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SUPPORT

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I have been involved in climate change advocacy since 2008. I think the proposed Wallaroo Solar Farm project is a good example of how communities can come together to help head off the potentially catastrophic consequences of climate change brought about by global warming. An example of my approach is included in one attached file. The other attached file sets out the rationale for taking immediate action to deal with energy transition away from a large scale dependence on fossil fuels as quickly as possible.

From the work I have done at ANU and with the Australian Security Leaders Climate Group it is very clear that urgency to promote community-based solutions must underpin more large scale projects commissioned by governments.

To cite the work of an expert - Professor Will Steffen - who said before he died last year that by 2030 we will know about the future of humankind: either survival or extinction!

We have just six years to make extraordinary changes to secure the future for all our people. This means just two federal election cycles ie 2025 and 2028.

The call to find and exploit all opportunities to transition our energy demands to renewables like the Wallaroo Solar Farm is strong. Let an example like Wallaroo shine as an example of what is possible when we put our minds to it.

Why ASLCG?

As a chief of the Australian Defence Force, I lived with the understanding that there was no more important task than assessing and preparing to deal with potential threats to our country. My work priority was about “risk policy”.

Underestimating security risks can be fatal, not only for military personnel but for the people and our nation.

But my current assessment is that we are ill-prepared to deal with issues of global warming, otherwise framed as climate change consequences. Australia is being left behind as our allies move forward on them. So, together with colleagues who share these concerns we have created the Australian Security Leaders Climate Group.

As a non-partisan network of Australian security and policy professionals – drawn from all services – this group has the aim of fostering national debate, discussion, and action. We want to address the existential climate risk our experience tells us is serious. And our experience gives us unique insights into Australia’s lack of preparedness.

This year, Australia’s climate preparedness is under the spotlight: our allies are stepping up on the issue; the next report from the intergovernmental panel on climate change is due in August; and there are make-or-break global climate negotiations in Glasgow in November, where Australia has a last chance to make credible commitments or remain an inconsequential climate policy laggard.

Australians want to live in a prosperous and safe society. They are concerned about their families, their friends, livelihoods and their well-being, and the future. It is the first duty of all governments to make this happen; to “protect the people”. The record shows, however, that when it comes to climate change federal governments from both sides of politics have failed in their duty to ensure Australians’ future.

Australia has a sad record of being ill-prepared at a national level for predictable threats such as extreme bushfire seasons and heatwaves, lower rainfall in southern Australia and in the Murray-Darling Basin, increasing aridification and loss of reliable croplands, and coastal inundation caused by

more intense and widespread cyclones. We are on the front-line of climate-driven security threats.

I worry, too, that Australia is ill-prepared for disruptions that climate change will cause in our region. They will have big consequences for human security for our Pacific and Asian neighbours. Asia is a “Disaster Alley” for climate change. It is already facing chronic water shortages that will get worse, threats to low-lying cities and island states, more extended and intense heat waves, more widespread typhoons, and much more.

These threats will impact Australia in many new ways. They will cause disruptions to vital imports and our export markets as production fails and supply chains are interrupted, weakening of our energy security, breakdowns in social cohesion, state failure and regional crises. In the future, up to a billion people may be displaced due to climate change. They will seek new, more secure, homes. U.S. security analysts say that at 3°C of warming – which is where we are heading – the world may be in a state of outright chaos.

From a human security perspective, climate disruption is the key threat to Australia’s future. Our response to this climate emergency requires “all-hands-on-deck”; pulling together just as we did in response to Covid-19.

Our federal government needs to undertake an urgent, full, and frank assessment of climate and security risks. It must encompass the full range of probabilities. It should take a holistic view, assessing systemic risks across the full range of space and time affected by nature and our relevant decisions. And it should use the best available evidence-based information.

From a high-quality assessment, we could focus on building our understanding of feasible high impact possibilities and know what it is we should avoid. These answers must inform decisions about how best to respond. The assessment must involve relevant departments, state and territory governments, business, and non-governmental expertise. Finally, the assessment must underpin an action plan!

We should take a lead from our closest allies. In the U.S., the new Biden administration has elevated climate change to a high-level national security issue. It is giving climate threats priority within national security decision-making. Governments in the U.K. and Europe are also stepping up.

In 2017-18, I told a Senate inquiry into the implications of climate change for Australia's national security that, after nuclear war, human induced global warming is the greatest threat to human life on the planet. The inquiry found that climate change is "a current and existential national security risk", one that "threatens the premature extinction of birth originating intelligent life for the permanent and drastic destruction of its potential for desirable future development". I cannot think of a more serious threat to our way of life.

It is disappointing that in the years since I spoke to the Senate inquiry about the scale of the threat and the Senate's recommendation that the government develop a plan to guide responses to climate change risks, not much has changed.

The present national security focus is too narrow. It prevents consideration of the full range of policy options. Some sections of our society distrust climate change actions based on perceptions of "green" framing; and a divisive, partisan public conversation on climate change prevents genuine debate based on evidence about the range of possible policy choices. This only serves to make all of us less safe.

Responding successfully to climate change requires global collaboration and leadership. We can foster that outcome and provide an example. It also requires from us a suite of policies integrated across our federal departments in our "whole of government" response that will lead to a "whole of nation" action plan.

We are a prosperous country. We have the capacity to face this threat head on and provide leadership. We have the economic resources, and skills, to meet this challenge. We are the renewable energy "lucky country": we know that renewable technologies are now cheaper than coal, and we have vast solar and wind resources. But we will not succeed with our solutions if we do not fully understand the full range of risks, and act on them urgently before time runs out.



Australian Government

Department of Climate Change, Energy,
the Environment and Water

Annual Climate Change Statement 2023



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Acknowledgement of Country

In delivering this Annual Climate Change Statement to Parliament, we pay our respects to our First Nations people, their Elders and their ancestors who cared for the lands before our time, their communities who continue to care for Country today, and the young ones who are following in their footsteps.

First Nations people have loved, cared for, and listened to Country for thousands of generations, so it is important to reflect on these ancient and ongoing connections and guardianship. These enduring cultures are the oldest on Earth. They have used their traditional knowledge to adapt as Australia's climate has changed over the millennia, and the resilience of these cultures is a source of inspiration for this Government.

First Nations people's voices and knowledge are critical to addressing the impacts of climate change and responding to the challenges we all now face. In the spirit of reconciliation, we look forward to improving how these voices are heard and represented in Australian Government action and decision-making, especially in our current climate and environmental crisis.

Australia recognises and pays its respects to First Nations people as the Traditional Owners of Australia. I would like to thank the Traditional Owners for their continuing custodianship of the lands, waters, skies, and communities that we live and work within today.

Contents

Foreword	3
Executive Summary	5
1. Setting Australia up for a net zero future	11
Becoming a renewable energy superpower	11
Establishing a renewable hydrogen industry	12
Critical minerals and domestic manufacturing	12
Diversifying international clean energy supply chains	14
Restoring and strengthening international cooperation	15
Sustainable finance	16
Jobs and skills in a net zero economy	17
Clean energy workforce opportunities	18
Diversity in the clean energy workforce	19
Regional impacts	19
2. Reducing emissions across all sectors	21
Accelerating the renewable electricity transition	22
Cheaper, more reliable energy	23
Renewable energy generation	25
Offshore renewable energy	25
Firming capacity for variable renewable energy	26
Unlocking private investment in electricity generation and storage	26
Transmission	28
Improving planning processes	28
Improving community engagement	28
Partnering with First Nations people	29
Alleviating cost of living pressures	29
Reducing industry and resources sector emissions	32
Reforms to the Safeguard Mechanism	32
Gas production, use, and emissions in industry	33
Product use emissions	34
Reducing transport emissions	35
Agriculture and land	37
Research and development	37

3. Cross cutting issues	39
Strengthening the ACCU Scheme	39
Carbon storage in the land	40
Managing waste and establishing a circular economy	40
Carbon capture, use and storage	42
4. Tracking towards emissions reduction targets	43
Progress against the 2030 target	43
Emissions trends to 2035	44
Delivery of key Paris Agreement milestones	45
Assessing policy effectiveness	45
Embedding targets in policy and legislation	46
Climate action in government operations	47
5. State and territory action on climate	47
6. Adapting to climate change	53
National Climate Risk Assessment and National Adaptation Plan	54
Adaptation and First Nations people	54
Disaster risk management	56
Health and wellbeing	56
Protecting and repairing Australia's environment	57
7. National security	59
Implications for Australia's region	60
Economic and supply chain implications	61
8. International developments	63
Supporting our Pacific partners' response to climate change	64
Conclusion	67
Glossary	68
Government Response to the Climate Change Authority's Annual Progress Report	71
References	87



Foreword

It gives me great pleasure to present the Albanese Government's Annual Climate Change Statement 2023.

This is our second statement to Parliament, required by the Climate Change Act, which we passed as one of our first pieces of law.

We committed under the Act to be both accountable and transparent in how we implement our ambitious agenda for climate change and energy reforms with a yearly report to Parliament and the people of Australia.

Each annual statement is informed by advice from the independent Climate Change Authority. This advice and our response to it is also made public, along with the latest emissions projections and results from the National Greenhouse Gas Inventory, showing progress in meeting our targets.

As promised, this statement is honest and open about the impacts of climate change – including on national security, jobs and the regions. The statement also provides a report on achievements and the challenges we face in achieving the economic transformation required to reach net zero.

The past year has seen industry, communities, scientists and government at all levels come together to consolidate the policy agenda and get working on implementation.

Government investment of \$40 billion has set us on a path to becoming a renewable energy superpower, transforming our rich resources of sun, wind and critical minerals into job and investment opportunities.

The government is accelerating investment in new renewable generation and storage through the Capacity Investment Scheme and investing to modernise the grid through Rewiring the Nation.

