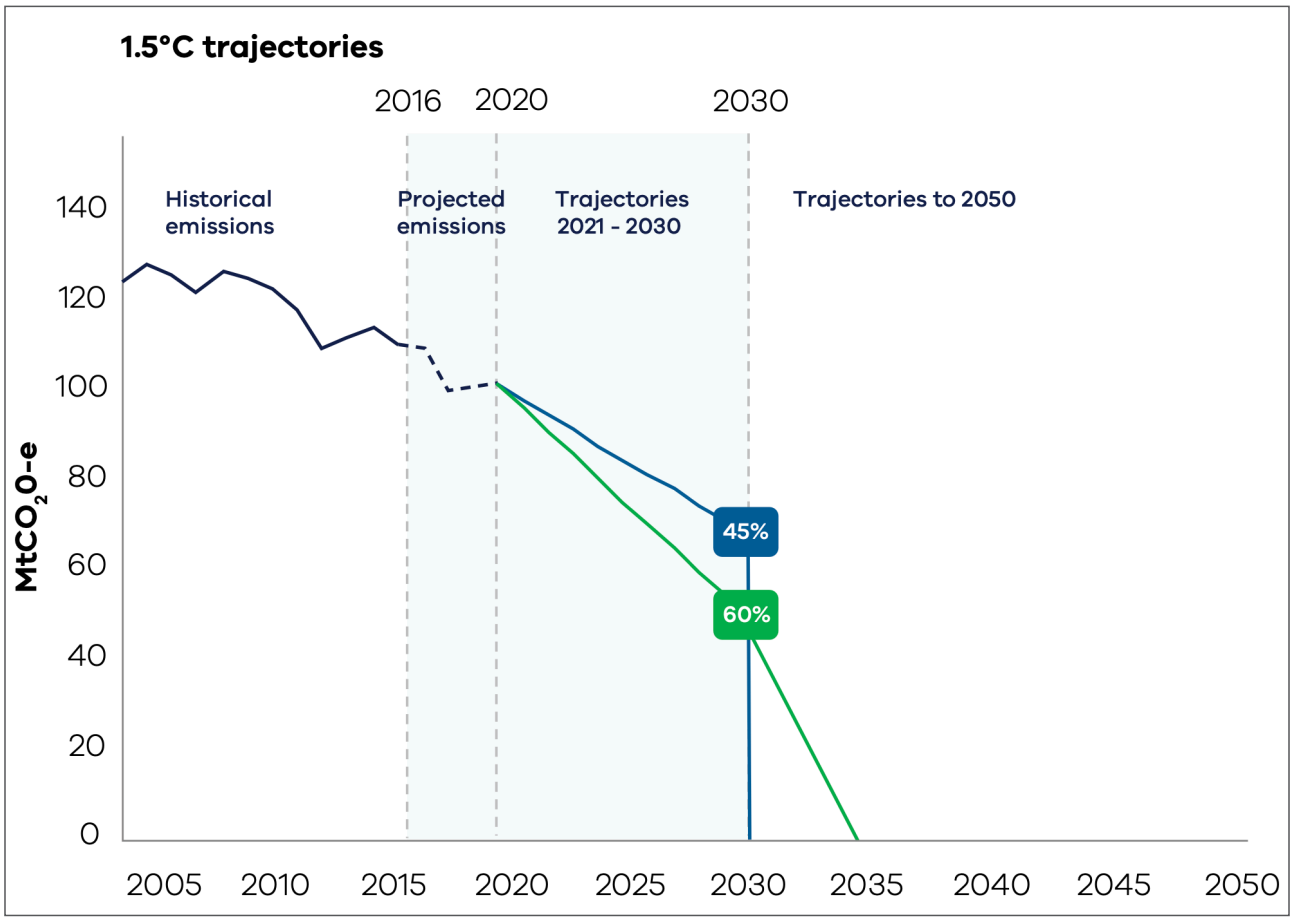
18 Combet, G., Stephenson, L.,and Whetton, P. (2019), Independent Expert Panel: Interim Emissions Reduction Targets for Victoria (2021-2030) Final Report <https://www.climatechange.vic.gov.au/reducing-emissions/interim-targets>

within ten parliamentary sitting days of 31 March 2020, yet the escalating COVID-19 pandemic saw the government defer making a decision.

Minister for Climate Change Lily D'Ambrosio has stated that a decision would be made by the end of 2020. An announcement is expected in the first quarter of 2021.