In November, we announced that the Capacity Investment Scheme is being expanded from its current pilot stage to support 9 GW of dispatchable capacity and 23 GW of variable renewable capacity – for a total of 32 GW nationally.

We're making sure that heavy industry plays its part and remains competitive in a decarbonising global economy with reforms to the Safeguard Mechanism.

As we do that, we are ensuring that all Australians benefit from the changes ahead. The Net Zero Economy Agency has started its important work with the regions most affected by change. We are improving consultation with communities facing changes to employment, landscapes and natural environments. First Nations insights are central to this work.

At the same time, the statement demonstrates the Government's commitment to easing the cost-of-living challenges faced by so many Australians, reporting on how we can deliver clean, reliable and affordable energy to households and businesses.

As the Climate Change Authority recognises, reducing emissions by 43% by 2030 will require a whole of economy effort. But with our policy framework in place and effective implementation, it is an achievable target.

I look forward to more hard work, and more progress in 2024.

The Hon Chris Bowen MP
Minister for Climate Change and Energy



Executive summary

2023 has been a significant year for climate action. Global action on climate change is accelerating – driving the biggest economic transformation since the Industrial Revolution.

The net zero transformation is creating unprecedented demand for critical minerals and cheap, clean renewables are unlocking opportunities across sectors. The Government is putting settings in place now to ensure Australia can seize the economic opportunities presented by the transformation.

Last year, the Government laid the groundwork for ambitious climate action. The *Climate Change Act 2022* legislated our emissions reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. It also introduced the requirement for an Annual Climate Change Statement to Parliament (the Annual Statement) to provide greater accountability and transparency, supported by independent advice from the Climate Change Authority.

This second Annual Climate Change Statement provides an overview of Australia's progress in 2023. It describes the broader international context and impacts of climate change – including on the regions, national security and jobs – and lays out the achievements from this year while identifying areas for further action.

Part 1 focuses on how the Government is setting Australia up to take advantage of opportunities – including for regions, jobs and skills – from the global net zero transformation. This transformation is well underway and will shape our economic opportunities for the next several decades. Part 2 identifies action across all sectors to reduce emissions, starting with electricity before moving onto other sectors. A number of cross-cutting issues are discussed in Part 3, including reform of Australian Carbon Credit Units (ACCUs) and managing waste and the circular economy. Part 4 sets out Australia's 2023 emissions projections.

Part 5 includes discussion of policy, climate commitments and progress to date from state and territory governments. Part 6 describes the impacts of climate change and how we are adapting. National security and the challenges climate change present to it are discussed in Part 7. Part 8 of the Annual Statement focuses on international developments through the year. The final section outlines the Government's response to the Climate Change Authority's recommendations. Some cross-cutting issues, such as the impacts of climate change on regional Australia and First Nations people, are considered in multiple sections.

The Government thanks the Climate Change Authority for delivering its second Annual Progress Report. The advice plays an important role in enhancing the accountability and transparency provided by this Statement. Together, the Annual Statement, the Climate Change Authority's Annual Progress Report, Australia's Emissions Projections 2023, and quarterly updates of the National Greenhouse Gas Inventory ensure accountability and transparency of the Government's climate change policies.

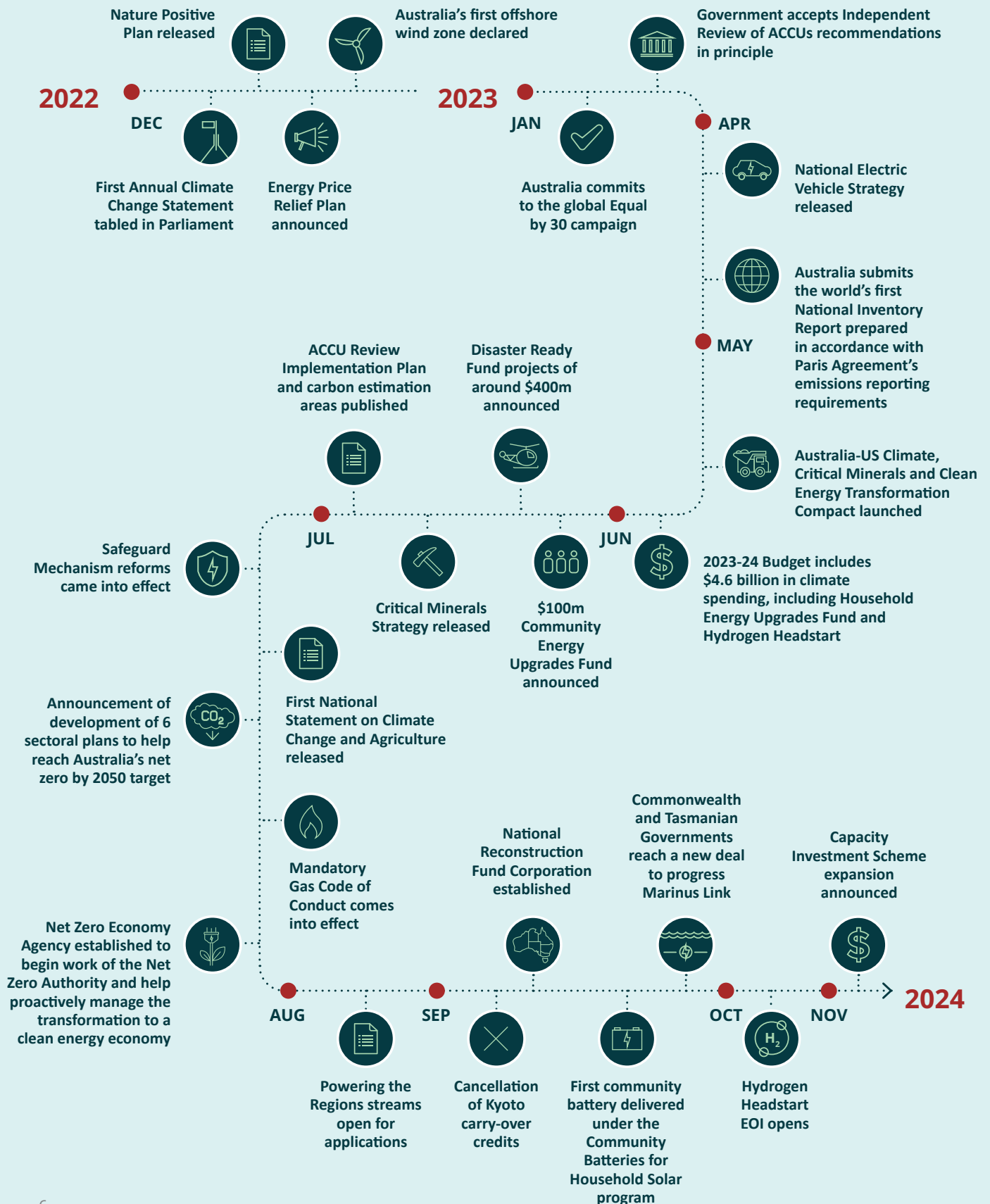
The Government agrees with the Climate Change Authority's advice that emissions need to decrease at a faster rate than they have historically to reach Australia's 2030 target (CCA, 2023). While the Government has moved quickly to implement its climate change commitments, it is not surprising that the national inventory will take some time to reflect these. The Safeguard Mechanism reforms only came into effect in July this year, and the detailed design of the Fuel Efficiency Standard (FES) is still underway, informed by significant public consultation earlier this year. Work has continued to ensure we meet our commitment to ensuring reliability, affordability and emissions reduction by achieving 82% renewables in Australia's electricity grids. This target is achievable but ambitious, and we need more effort to get there.

The Australia's Emissions Projections 2023 report – published alongside this Annual Statement – shows that emissions are projected to be 42% below 2005 levels by 2030 once our announced policies to increase renewable electricity to 82% by 2030, and implement further National Electric Vehicle Strategy measures, are included (the 'with additional measures' scenario). Investments through the National Reconstruction Fund, Hydrogen Headstart and some streams of the Powering the Regions Fund are not yet included in the projections. These could deliver additional emissions reductions in the coming years.

The 2023 emissions projections also track Australia's progress toward its emissions budget over the period 2021 to 2030. On a budget basis, cumulative emissions from 2021 to 2030 are projected to be 1% below the target in the 'with additional measures' scenario. The 'with additional measures' will move into the baseline once detailed design is complete and they are implemented.

Key Achievements

December 2022 – November 2023



Setting Australia up for a net zero future

The Government has an ambition for Australia to become a renewable energy superpower. Cheap renewable energy will underpin new, internationally competitive, clean industries, which will help to secure Australia's long-term prosperity in a decarbonising world. These new industries – such as renewable hydrogen, green metals, critical minerals processing, and manufacturing of generation and storage technologies including solar and batteries – offer major economic opportunities and will significantly reduce domestic and global emissions.

Developing these industries in Australia could also boost Australian resilience, help diversify global clean energy supply chains and support the strategic objectives of our global partners. The Government is backing in its ambition with further action to support the development of these industries.

Reducing emissions across all sectors

While 2023 was a year of significant policy implementation, there is more to do. Australia's emissions increased marginally by 3.6 million tonnes of carbon dioxide equivalent (Mt CO₂-e) or 0.8% this year.¹ This reflects the recovery from the impacts of the COVID-19 lockdowns in the transport sector and a strong recovery from the impacts of drought on livestock herds and crop production. Higher emissions in these sectors outweighed significant reductions from the electricity sector over the last year. Importantly, emissions reflect the policy decisions of several years prior. It will take more time for the full impact of this Government's policies and measures to flow through to reported emissions.

These results are all the more reason to stay the course. Reinforcing the urgency of reaching our emissions reduction targets, there are now only 73 months left until 2030 – the critical period for keeping 1.5 degrees of global warming within reach. This is ambitious, but achievable.



Agnew's Renewable Hybrid Microgrid in Western Australia. Photo supplied by EDL Energy.

¹ The emissions data presented in this Annual Statement comprise estimates on an Australian financial year basis, i.e. the period 1 July to 30 June of the next year, where 2023 represents the 2022-23 financial year.

Rapidly decarbonising the electricity system will provide the foundations to decarbonise many other sectors, so is fundamental to reaching net zero. The Government is taking steps to reach the target of 82% renewable electricity by 2030, which is critical to delivering cheaper, more reliable energy in a decarbonising economy. This includes recapitalising the Clean Energy Finance Corporation (CEFC), identifying and progressing priority transmission projects under the \$20 billion Rewiring the Nation program, and announcing new areas as suitable for offshore wind. The Capacity Investment Scheme is also accelerating investment in dispatchable energy and storage, building on direct investment from state and territory governments and industry.

The effects of the transformation will be felt by all Australians, and there will be significant opportunities for regional communities and Northern Australia to benefit from the transition. It is important that communities are engaged closely on these effects and potential opportunities to maximise benefits. The Government is consulting industry, state and territory governments, and communities – including First Nations communities – on how the expansion of renewable electricity should be implemented. Maintaining social licence with communities is vital. This year, the Government proposed important electricity rule changes to require better engagement with communities that have now been implemented by the Australian Energy Market Commission.

The energy transformation is unfolding rapidly, but not instantly. While we invest in cleaner and cheaper energy for the future, gas will continue to play a role in supporting the transition to renewables, particularly as coal-fired generation leaves the system. Australian gas will also help support regional stability, energy security and international partners' plans to reduce their emissions. Australia continues to be a trusted and stable energy supplier and it is in our best interests to maintain international trade relationships as we, and the world, transition from unabated fossil fuels to clean energy sources.

Beyond the electricity sector, the Government delivered landmark policy reforms this year which are central to meeting Australia's emissions reduction targets. These include reforms to the Safeguard Mechanism and release of the National Electric Vehicle Strategy (NEVS). The year also saw the finalised design of the Powering the Regions Fund and establishment of the National Reconstruction Fund Corporation.

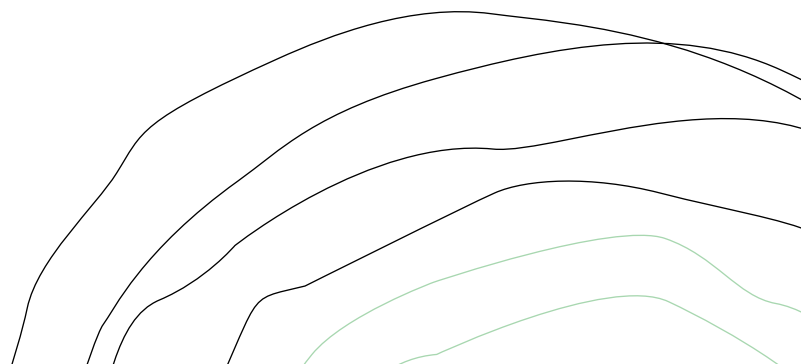
Looking forward, the Government is developing sectoral plans which look beyond 2030 covering electricity and energy, transport, industry, resources, the built environment, and agriculture and land. The waste sector will be included in the industry plan, and a focus on the circular economy will be a cross cutting issue for all sectors. The sectoral plans will be key inputs to the Net Zero Plan and inform Australia's 2035 target. The Government is engaging extensively on these plans in recognition that everyone – communities, businesses, workers, investors, First Nations people, experts, and individuals – has a role to play in the transition.

The Commonwealth, states and territories, and local governments will need to adopt more policies to achieve our net zero targets. Effective collaboration through forums like the Energy and Climate Change Ministerial Council (ECMC) is necessary to meet our emissions reduction goals.

Adapting to a changing climate

As the year draws to a close, 2023 is on track to be the warmest year on record, with heatwaves across the northern hemisphere summer and deadly wildfires in Canada and Hawaii. Australia had above-average rainfall for the first half of the year, contributing to flooding across the country. This year's bushfire season started early in northern and eastern Australia, and in some cases has affected communities that are still recovering from the 2019-20 Black Summer bushfires.

Even with strong global action to reduce emissions, the impacts of climate change will continue to be felt due to historical emissions. More frequent and intense natural hazards, among other impacts of climate change, underscore the importance of adaptation measures. Efforts are underway at all levels of government to protect Australian communities and the environment from the impacts of climate change.



Climate change impacts



The global situation and outlook

The world's climate continues to change due to greenhouse gases building up in the atmosphere.



2023 was on track (as at October) to be the warmest year on record. June, July, August and September all broke monthly temperature records.



The largest monthly anomaly in global averaged temperatures ever recorded was in September 2023 at more than 1.4°C above pre-industrial temperatures.



In September 2023, the Bureau of Meteorology announced that both the El Niño and positive Indian Ocean Dipole events are underway. For Australia, the drying effect is typically stronger and more widespread when these occur together.



Antarctic sea ice is at a record low. Less polar sea ice has profound impacts on species and ecosystems and also influences the global climate.



The situation in Australia

Bureau of Meteorology and CSIRO data shows Australia is already experiencing significant climate changes.



Australia's climate has already warmed on average by 1.48°C since national records began in 1910.



Oceans around Australia are acidifying and have warmed by around 1°C since 1900, contributing to longer and more frequent marine heatwaves.



There has been an increase in extreme fire weather, and in the length of the fire season, across large parts of the country since the 1950s, especially in southern Australia.



Rainfall between April and October has declined across parts of southwestern Australia since the 1970s and southeastern Australia since the 1990s.



According to the National Emergency Management Agency, 29 natural disasters were declared in Australia in 2023, with 20% of Australian local government areas impacted to date (as at 16 October).



The outlook for Australia



This **Australian summer is likely to be unusually warm** with an increased risk of heatwaves and bushfires.



Even if emissions were stopped today, our climate will still be impacted, with the **warming trajectory for the next decades to come** influenced by greenhouse gases already present in the atmosphere.



In the coming decades, Australia is likely to experience:

- Continued increase in air temperatures, more heat extremes and less cold extremes.
- Continuing changes to seasonal rainfall patterns, which will likely lead to more time in drought and more extreme, short duration rainfall and associated flooding.
- More dangerous fire weather days and a longer fire season in southern and eastern Australia.
- Higher sea levels affecting our coastlines.
- Fewer tropical cyclones, but with greater intensity and variability.



1. Setting Australia up for a net zero future

Becoming a renewable energy superpower

The Government has an ambition for Australia to become a renewable energy superpower.

Globally, action to build new clean energy industries has intensified. The *United States' Inflation Reduction Act* will see estimated government investment of at least US\$370 billion in clean energy solutions (possibly more), marking it as the most significant US intervention on climate change in history. Other countries have also announced ambitious plans to accelerate action on climate change and develop their own decarbonised industrial bases, including the European Commission Green Deal Industrial Plan for the Net-Zero Age, Made-in-Canada Plan, and Japanese Green Transformation Plan.

The global energy transformation is underway. In 2023, the world is set to invest a record US\$1.8 trillion in clean energy (IEA, 2023a). For every US dollar invested in fossil fuels globally, about US\$1.7 are now going into clean energy (IEA, 2023b).

Against this backdrop, new opportunities are emerging for Australia. Australia is well-positioned to capitalise on the opportunities of the net zero transformation, with abundant and high-quality renewable energy potential, a skilled and innovative workforce, strong trading relationships and mineral resources. Australia can use these advantages to support the development of new clean energy industries, underpinned by cheap renewable energy. Global recognition of the value of building diverse and resilient clean energy supply chains means Australia's partners are increasingly looking to friends and allies, and Australia has an opportunity to step up and play a greater role in value chains such as critical minerals; generation and storage technologies, including solar and batteries; and renewable hydrogen, ammonia and green metals.

Over 97% of Australia's exports now go to destinations with net zero targets. The Government has a critical role to play in supporting growth of new industries aligned with the global transformation – to diversify and make our economy more resilient, while unlocking new sources of prosperity.



The Government has already committed over \$40 billion to building a clean energy future, but more action will be needed. Moving forward, the Government is continuing to focus its efforts on creating a positive investment environment and supporting the development of industries aligned with Australia's priority areas, including renewable hydrogen and its derivatives, refining and processing critical minerals, generation and storage technology manufacturing and green metals. Growing these industries will allow Australia to move up and along global supply chains, to capture more of the value added – capitalising on the world's demand for inputs to a net zero economy and increasing the resilience of Australian supply chains.

In addition to these sectors, the Government is continuing to evaluate other opportunities – such as other clean energy technology manufacturing and low carbon liquid fuels – which could provide strategic benefits to Australia by diversifying supply chains and bolstering energy security, as well as creating good jobs.

The Government will also work with industry and the community to consider additional actions and policies that address barriers to investment and accelerate growth of key clean energy industries.



Establishing a renewable hydrogen industry

A domestic hydrogen industry will help Australia realise its vision to become a renewable energy superpower. Renewable hydrogen will provide opportunities for the decarbonisation of hard-to-abate sectors like steel, aluminium, ammonia, and chemicals production and heavy transport.

A large-scale hydrogen industry could create over 16,000 jobs in regional Australia and a further 13,000 jobs in renewable energy infrastructure by 2050. The Government is currently leading a review and update of the 2019 National Hydrogen Strategy to capture these opportunities.

To help support hydrogen project feasibility, the Government has invested more than \$500 million to support the development of hydrogen hubs across regional Australia and to fund design and development studies. The hubs will be industrial clusters made up of hydrogen producers, users and exporters that will lower the cost of hydrogen production, encourage innovation and build the necessary skill base.

Australia has a \$230 to \$300 billion announced pipeline of over 100 hydrogen projects, representing approximately 40% of all global renewable hydrogen projects announced to date. The Hydrogen Headstart program, announced in the 2023-24 Budget, will invest \$2 billion to accelerate the development of Australia's renewable hydrogen industry by covering the current commercial gap between the cost of producing renewable hydrogen and its market price. This should enable producers to offer hydrogen to users at a price that will encourage its use. The program will provide revenue support to eligible renewable hydrogen projects in Australia over a 10 year period and aims to connect Australia to new supply chains. Expressions of interest in the program opened in October 2023, with first funding to become available in 2026-27.