GRAPH 1: The Combet Review presents straight lines from Victoria's projected emissions in 2020 until Victoria's 2°C and 1.5°C-consistent emissions budgets are exhausted.



GRAPH 2: The Combet Review's 1.5°C trajectories

Consensus on the Need to Limit Warming to 1.5°C

There is consensus among key stakeholders on the need for Victoria's interim targets to be inline with a 1.5°C carbon budget.

Friends of the Earth recommend a 57 percent reduction by 2025 and 75 percent by 2030 to provide a longer tail for achieving zero-net emissions by 2050 within a 1.5°C carbon budget. (Friends of the Earth notes that governments should be aiming to achieve net-zero emissions as quickly as possible within that timeframe.)[19]

The Climate Council recommends the minimum level of ambition for the government should be a reduction of 60 percent by 2030.[20] Environment Victoria, have called for a reduction of between 65-80 percent.[21]

The Victorian Trades Hall Council has emerged as a champion of renewable energy and a just transition. The Trades Hall is backing a 67-75 percent reduction by 2030 from the Andrews government.[22]

The Victorian Council of Social Services supports ambitious and achievable Emissions Reduction Targets to limit warming to 1.5°C and protect disadvantaged communities.[23]

Victoria's Emissions Reduction Performance

The Victorian *Climate Change Act (2017)* required the government to publish annual greenhouse gas performance data. Analysis of the latest greenhouse gas performance report on 2018 data shows that the rate of reductions in Victoria is accelerating:

- The Victorian Labor government is on track to beat its voluntary commitment of reducing emissions by 15-20 percent (below 2005 levels) by 2020. The state is on a trajectory to achieve a 22 percent reduction in emissions by 2020. (Refer to Graph 3)
- If Victoria maintains its current 'Business-as-Usual' rate of decarbonisation, then the state is on a trajectory to deliver an emissions reduction of 37 percent by 2025 and 52 percent (below 2005 levels) by 2030. While this trajectory puts the state on track to achieve the legislated target of net-zero emissions by 2050, four years ahead schedule, it would see a 1.5°C-compliant carbon budget exhausted by 2034. (Refer to Graph 4)
- Based on the accelerating rate of emissions reductions in the latest GHG performance data, the state could extend a 1.5°C carbon budget to 2050—the legislated deadline for net-zero emissions—with an emissions reduction of 52 percent by 2025 and 69 percent (below 2005 levels) by 2030. (Refer to Graph 5)
- The analysis of the Victorian government's greenhouse gas reduction performance underscores the importance of early cuts as they have a dramatic impact on emissions reductions over the longer term.

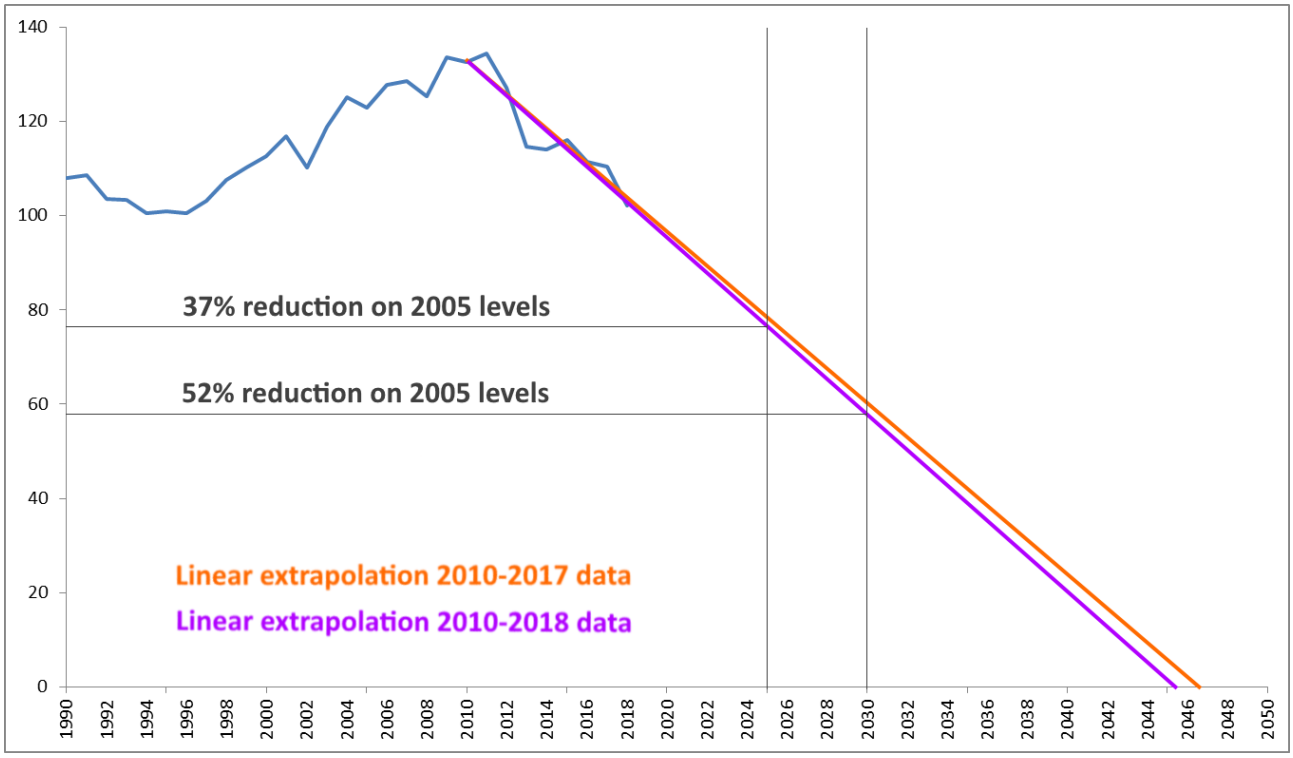
19 Friends of the Earth (2019), Submission: Reducing Victoria's Greenhouse Gas Emissions <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/9715/6712/5370/Submission_-_climate_change_targets_and_actions_-_Friends_of_the_Earth.pdf>