The Guarantee of Origin scheme will provide transparency to future consumers of hydrogen and other Australian-made low-emissions technologies, which will help to ensure Australia is seen as an attractive investment destination. The scheme will identify where a product has come from, how it was made, and its lifecycle carbon intensity.

Australia's international engagement is also helping drive the development of a global hydrogen industry and create export opportunities. Australia has joined 14 countries in the new International Hydrogen Trade Forum, to improve the market for importing and exporting hydrogen across the world.

It is important that First Nations people are included in developing a domestic hydrogen industry and can benefit from its emergence. The Government has committed \$2 million to establish a fund to support First Nations communities to meaningfully engage with hydrogen project proponents, planning processes and program design, to capture associated benefits.





























Critical minerals and domestic manufacturing

The global net zero transformation is driving demand for critical minerals that are essential to modern technologies, economies, and national security. Australia is well placed to meet this demand, with rich geological reserves, mineral extraction expertise, and a track record as a reliable producer and exporter of energy and resources. Australia currently produces almost half the world's lithium, and has the world's second largest lithium reserves after Chile (US Geological Survey, 2023).

The Critical Minerals Strategy, published in June 2023, outlines the Government's plan to work with communities, industry, investors, the research and innovation sector, states and territories, and international partners to grow the critical minerals sector in the national interest. The Government has asked the Northern Australia Infrastructure Facility (NAIF) to earmark \$500 million in financing support for projects that align with the Critical Minerals Strategy, in addition to the \$655 million in loans the NAIF has already approved for 4 critical mineral and rare earth projects. Export Finance Australia also manages the Government's Critical Minerals Facility, which was expanded to \$4 billion in October 2023.

The Critical Minerals Strategy is also focused on supporting the development of domestic minerals processing capacity, which can support future clean energy manufacturing of key technologies.

Key minerals and their potential uses

	Electric vehicles and batteries	Electric network	Solar	Wind	Hydro	Bioenergy	Geothermal
Bauxite							
Cobalt							
Lithium							
Rare Earth Elements							

Source: Treasury (2023).

 High  Medium  Low

Note: Relative importance of the mineral for a particular clean energy technology is indicated by blue circles for high importance, teal circles for medium importance and green circles for low importance.

As an example, batteries will be central to the global net zero transformation. Batteries are needed to power electric vehicles, for commercial, residential and community energy storage, and for utility scale grid energy storage.

Australia is not alone in its ambitions to build a local battery industry. The United States, the European Union and China have adopted battery industry development strategies that aim to secure their rights to low value raw materials overseas, while preserving domestic value adding activities. The Government is supporting the Australian battery industry by:

- developing a National Battery Strategy, to guide governments and industry towards a shared vision of a diverse and competitive battery manufacturing industry
- establishing the Australian Made Battery Manufacturing Precinct to boost domestic manufacturing, in partnership with the Queensland Government
- establishing a Powering Australia Industry Growth Centre to support businesses to locally manufacture renewable technologies and commercialise local ideas.

Australia is also growing its critical minerals processing capacity to ensure inputs for domestic battery manufacturing are locally produced. Through the Critical Minerals Development Program, the Government has awarded \$100 million to critical minerals projects to diversify supply chains, build domestic downstream processing and support new jobs and regional development.

The \$15 billion National Reconstruction Fund will include up to \$3 billion for investment into renewables and low-emissions technologies, which may include supporting local EV manufacturing. National Reconstruction Fund finance may also help drive the transition in Australia's steel industry to producing green steel with the use of renewable hydrogen.

The Government is supporting the development of other clean energy manufacturing technology that could also benefit from expanded domestic critical minerals production and processing capacity. For example, a \$20.9 million investment through the Australian Renewable Energy Agency (ARENA) is helping to commercialise locally developed electrolyser technology for making low cost renewable hydrogen. ARENA is also investing in the development of green steel, aluminium, and ammonia production opportunities in Australia.

Australia's solar potential

Onshore manufacturing can strengthen supply chains and support Australia's energy transformation, renewable energy export potential and new energy jobs market. The Government is exploring opportunities for Australia to become a manufacturer of solar panels for our leading domestic market and as an exporter to the rest of the world.

Tindo Solar has been manufacturing solar panels in Australia since 2011, with an expanded factory at Mawson Lakes in Adelaide with capacity to produce 150 MW per year.

In January 2023, the Government announced funding for 13 Australian research projects with a combined funding of \$41.5 million, focusing on delivering Ultra Low Cost Solar – that is, solar generated at about one quarter of the current price.

In June 2023, ARENA provided a grant for the Silicon to Solar study, which will explore the challenges and opportunities for producing solar panels, our leadership in solar photovoltaic (PV) research and development, and our potential as a renewable superpower to underpin a thriving manufacturing industry.

In November 2023, ARENA invested \$11 million to back in Australian solar technology developers SunDrive to manufacture the world's most efficient solar modules. SunDrive will scale up its advanced production line to make enough copper metallised PV cells for around 15,000 household solar systems each year. The \$33.6 million project will help SunDrive to step up their production, employing around 100 people by the end of the year at their manufacturing facility at Kurnell in Sydney. SunDrive aims to employ more than 500 people as production increases in Australia.



Prime Minister The Hon Anthony Albanese MP and Minister for Climate Change and Energy, the Hon Chris Bowen MP, opening SunDrive's solar manufacturing pilot production and commercialisation facility in Kurnell, NSW in November 2023.

Diversifying international clean energy supply chains

Supply chain diversity will become increasingly important as global demand for clean energy products like solar panels, batteries, and electrolyzers grow. Currently, production and processing of many critical minerals required for making these products is concentrated in just a few countries. Concentrated production creates the potential for supply disruptions in the event of a shock, like those seen in fossil fuel markets since the start of the Ukraine war. For example, China holds at least 60% of the world's manufacturing capacity for most mass-manufactured renewable technologies, including solar PV, wind systems and batteries, and undertakes 90% of the processing of rare earth elements essential for producing wind turbines and electric vehicles (IEA, 2023b). Around 70% of cobalt's global supply (used in lithium-ion batteries) comes from the Democratic Republic of Congo, while 60 to 70% of its processing occurs in China (IEA, 2023d).

Developing domestic production and processing capacity will help safeguard Australia and its trading partners from global supply shocks. Additionally, Australia's investments in clean energy manufacturing will support the supply chain expansion needed to meet domestic decarbonisation and export goals.

In 2023, Australia made commitments to collaborate on critical minerals with the United States, Germany, France and the United Kingdom. Australia is also working with international partners to develop shared approaches on transparency, environmental and social standards, and ethical labour practices for clean energy supply chains. As part of the May 2023 Quad Leaders' Summit, Quad partners – Australia, India, Japan and the United States – announced a Statement of Principles on Clean Energy Supply Chains in the Indo Pacific. The principles are designed to promote diverse, secure, transparent, and resilient clean energy supply chains and support a sustainable and inclusive clean energy transition. This work is also supported by the Quad Clean Energy Supply Chain Diversification Program – to which Australia is contributing \$50 million to develop clean energy supply chains in the Indo-Pacific and the Pacific.

Given the increase in global demand for key inputs and components in the renewable energy supply chain, resilient supply chains will be important to support the 82% renewables target by 2030. All of Australia's Energy Ministers, through the National Energy Transformation Partnership, have committed to delivering a National Renewable Energy Supply Chain Action Plan to improve supply chain resilience while capturing economic opportunities associated with the transformation.

Restoring and strengthening international cooperation

Australia's international relationships sit at the heart of our efforts to accelerate decarbonisation and become a renewable energy superpower.

Since the first Annual Statement, Australia has been working to develop and deepen climate and energy ties with significant partners including the United States, China, Japan, Republic of Korea, India, Germany, the Netherlands, Singapore, Austria and the UK. These partnerships aim to build enabling environments and opportunities in climate policy and technical exchanges, and across new renewable energy sectors including solar, hydrogen, and offshore wind, while supporting our collective energy security.

United States

Deepening Australia's partnership with the United States – the world's largest economy, a predominant force in renewable energy capital flows and one of Australia's principal strategic partners – will be key to realising the Government's renewable energy superpower vision.

In May 2023, the Prime Minister and the United States President launched the historic Australia–United States Climate, Critical Minerals, and Clean Energy Transformation Compact. This affirmed our shared determination to make climate and clean energy cooperation the third pillar of the Australia–US alliance and to counter the threat to global security and prosperity posed by climate change. During the Prime Minister's October 2023 visit to Washington, leaders agreed first steps under the compact which will over time integrate our countries' clean industrial bases, including cooperative activities on critical minerals, clean energy supply chains, industry engagement, collaboration in the Indo-Pacific and the Pacific, and research and policy alignment.

China

China is the world's largest producer of clean energy technology and a key player in global clean energy supply chains. In November 2023, during his visit to China – the first prime ministerial visit since 2016 – the Prime Minister and Chinese Premier Li Qiang agreed to expand engagement on climate change and energy, including through recommencement of bilateral dialogue.

Japan

Japan and Australia, as Quad members and long-term energy partners, are focused on harmonising our transition pathways. In October 2023, Australia and Japan further agreed to work together towards an enhanced partnership on energy security, transition and climate change to address mutual opportunities and challenges in the transition to net zero.

Republic of Korea

The Republic of Korea and Australia retain a strong, long standing relationship on energy, resources and minerals. Australia and the Republic of Korea are well-placed to step up clean energy cooperation and are discussing opportunities to enhance bilateral cooperation across the clean energy value chain, including on hydrogen, green steel and solar.