20 The Climate Council (2019), Submission to: Interim Emissions Reduction Targets Consultation (Victoria) <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/6815/6712/5323/Submission_-_climate_change_targets_and_actions_-_Climate_Council.pdf>

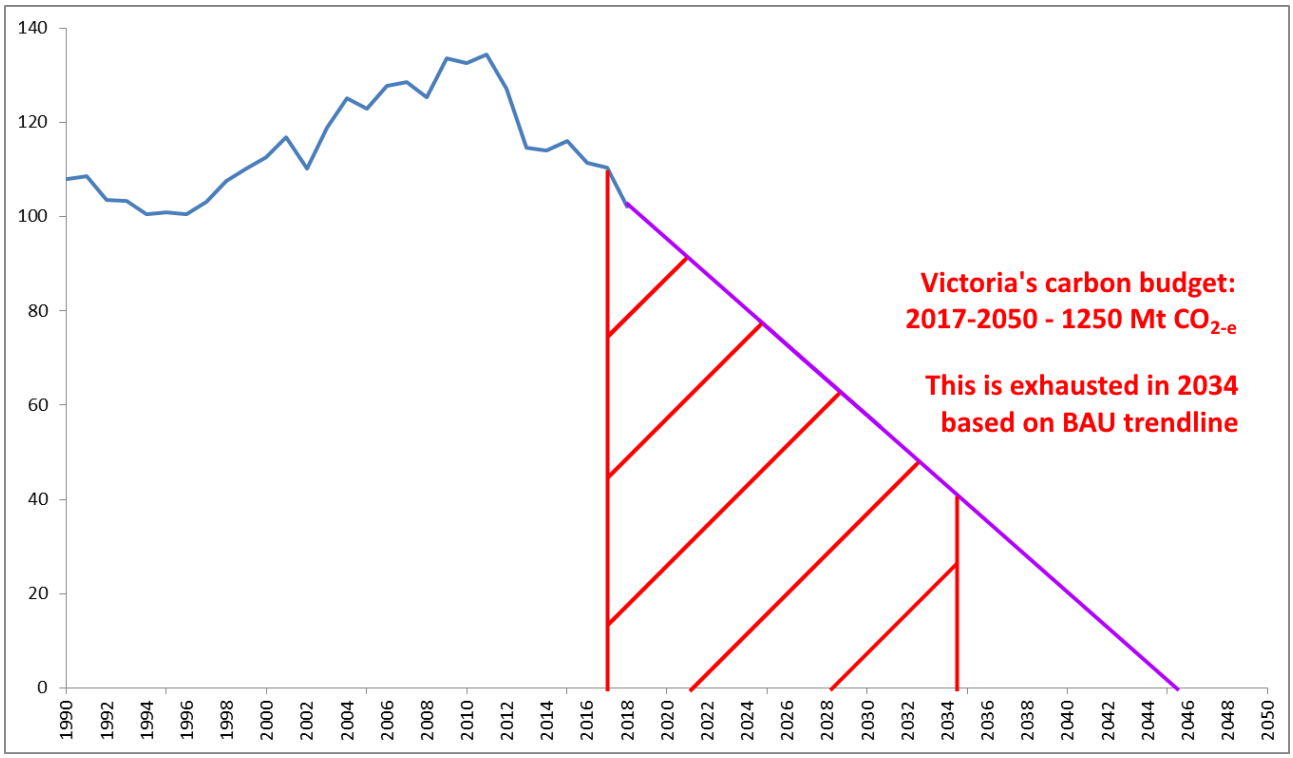
21 Environment Victoria (2019), Environment Victoria's Submission to the Independent Panel's recommended targets survey <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/7715/6713/9585/Submission_-_climate_change_targets_and_actions_-_Environment_Victoria.pdf>

22 Victorian Trades Hall Council (2019), VTHC Submissions to the Enquiry into the interim Emissions Reduction Targets for Victoria (2021-2030) <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/4315/6712/5432/Submission_-_climate_change_targets_and_actions_-_Victorian_Trades_Hall_Council.pdf>

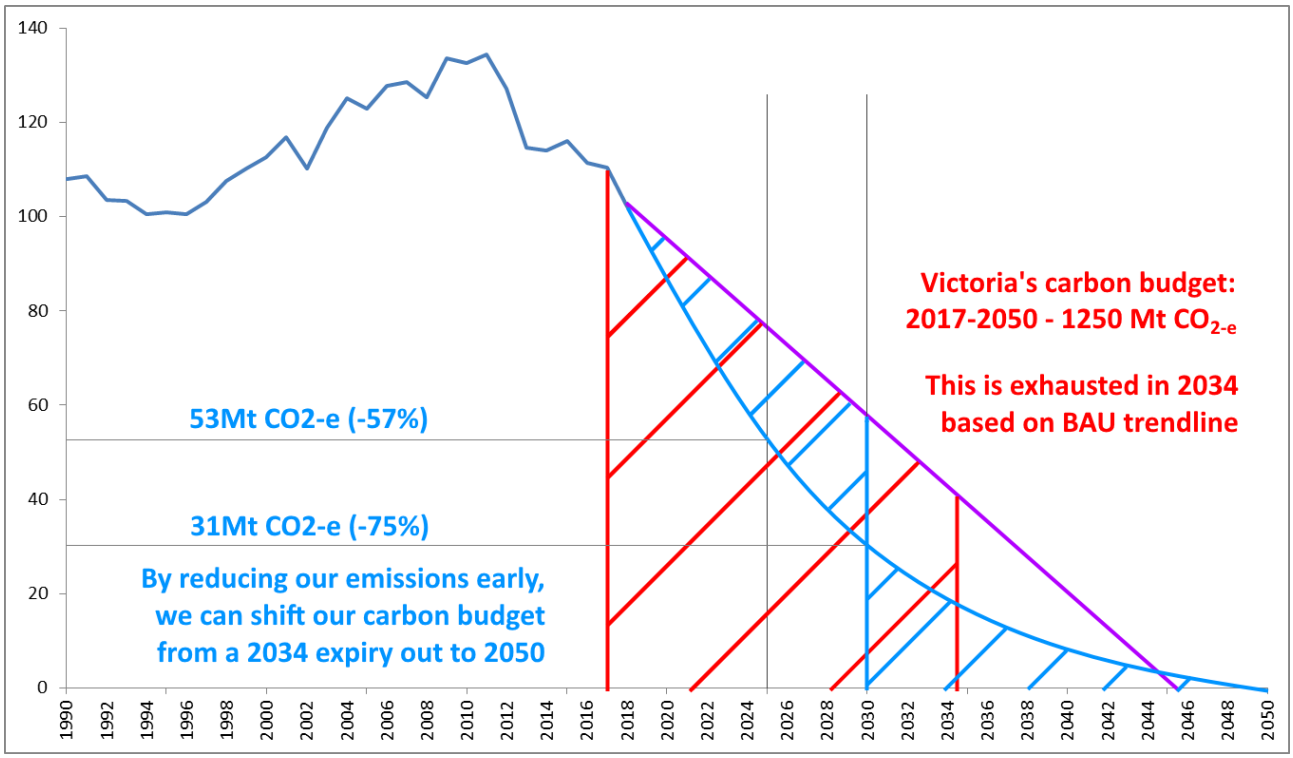
23 Victorian Council of Social Services (2019), Equitable transition to a zero net emissions Victoria Response to Independent Expert Panel Final Report: Interim Emissions Reduction Targets for Victoria (2021-2030) <https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/7515/6712/5432/Submission_-_climate_change_targets_and_actions_-_Victorian_Council_of_Social_Services.pdf>