Germany

In January 2023, Australia and Germany announced the outcomes of HySupply, which found that exporting renewable hydrogen between Australia and Germany was both possible and desirable. Minister Bowen and German Minister for Education and Research, Bettina Stark Watzinger, have also announced funding for 4 new joint renewable hydrogen pilots under the German–Australian Hydrogen Innovation and Technology Incubator (HyGATE) initiative, which are supporting efforts to establish a green hydrogen supply chain between Australia and Europe.

India

In March 2023, Prime Ministers Albanese and Modi agreed to work towards an elevated Renewable Energy Partnership to enhance cooperation on the production and deployment of renewable technologies. An elevated partnership will include a focus on accelerating solar deployment and exploring commercial and research opportunities around green hydrogen.

The Netherlands

In January 2023, Minister Bowen and the Dutch Minister for Climate and Energy, Rob Jetten, signed a memorandum of understanding to promote green energy supply chains between Australia and the Netherlands on green hydrogen. This partnership will deliver practical collaboration to support the development of a hydrogen supply chain from Australia to Europe, via the Port of Rotterdam.

Singapore

The 2022 Singapore–Australia Green Economy Agreement lays the foundations for greater collaboration to drive growth while reducing emissions. The Government is in discussions with Singapore to explore areas of cooperation in green and digital shipping and will establish a Singapore–Australia Green and Digital Shipping Corridor by the end of 2025.

Sustainable finance

Australia's reputation as an open economy with transparent, stable legal and governance systems and a highly-skilled workforce makes it an attractive investment destination. Sustainable finance – financial flows that integrate consideration of impacts on society and the natural environment – can be a significant competitive advantage for Australia.

The Government is developing a Sustainable Finance Strategy to help mobilise private sector investment needed to support the transition to net zero. The Strategy builds on the Government's work to implement mandatory climate-related financial disclosure requirements for large companies and financial institutions.

The Strategy identifies policy priorities across three key pillars:

1. Improve transparency on climate and sustainability
2. Financial system capabilities
3. Australian Government leadership and engagement

Each pillar contains a range of proposed tools and policies to support sustainable finance in Australia. Consultation is ongoing and will inform policy development and regulatory engagement on sustainable finance in Australia.

The Government's actions build on the private sector's actions in sustainable finance. Compared to last year, an additional 26 ASX200 companies have made net zero commitments, bringing the total to 121 (ACSI, 2023). Large companies have moved even faster and by value, 80% of ASX200 market capitalisation sits in companies with net zero commitments.

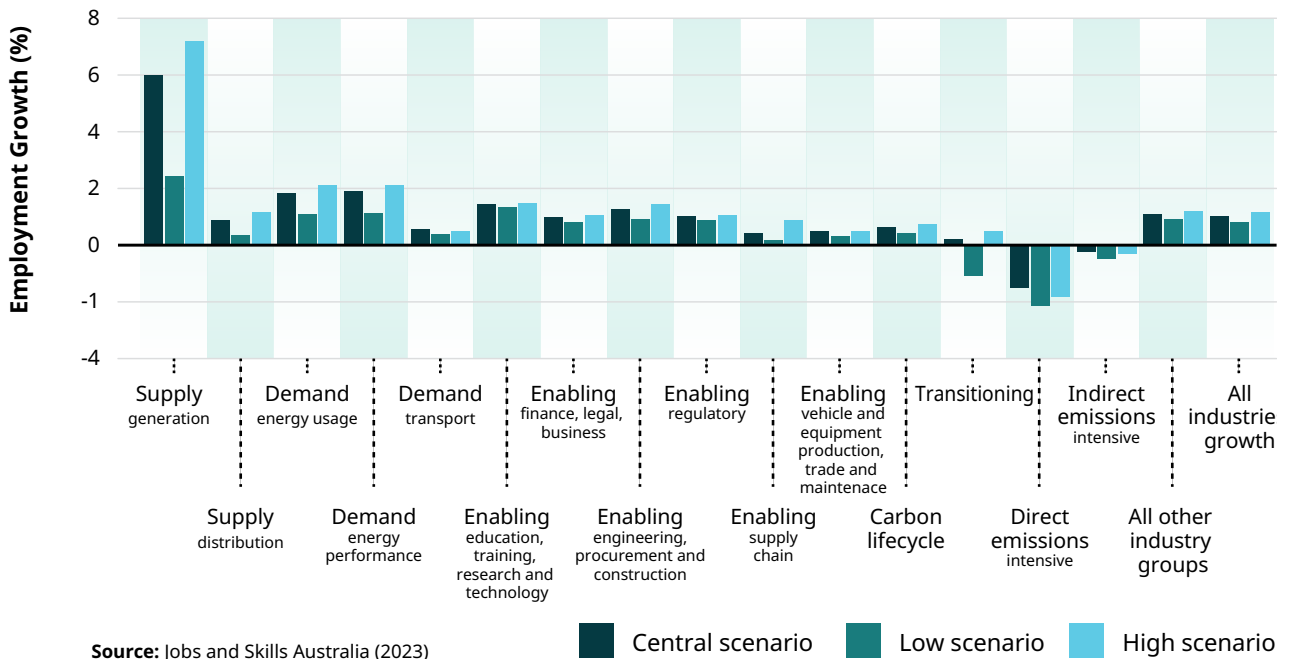
The green finance market in Australia has developed quickly over the past decade. Around \$13 billion of green bonds were issued in Australia in the first half of 2023. This is the highest annual amount on record. In mid-2024, the Government will start issuing Sovereign Green Bonds, which will enable investors to back public projects driving Australia's net zero transformation, and will boost the scale and credibility of Australia's green finance market.

The Government is also providing funding for the Australian Securities and Investments Commission to expand its work combating ‘greenwashing’ (businesses making misleading claims about the sustainability of their products). This will support investor sentiment towards Australia as a destination for green capital.

Jobs and skills in a net zero economy

The net zero transformation will reshape the skills needed in Australia’s economy. While employment in some emissions-intensive sectors will decline as domestic and global markets move away from fossil fuels, new employment opportunities will increase – both in existing and new industries.

Figure 1: Average annual employment growth rates by clean energy workforce and related sectors, 2030 to 2050



Clean energy workforce opportunities

The clean energy workforce² includes workers involved in energy infrastructure, energy service delivery, and clean energy technology (JSA, 2023). Jobs and Skills Australia analysis³ indicates the clean energy supply workforce will need to grow from 53,000 to 84,000 workers by 2050, with strong growth likely in hydro-electricity, wind and solar generation. Strong growth in demand for occupations such as electricians, tradespeople, technicians, machine operators, and project managers is expected. Construction is also likely to grow, as much of the activity to build and replace transmission infrastructure is in the civil construction sector.

With the retirement of ageing coal-fired infrastructure and global transition to a clean energy economy, employment in fossil fuel industries is expected to decrease in coming decades. This will occur in the context of an additional 1.5 million jobs expected in the economy overall during this period, with many arising from the opportunities of transitioning to a net zero world. The Government recognises the disruptive impact of this change and is establishing the Net Zero Authority to help manage the opportunities and challenges that will come with it. The Net Zero Economy Agency has been established to begin the Net Zero Authority's work.

The transition will need to be supported by building an appropriately skilled workforce. Many of the skills needed to decarbonise already exist in Australia's economy and growth in sectors like solar and wind farms will provide opportunities for workers in emissions-intensive occupations to reskill, upskill or change jobs. Australia has a high share of emissions-intensive jobs that can effectively transition to clean energy jobs. To take advantage of these opportunities, workers affected by industrial changes need to be able to access reskilling and upskilling opportunities.

Despite Australia's highly skilled workforce, an insufficient number of available skilled workers to meet clean energy workforce demand risks being a barrier to investment and project development in Australia and internationally.

The tertiary education system will need to support young Australians to get their first qualification and provide opportunities for existing workers to reskill and upskill. While most clean energy jobs will require existing, broad-based qualifications that teach core skills, 'top-up' or elective courses (such as short courses) may also be needed to deliver specialist knowledge. New qualifications may also be needed for emerging occupations.

The Commonwealth's investment of up to \$12.6 billion in a new National Skills Agreement, which will commence in 2024, will help provide Australia with the skilled workers it needs. Supporting the net zero transformation is one of the national priorities under the agreement. The Government is also working with the newly-established Jobs and Skills Council for the energy sectors – Powering Skills Organisation – to address energy skills and workforce challenges.

The Government is also providing direct support to Australians training for jobs in the clean energy sector. The New Energy Apprenticeships Program is providing eligible apprentices with up to \$10,000 during their apprenticeship in the clean energy sector. This direct financial assistance is encouraging more apprentices to choose clean energy careers and improve retention and completion rates. As at October 2023, over 1,300 new energy apprentices had been approved for the program.

Skilled migration will also contribute to the future clean energy workforce to meet demand and transfer emerging technology and ideas from overseas. However, global demand for clean energy workers may make it harder to attract skilled migrants and retain Australian workers.

The Government's white paper on jobs and opportunities, 'Working Future', outlined further directions and initiatives to boost workforce participation and build a more dynamic and inclusive workforce.

Looking forward, the National Energy Workforce Strategy (due in 2024) will seek to address energy workforce challenges. This includes attracting and retaining workers, ensuring productive quality careers in energy supply and demand sectors, and improving coordination between the Australian, state and territory governments.

2 Jobs and Skills Australia defines the 'clean energy workforce' as workers involved in clean energy supply, energy efficiency, energy management, demand management and clean energy. All workers contributing to these activities are in scope.

3 The analysis referred to in this Annual Statement is the Jobs and Skills Australia's central scenario set out in the Clean Energy Capacity Study, which is broadly aligned to current Government climate and energy policy and future intent.

Diversity in the clean energy workforce

Increasing women's participation in clean energy industries will help boost women's economic equality and support the net zero transformation. Currently, women are underrepresented in renewable energy occupations – for example, in 2019, women represented 6% of solar installers and 8% of energy efficiency engineers. More broadly, women are underrepresented in science, technology, engineering and mathematics (STEM) occupations that are likely to play a role in the transformation.

This underrepresentation needs to be addressed throughout the skills pipeline, with women representing only around 19% of engineering or related technologies enrolments in 2021. To keep women in these industries and occupations longer-term, it will be necessary to address barriers to women's ongoing participation in male-dominated industries and occupations, including by addressing bias and improving flexible work arrangements. The National Energy Workforce Strategy will also explore opportunities to increase women's participation in the energy workforce.

The Pathway to Diversity in STEM Review will make recommendations to the Government to support pathways for diverse groups into STEM, including women and girls. Additionally, the Women in STEM Cadetships and Advanced Apprenticeship Program supports women to pursue STEM qualifications while they work.

Australia has also signed up to the international Equal by 30 campaign to work towards equal pay, leadership and opportunities for women in the clean energy sector by 2030.

First Nations people should also benefit from new clean energy workforce opportunities. Coal mining, in particular, has been a major employer for First Nations people, with 3.4% of the workforce identifying as Aboriginal or Torres Strait Islander.

Currently, the emerging clean energy sector's First Nations employment levels sit at around 1.9%, in line with the labour force average. Growing the number of First Nations tertiary graduates will be critical to ensure First Nations employment in the clean energy sector is not concentrated at the lower-skilled, lower-paid operational level of the workforce, which has been the case for the transitioning energy sector.

Regional impacts

The net zero transformation will come with challenges as it changes the industry mix in some rural and regional economies. Australia's remaining coal-fired power stations and their dependent mines will gradually close, in part due simply to their age and reliability. This will affect workforces, particularly in the Latrobe Valley (Victoria), the Hunter region (NSW), Collie (Western Australia), Gladstone (Queensland), and central Queensland.

More broadly, growth in demand for trades and technical occupations that are critical to clean energy – such as electricians, metal fitters and machinists – is likely to be concentrated in regional Australia. This will require a substantial uplift in training infrastructure to ensure that local students and workers can take advantage of new clean energy opportunities.

Forward planning will help ensure regional communities are ready for the transformation. Responsibility for the transition is shared between governments, industry, workers and communities. The Net Zero Economy Agency is collaborating with state and territory governments, local governments, industry, unions, First Nations people and communities to ensure highly-affected regional areas have access to targeted support and benefit from the transformation. This includes supporting workers from emissions-intensive sectors to access new employment, skills, and opportunities. The Government will also work with employers and local communities to support retrenched workers and their families through transition.

Australia's regions are likely to experience varied impacts from climate change, including economic impacts. The Government's Regional Investment Framework, which guides investment decisions in the regions, includes guiding principles to support the transformation to a net zero economy and decarbonisation. This will help ensure that investment in regions experiencing economic impacts due to the net zero transformation will be flexible and aligned with each region's strengths and needs.



2. Reducing emissions across all sectors

Australia's emissions are now 24.5% below 2005 levels.

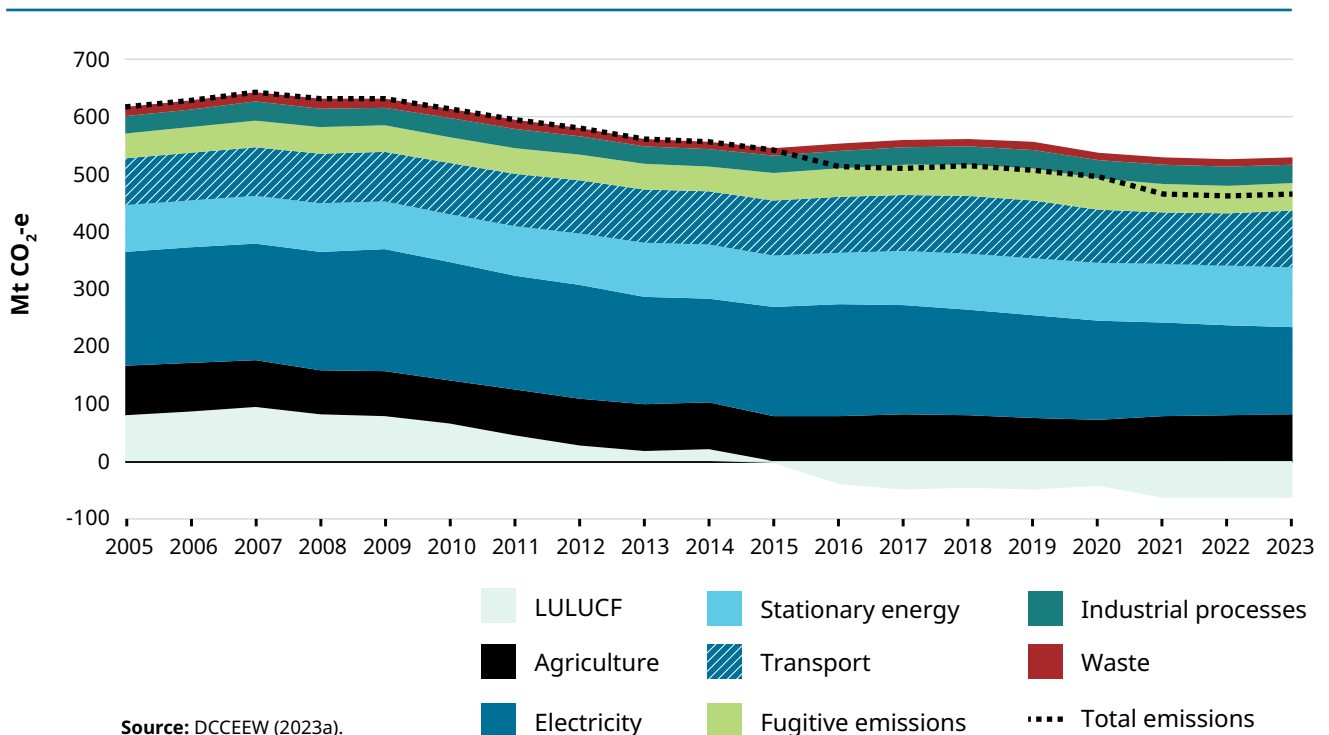
In the year to June 2023, emissions increased marginally by 0.8% (or 3.6 MtCO₂-e). This was driven by increased emissions in the transport and agriculture sectors, reflecting the ongoing recovery from COVID-19 travel restrictions and a return to pre-drought emission levels in agriculture. Increased emissions in these sectors were partially offset by decreases from electricity generation and fugitive emissions, reflecting the continuing shift to renewable generation and reductions in coal production.

Australia's downward trend in emissions since 2005 has largely been driven by emissions reductions in the electricity and land use sectors. Emissions from land use, land use change, and forestry (LULUCF) in 2023 are 179.1% lower (144.6 Mt CO₂-e) than in 2005.

This is due to a long term decline in land clearing and harvesting of native forests, and an increase in forest cover. The other significant contribution to national emissions reductions came from the electricity sector, which saw a decrease of 22.9% (45.0 Mt CO₂-e) between 2005 and 2023. This is largely due to the ramping up of renewable generation and the retirement of ageing coal-fired generation.

Not all sectors have declined over this time, with stationary energy and fugitive emissions increasing by 26.1% and 10.8% respectively since 2005, largely due to an increase in liquefied natural gas (LNG) production and exports. The transport sector has also seen significant emissions growth, increasing by 19.5% (16.0 Mt CO₂-e) since 2005. This has been driven by rising passenger vehicle numbers, greater diesel use in heavy transport, and an increase in air travel.

Figure 2: Breakdown of emissions per sector between 2005 and 2023



To reach its 2030 emissions reduction target, Australia needs to decarbonise at an annual average rate of around 16 Mt CO₂-e. The commitment to reach 82% renewable electricity by 2030 will make a significant contribution to this rapid decline, with emissions in the National Electricity Market (NEM) expected to decline from 129 Mt CO₂-e in 2022 to around 43 Mt CO₂-e in 2030. However, all sectors of the economy will need to contribute. More action will be needed to achieve our net zero target for 2050.

To work towards this, the Government is developing sectoral decarbonisation plans, covering electricity and energy, transport, industry, resources, the built environment, and agriculture and land. The waste sector will be included in the industry plan, and a focus on the circular economy will be a cross cutting issue for all sectors. The sectoral plans will inform the development of the Net Zero Plan and Australia's 2035 emissions reduction target. The Government will engage extensively with industry, investors, the climate movement, First Nations people, experts, unions, the community, and all levels of government to develop the sectoral plans.

Accelerating the renewable electricity transition

The electricity sector is the largest single emissions source in the Australian economy. In 2023, emissions from the sector represented 32.6% of total emissions, having decreased by 3.5% (5.6 Mt CO₂-e) since 2022. Most of the electricity sector emissions are from Australia's ageing coal power generators, which are reaching the end of their design life and becoming increasingly unreliable. These generators are being replaced by renewable energy and storage to provide cheaper, cleaner, more reliable energy.

Decarbonising the electricity sector will be vital to meeting our emissions reduction targets and will facilitate the decarbonisation of emissions-intensive sectors like transport and industry as they electrify and use renewable electricity.

Australia's energy system is rapidly transforming. In 2022, renewable sources contributed an estimated 32% of Australia's total electricity generation – a 3 percentage point increase from 2021 – and renewable generation is expected to average 40% of generation in the NEM by December 2023 (CER, 2023). The share of renewable energy has been steadily increasing, mostly driven by increases in wind and solar generation. Instantaneous renewable energy penetration reached an all time high in Q3 2023, peaking at 70% as shown in Figure 3.



As the Climate Change Authority notes, however, decarbonisation of the electricity sector needs to accelerate. Over the next 7 years, the share of renewables will need to grow even faster to reach 82%. The expanded Capacity Investment Scheme and Rewiring the Nation will be central to achieving this. The electricity and energy sectoral decarbonisation plan, being developed as part of the Net Zero Plan, will identify the pathways for how the sector will transition to net zero by 2050.