GRAPH 3: Victoria's historical emissions with 2010-18 trendline to zero emissions



GRAPH 4: Victoria's 2010-18 emissions trendline to zero and 1.5°C carbon budget

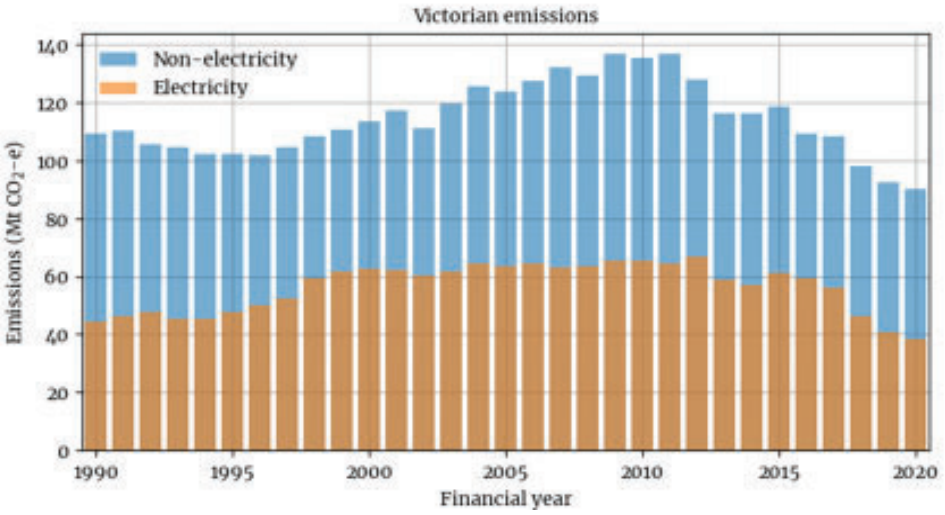


GRAPH 5: Victoria's 2010-18 emissions trendline to zero and 1.5°C carbon budget to 2050

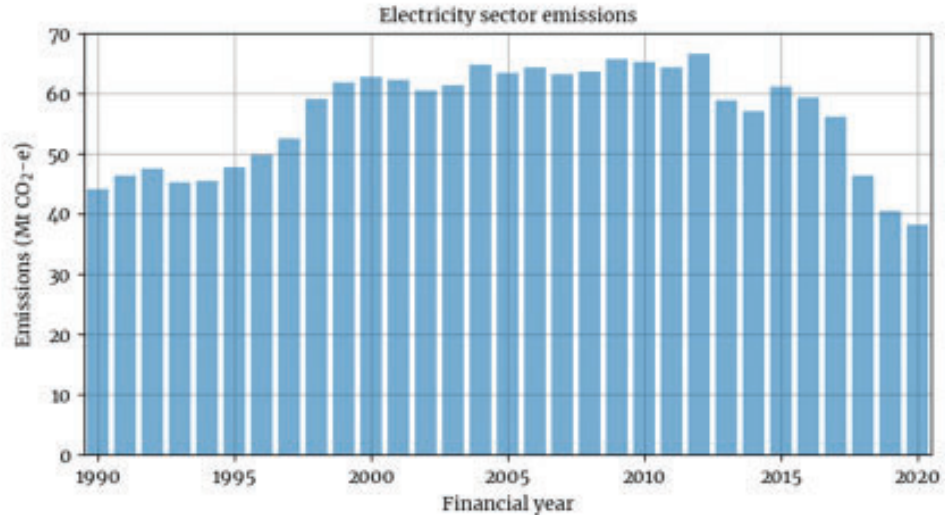
University of Melbourne Forecast - Victoria's Emissions Reduction Performance

Looking ahead, analysis by the University of Melbourne's Climate & Energy College finds:

- The state's emissions have reduced by 34 percent in eight years, since their peak in 2010-11 and fallen to the lowest level in over 30 years. Victoria's emissions are expected to be approximately 23 percent below 2005 for the 18-19 financial year—a deeper reduction than what extrapolations from the government's 2018 data indicate.
- Electricity sector emissions have fallen 35 percent since 2016 and 17 percent in 2018 and is the key driver of emissions reductions in the state. In aggregate, wind and solar generation increased by 70 percent between 2016 and 2019. This trend will continue due to the Victorian Renewable Energy Target, Solar Homes program, Renewable Energy Zones, and investment in energy efficiency programs.



GRAPH 6: Victoria's historical electricity/non-electricity greenhouse gas emissions 1990-2020



GRAPH 7: Victoria's historical electricity sector greenhouse gas emissions 1990-2020

University of Melbourne Climate & Emergency College Modelling

The analysis prepared by the University of Melbourne Climate and Energy College presents a scenario in which Victoria uses its extensive renewable energy resources to reduce carbon emissions in a manner consistent with the Paris Agreement, and a 1.5°C carbon budget.

This analysis draws on extensive decarbonisation of the electricity supply side, while considering extensive electrification of non-electric demand. The transition of electricity supply is modelled, while ensuring a secure, reliable and cost-effective domestic electricity supply to avoid CO2 emissions. The potential to decarbonise other energy demands through electrification is modelled in this scenario. Specifically, this includes energy demands stemming from transport, industry and direct combustion with technologies that are available today (e.g. battery-electric vehicles, electric furnaces and heat pumps).

The approach for agricultural emissions and LULUCF emissions is to group them together. While the biological emissions of enteric methane and nitrous oxide are much more effective at trapping heat than carbon dioxide, they do not persist in the atmosphere as long. Their lifespans are more comparable to carbon stored in land sinks, such as trees and soil. Therefore, biological based land sinks are more appropriately used to offset methane and nitrous oxide than fossil carbon dioxide emitted to the atmosphere, which remains for centuries. There are also practical reasons for linking agricultural and LULUCF emissions. Decisions regarding both the mitigation of these emissions and carbon sequestration activities are made by landholders. Land-sinks can also provide offsets while the technical challenges in mitigating methane and nitrous oxide are addressed.

The energy sector analysis draws on existing programs and initiatives to consider, for modelling the electricity system. These input assumptions were used in the openCEM modelling tool[24] to determine the least cost electricity system subject to cost, reliability and emissions constraints. The inputs were largely based on the Australian Energy Market Operator's Integrated System Plan, with some notable caveats. This includes an accelerated electricity vehicle rollout (40 percent electric vehicle penetration by 2030, compared with 20 percent in the ISP).[25] Other key assumptions include the inclusion of the Victorian Energy Upgrades initiative[26] and VRET 2.0. An accelerated VRET 3.0 (50 percent by 2025) and continued renewable energy deployment, in line with the 'step change' scenario were also assumed. The Star of the South Offshore Wind project is also explored as a sensitivity.

The energy generation from the results of the electricity sector modelling can be shown below in Graph 8. These results are only marginally different to the results in AEMO's step change scenario, with slightly less emissions, and less brown coal. The impact of the Star of the South project is to largely substitute offshore wind for onshore wind. There are small additional reductions in storage in other firming strategies when offshore wind is used.

Strategy to Deliver 1.5°C-Compliant Emissions Trajectory to 2030

Victoria's recent progress means achieving emissions reductions consistent with 1.5°C emissions trajectory is possible with a range of strategies across different sectors. Refer to Table 2 below.

The electricity sector and Victoria's abundant renewable energy resources provides a strong foundation for reaching Paris Agreement emissions reduction targets in the state. The electricity sector has already significantly reduced its emissions in the last five years, and is on track to continue doing so. According to this modelling, further decarbonisation of the sector is possible and facilitates the decarbonisation of other sectors, notably transport and direct combustion. See Graph 8.

The electrification of vehicles and modal shifting will drive emissions reductions in what is now the state's second largest source of emissions.