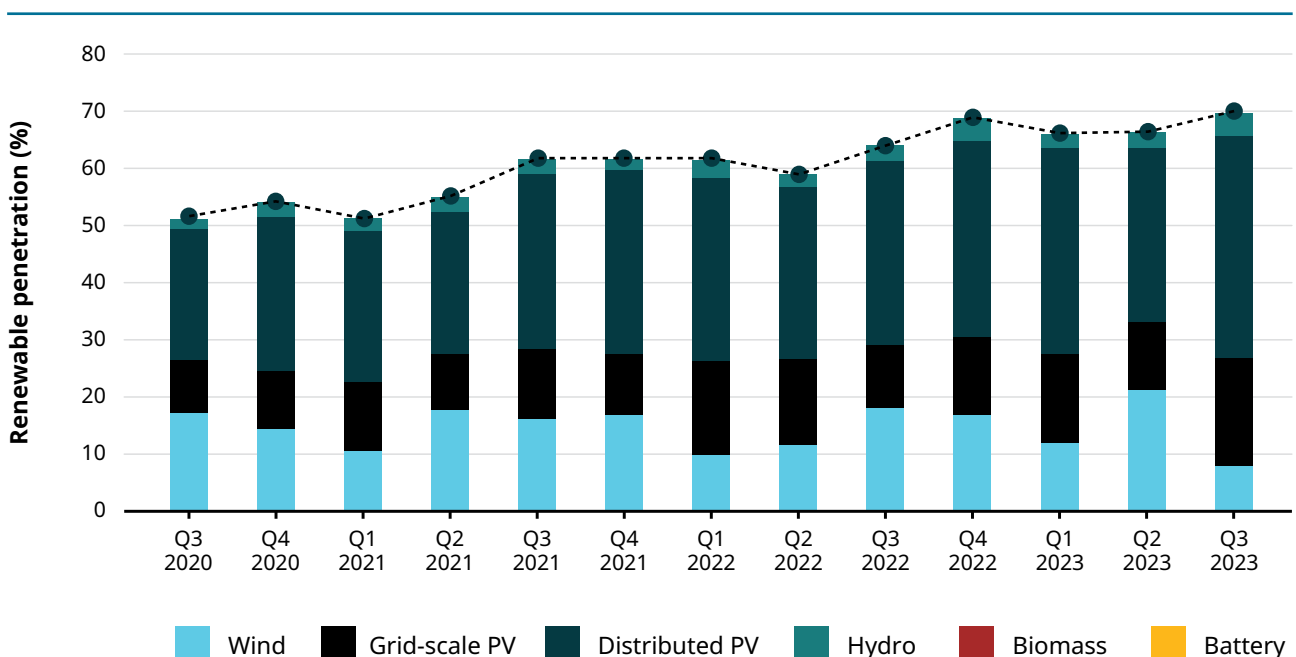
Cheaper, more reliable energy

While the price that consumers pay for electricity is influenced by a range of factors, including the wholesale cost of generating electricity and the cost of transmission and distribution, renewable generation has almost no short run costs to operate compared to fossil fuel based generation, whose input costs are subject to international price fluctuations.

Increasing the role of variable renewable energy, like wind and solar, helps put downward pressure on wholesale prices and helps to insulate electricity prices from international coal and gas prices. In quarter 3 2023, over 800 MW of new solar, wind and batteries connected to the NEM, and the increased solar and wind output contributed to lower wholesale prices during that quarter.

Additionally, while substantial capital investment is required to fund renewable transmission and distribution infrastructure, Australia's fossil fuel generators are becoming increasingly costly and unreliable as they age. It is not possible to continue to rely on these generators, so investment is needed. According to AEMO, coal-fired generation reliability continued to demonstrate historically poor performance in 2022, consistent with recent historical trends.

Figure 3: Instantaneous renewable energy penetration in the NEM



Note: AEMO measures the instantaneous penetration of renewables by determining the percentage of total generation produced from renewable sources over a 30-minute period.

Source: AEMO (2023a).

Experiences in Europe saw generator outage rates increase from an average of 9% to an average of 18% close to their end of life. This is significantly higher than typical industry best practice of 3%, as coal generators tend to cut down on operations and maintenance expenditure as a plant approaches its retirement date.

An increase in unplanned outages and unexpected early closures can have significant impacts on reliability and drive wholesale prices up. Increasing the share of renewables – replacing coal with firm renewable energy – will improve electricity reliability and affordability.

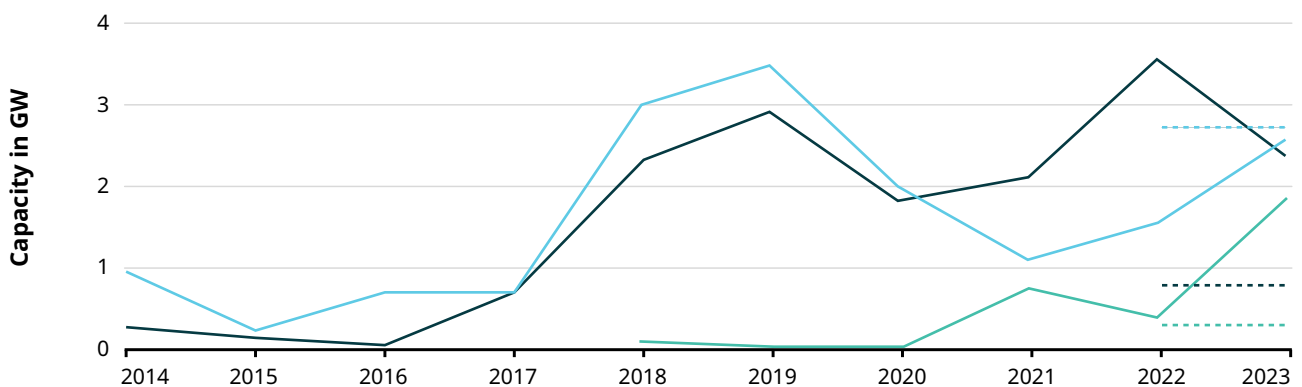
Figure 4 provides a snapshot of how much extra large scale wind, solar and storage capacity is required to meet our climate targets. To reach 82% renewable electricity by 2030, committed projects (projects that have land or sea rights, ordered components and received planning approvals, finance completion, and set construction timing) need to meet or exceed the annual investment benchmarks. During 2022-23, Australia's committed solar, and shallow and medium storage project levels were on track to reach 82% renewable electricity in 2030, while additional wind commitments will be needed.

Reaching the 82% renewable electricity target will require significant investment in new transmission to connect renewable resources to the grid, working with local communities to build support for projects and ensuring that approvals processes are fit-for-purpose.

In 2023, the prices of raw materials needed for technology manufacturing and in freight costs were higher than anticipated, given ongoing impacts from COVID-19 supply chain disruptions. Such constraints underlie recent delays and cost increases to a range of NEM generation and transmission projects. However, investment in the grid and timely delivery of transmission, generation and storage projects will be vital to ensure reliability and price impacts of coal generator retirements are mitigated.

As the Climate Change Authority has advised, achieving the 82% target requires significant coordination with state and territory governments (CCA, 2023). Under the National Energy Transformation Partnership, the Australian Government and state and territory governments are working together on a range of reforms that will support reaching the 82% target, including the Capacity Investment Scheme and its significant expansion announced in November, as well as Rewiring the Nation.

Figure 4: Committed large-scale solar PV, wind generation and shallow and medium storage in the NEM, 2014 to 2023



Notes: The annual investment benchmarks are derived from Climate Change Authority analysis (CCA, 2023). AEMO produces NEM Generation Information every three months or less. The CCA has used a data point aligned most closely with the end of each financial year. Solar PV excludes rooftop PV installations.

Sources: (AEMO, 2014); (AEMO, 2015); (AEMO, 2016); (AEMO, 2017); (AEMO, 2018); (AEMO, 2019); (AEMO, 2020a); (AEMO, 2021a); (AEMO, 2022e); (AEMO, 2023b); (CCA, 2023).

Wind Wind benchmark annual investment
 Solar Solar PV benchmark annual investment
 Storage Storage benchmark annual investment



Renewable energy generation

In 2022, the largest source of renewable generation was solar (14% of total electricity generation) followed by wind (11%) and hydro (6%). Fossil fuel sources contributed 68% of total electricity generation, with coal accounting for the largest share (47% of total generation in 2022, down from 51% in 2021).

The Government is investing in renewable energy projects around the country to bring more renewable electricity generation online. These include:

- establishing a Capacity Investment Scheme to encourage investment in 23 GW of variable renewable capacity and 9 GW of dispatchable capacity, for a total of 32 GW nationally
- \$65 million towards the upgrade of the Tarraleah hydropower scheme, a key asset of Tasmania's Battery of the Nation initiative
- partnerships with the Northern Territory, ACT and Victoria to deliver community solar banks, to assist renters, apartment-dwellers, and low-income earners to access shared solar
- continuing to focus on the delivery of the Snowy 2.0 pumped hydropower project, which will provide an additional 2.2 GW of dispatchable, on demand generating capacity, and 350 GWh of large scale storage to the NEM
- \$125 million to develop and deploy microgrid technologies in regional and remote communities through the Regional Microgrids Program, including \$75 million allocated for projects in First Nations communities.

Offshore renewable energy

Offshore wind can help with energy security and resilience due to its power capacity and availability at times when solar power and onshore wind are not available. Building an offshore wind industry will also provide significant economic opportunities, particularly in the regions. Offshore wind is both energy and jobs rich, yet Australia has come late to this important resource.