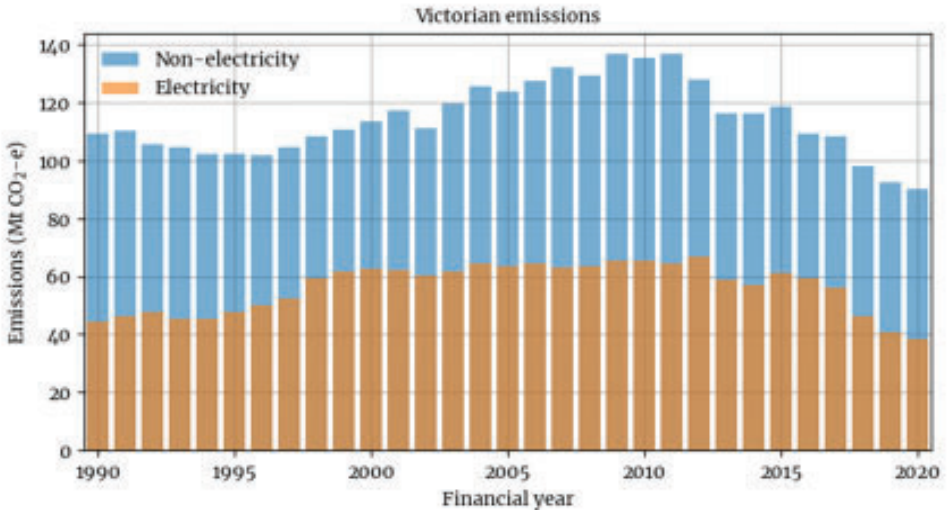
The combination of strategies would result in Victorian emissions falling to approximately 60MT per annum by 2025, and 31MT by 2030. This is inline with 1.5°C emissions abatement trajectory for Victoria, as highlighted by the Combet review. See Graph 9.

24 Open-source Capacity Expansion Model <http://www.opencem.org.au/>

25 At 40 percent electrification, the Victorian Government's proposed EV tax would draw in over $500 million per annum into consolidated revenue.

26 D'Ambrosio, L.(2020), Victoria Sets New Energy Targets to Reduce Bills and Emissions <https://www.lilydambrosio.com.au/media-releases/victoria-sets-new-energy-targets-to-reduce-bills-and-emissions/>

The delivery of these emissions reduction strategies across the Victorian economy would generate investment in the state in excess of $50 billion out to 2030, while creating up to 53,900 of construction, ongoing, and manufacturing jobs. Refer to Tables 3 and 4.



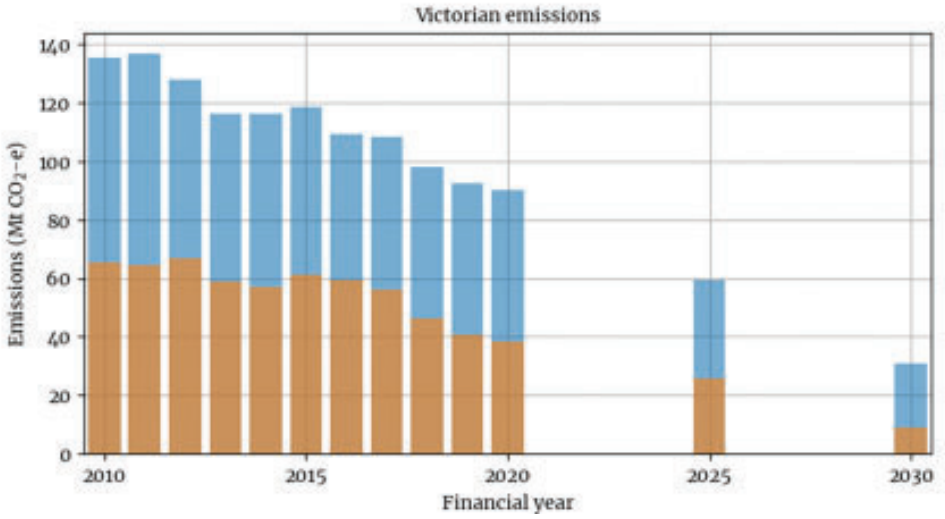
GRAPH 8: Decarbonisation of Victoria's electricity sector (2021-31)

TABLE 2: Strategies for delivering a 75 percent Emissions Reduction Target (2030)

SECTOR	INITIATIVE	REDUCTIONS (MT PA)
ENERGY	Star of the South (2000 MW off-shore wind farm)	**7.35**
	VRET 2.0* 40% by 2025 (Legislated target)	**9.58**
	Accelerated VRET 3.0 50% by 2025 (Fast tracking 2030 legislative target)	**14.48**
	Total by 2030	**39**
TRANSPORT	Complete electrification of buses. Complete electrification of passenger rail. 40 percent electrification of passenger vehicles by 2030. 10 percent modeshift of passenger vehicles to active or public transport.	**11.17**
AGRICULTURE & LAND USE	Enteric Fermentation	**0.7**
	Manure Management	**0.4**
	Agricultural Soils	**0.2**
	Other (liming, urea, burning, etc)	**0.1**
	LULUCF Sink	**2.4**
	Combined ag & land use**	**3.8**
INDUSTRY & DIRECT COMBUSTION	Electrification of low Grade Heat Conversion	**9.38**

**50 percent by 2025 is approximately business as usual (central scenario) in latest draft of AEMO's ISP*

*** Landuse sector (including agriculture) is consider as a whole, and strategies involved result in landuse sector being net negative (-0.1MT) by 2030. Bracketed values represent absolute emissions values in 2025.*



GRAPH 9: Expected emissions profile from implementing abatement strategies (2025 & 2030)

	CONSTRUCTION*	DIRECT ONGOING	MANUFACTURING**	INVESTMENT $B
STAR OF THE SOUTH	1,400*	350-600	260-2100	$8-9
VRET 2.0†	13,400	1,200-1400	300-400	$6
VRET 3.0†	16,800	1,500-1600	400-600	$3
TOTAL TO 2030	31,600	2,050-3600	960-3,100	$20bn

TABLE 3: Expected jobs and economic benefit of renewable energy deployment towards a 75 percent Emissions Reduction Target (2030)

**Assumes a three-year construction period for offshore wind, two year for wind, and 1.5 year for solar PV.*

*** Depends largely on the percentage of local manufacturing. Range shown illustrates the full range from minimum (10 percent) local content to maximum (100 percent) local content for offshore wind. Onshore wind shows only 10-15 percent reflective of current local content requirements*

† Dependent on the breakdown of wind and solar installations. Based on current modelling results for least cost installation capacity.

	CONSTRUCTION	ONGOING	INVESTMENT $B
ENERGY EFFICIENCY	-	2,200[27]	**$0.7**
MELBOURNE METRO PHASE 1	7000[28]	-	**$11**
MELBOURNE METRO PHASE 2	7000	-	**$20[29]**
TOTAL TO 2030	14,000	2,200	**$31.7b**

Table 4: Other expected jobs and economic benefits of decarbonising Victoria's economy

27 D'Ambrosio, L. (2020), Victoria sets new energy targets to reduce bills and emissions <https://www.lilydambrosio.com.au/media-releases/victoria-sets-new-energy-targets-to-reduce-bills-and-emissions/>

28 Melbourne Metro Rail Authority (2020), Jobs <https://metrotunnel.vic.gov.au/jobs>

29 Jacks, T. (2018), What will happen to Melbourne Metro 2, the other planned underground rail line? <https://www.theage.com.au/national/victoria/what-will-happen-to-melbourne-metro-2-the-other-planned-underground-rail-line-20180902-p5019k.html>

Friends of the Earth Recommendations

Based on the analysis presented in this report and University of Melbourne modelling, Friends of the Earth recommend the Andrews government:

- Commit to a 1.5°C carbon budget.
- Set an Emissions Reduction Target of at least 75 percent below 2005 levels by 2030 and pursue efforts to achieve zero-net emissions as soon as possible.
- Continue strategic investment in the budget to accelerate decarbonisation.

Conclusion

There are no barriers stopping Victoria from committing to science-based Emissions Reduction Targets inline with the Paris Agreement goal of 1.5°C.

Friends of the Earth analysis of Victoria's historic emissions reduction performance shows an accelerating pace of decarbonisation and identifies an emissions gap between the state's current trajectory and compliance with a 1.5°C carbon budget.

The University of Melbourne's Climate & Energy College confirms Friends of the Earth's analysis of Victoria's historic emissions performance and notes that emissions are at a 30-year low driven by the rollout of renewable energy.

Forecasting by the Climate & Energy College expects Victoria to achieve a 23 percent emissions reduction (below 2005 levels) by 2020. This positive outlook sets the Victorian government up to further accelerate the pace of decarbonisation through the interim Emissions Reduction Targets process.

University of Melbourne modelling presents a scenario in which Victoria can achieve a reduction of 75 percent by 2030—a reduction that would comply with the Paris Agreement goal of 1.5°C carbon budget. This reduction would give the state a longer tail to deal with sectors of the economy that are more difficult to decarbonise.

The delivery of an Emissions Reduction Target of 75 percent by 2030 would require the continued rollout of solar, wind, and storage, as well as critical public transport infrastructure. It would result in significant job-creation and investment in Victoria.

The Victorian government can become the first state to match the Australian Capital Territory's level of ambition and commit to an Emissions Reduction Target of 75 percent below 2005 levels by 2030. The adoption of this target would situate Victoria among global leaders, Denmark and Scotland.

Friends of the Earth believe all efforts must be made to achieve zero emissions as soon as possible.