This year, the Minister for Climate Change and Energy announced new areas as suitable for offshore wind energy, including the Bass Strait off Gippsland, Victoria, and in the Pacific Ocean off the Hunter region in NSW. Following public consultation, the final offshore areas in Gippsland and the Hunter were declared with smaller footprints than the original proposed zones, balancing the views of the local community, industry and sea users.

Consultation also began this year on proposed regions in the Pacific Ocean off the Illawarra, Southern Ocean off Victoria and SA and the Bass Strait off the Tasmanian coast. The Perth/Bunbury region off the West Australian coast has also been identified as a priority area for assessment.

Consultation will continue for all 6 areas over the next few years as projects move through feasibility and commercial licencing. Projects will need to have approved management plans and environmental approvals before commencing construction. This regulatory process is designed to ensure offshore infrastructure co-exists with local environments, sea users and communities and provides enhanced local content and employment opportunities.

Firming capacity for variable renewable energy

Renewable energy generation requires investment in firming capacity – flexible energy supply that can top-up supply when there is insufficient renewable electricity generation to meet demand. The future electricity system will require a significant increase in firming technologies like dispatchable storage, hydro, as well as a continuing role for gas fired generation.

Batteries, providing both shallow (under 4 hours) and medium (4 to 12 hours) storage capacity, will be required to facilitate an increasing share of variable renewable generation. The Government is investing in projects through the CEFC, ARENA, the Capacity Investment Scheme and with the states and territories to increase battery storage capacity. These include:

- the expanded Capacity Investment Scheme announced in November 2023, which will encourage investment in storage and renewable generation, including 9 GW of dispatchable capacity and 23 GW of variable renewable capacity
- ARENA's Large Scale Battery Storage Funding round, which is providing \$176 million in conditional funding for 8 grid-scale battery projects
- a \$100 million CEFC investment to deliver the Waratah Super Battery with the NSW Government, which will help move more electricity over existing transmission lines and serve as a 'shock absorber' during power surges
- up to \$15 million to support the rollout of a 35MW battery at Darwin's Channel Island Power Station with the capacity to provide power to 150,000 people
- the Community Batteries for Household Solar program is delivering 400 community batteries to enable households to store energy for use during peak times and share excess power with other households. By June 2023, the Government executed grant agreements to install, connect, and operate 52 community batteries. ARENA's first round has been oversubscribed and short listed applicants are required to submit full applications by March 2024.

Snowy 2.0 has the capacity to provide 'deep storage' firming capacity to support the NEM. State and territory governments are also investing in pumped hydro projects, including a \$6 billion commitment this year by the Queensland Government and efforts by the Tasmanian Government to expand the Battery of the Nation project, supported by Rewiring the Nation.

Gas-fired electricity generation contributed just under a fifth of Australia's power supply in 2021-22, a share that has remained relatively constant over the last decade. Gas is an important firming technology. Gas-fired electricity generation will continue to play a key role as dispatchable power during periods when insufficient renewable generation or stored electricity is available. The Government's Future Gas Strategy, expected to be released in 2024, will outline the approach to ensuring affordable and secure gas supply while achieving emissions reduction targets through the energy transformation.

Unlocking private investment in electricity generation and storage

In addition to funding from governments, significant private investment is required for the electricity sector transformation. The Capacity Investment Scheme is supporting new investment in energy storage and renewable generation by providing a long term revenue safety net that decreases financial risk for investors.

In 2023, the Government delivered the first phase of the scheme, improving energy security and reliability across the grid by attracting investment in the cheapest form of reliable energy – firmed renewables. The first phase included:

- in July 2023, the Commonwealth more than doubled the NSW Infrastructure Roadmap's firming tender, with 1,075 MW of reliable capacity from 6 projects winning bids in November, equivalent to 8% of the total 2022-23 NSW summer peak demand
- a South Australia-Victoria tender, announced in August 2023, is targeting 600 MW of renewable capacity that will be dispatchable across the 2 states.



Rewiring the Nation

Rewiring the Nation is the Government's program to make clean energy more accessible and affordable. This program is investing \$20 billion to modernise our electricity grid and infrastructure across Australia. An overview of some of the activities and agreements made to date between the Australian Government, state and territory governments and project proponents is below.



The Victorian Agreement sets out:

- \$1.5 billion of concessional financing available for Renewable Energy Zone (REZ) projects in Victoria, including offshore wind projects
- A commitment to coordinate Victorian and Commonwealth regulatory processes to support the rapid development of the Victorian offshore wind industry
- A concessional loan of \$750 million for VNI West to ensure it is completed by 2028
- A commitment to work together to deliver Marinus Link.

These commitments will support more than 2,000 direct jobs during construction. VNI West will unlock 4,000 MW of new power generation and generate \$1.8 billion in net market benefits – including for electricity users.



The Tasmanian Agreement includes:

- A concessional loan for Marinus Link to significantly reduce the cost of the project for consumers
- A 49% Commonwealth equity contribution to the project, with Tasmania's equity share to be 17.7% and Victoria's share to be 33.3%
- Low-cost debt for Tasmania's Battery of the Nation Project at Tarraleah and for the North West Transmission Development
- \$76.5 million in underwriting support to secure cable manufacturing and installation capacity.

Marinus Link will unlock renewable energy generation and storage for the mainland, and will unlock the next wave of renewable energy development in Tasmania, attracting investment and jobs in the state.



The NSW Agreement includes:

In December 2022, as part of the RTN plan, the Government announced a joint \$7.8 billion deal with the NSW government to support eight critical transmission and Renewable Energy Zone projects:

- Hunter Transmission Project
- Central-West Orana Renewable Energy Zones
- New England REZ
- HumeLink
- VNI West
- Hunter-Central Coast REZ, including potential offshore wind opportunities
- Sydney Ring – Southern Sydney Ring
- South-West REZ.

These projects are expected to support over 3900 jobs in the regions during the construction phase, help plug Snowy 2.0 into the grid and link REZs to ensure the energy can be supplied from the generation facility to households and industry.



The WA Agreement includes:

In August 2023, the Government signed an agreement with Western Australia to provide up to \$3 billion of concessional loans and equity investments through RTN to bolster WA's energy security by expanding and modernising electricity grids in Perth and in the North West Pilbara region. The agreement prioritises projects that have the most near term investment potential identified through the extensive planning and modelling process WA has been undertaking over the past year. This investment is expected to support around 1,800 construction jobs and unlock future projects across WA, helping to empower regional communities.



Underwriting support

In March 2023, the Government provided up to \$385 million in underwriting support to Transgrid for Long Lead Equipment for two transmission line projects – VNI West and Humelink. This allowed the early signing of equipment supply contracts, locking in lower prices and de-risking delivery schedules. VNI West and Humelink will harness cleaner, cheaper electricity from existing and future renewable energy zones in New South Wales and Victoria, significantly boosting the ability to share energy between states and unlock the full potential of Snowy 2.0's deep energy storage.

Transmission

The Australian Government is working with state and territory governments to deliver critical transmission infrastructure, in line with the Climate Change Authority's advice about accelerating the rollout of network infrastructure to support deployment of large-scale renewables. The Rewiring the Nation program is making \$20 billion in low-cost finance available to upgrade and modernise Australia's electricity grids and grid supporting technologies.

Improving planning processes

All major energy infrastructure projects are subject to planning processes, which exist at all levels of government and involve varying timeframes. Grid-connected, utility-scale renewable energy projects undergo approval processes related to planning, environmental impacts, grid connection, and energy market participation.

At the federal level, environmental referrals and approvals are carried out under the *Environment Protection and Biodiversity Act 1999* (EPBC Act). Approvals under the EPBC Act assess the environmental impact of proposed projects, including renewable energy infrastructure, with potential impacts on nationally and internationally important animals, plants, habitats and places.

While environmental approvals are only a minor component of the overall development timeframe for renewable projects, the Government is making improvements including:

- providing the renewable energy industry with advice to enable their proposed projects to be assessed more efficiently, without compromising on the assessment of environmental impacts
- working with state and territory governments to align approval processes where possible
- working with states and territories to integrate environmental considerations early in the energy planning processes.

Future reforms to environmental laws, including enhanced environmental information, national standards and regional planning will further streamline assessment processes and support faster decision making and better environmental outcomes. It will also be important for the Australian, state and territory governments to work together to support faster deployment of these projects, as recommended by the Climate Change Authority.

Improving community engagement

Building the additional generation and transmission infrastructure required for the energy transformation requires community acceptance and support.

The Government is working with states, territories, energy market bodies, and transmission network service providers to improve community engagement for energy infrastructure projects. This includes the development of national guidelines to gain, maintain, and measure social licence for transmission.

The Australian Energy Infrastructure Commissioner is leading a review into community engagement practices relating to renewable energy infrastructure, to ensure genuine and effective community engagement. The Commissioner will report the outcomes of the review to the Minister for Climate Change and Energy in December 2023. The Government will respond to the review's recommendations in early 2024, as recommended by the Climate Change Authority.

Additionally, the Minister for Climate Change and Energy has proposed rule changes to the Australian Energy Market Commission, which will make sure communities are engaged much earlier in the planning process to identify optimal route selection, discuss landholder concerns, and ensure there is transparency and appropriate engagement in the planning process. On 9 November 2023, the Australian Energy Market Commission made a final determination, with amended rules to commence on 5 December 2023.

Partnering with First Nations people

Many renewable energy projects will need to access First Nations lands and waters. The Government is working with Traditional Owners and communities to ensure new development projects proceed with the consent and agreement of Traditional Owners and communities, with land and cultural rights respected, environment and heritage protected and to ensure the transition's benefits are shared fairly.

This includes partnering with First Nations people to co-design principles and strategies for the rolling out of future clean energy projects across the First Nations estate. These strategies and projects are to be informed by free, prior and informed consent principles and the voices of First Nations people, to ensure First Nations people benefit from the social and economic opportunities presented by the transition.

For example, the First Nations Clean Energy Strategy will help communities share the benefits of renewable energy projects and inform how the Government addresses the renewable energy transition. The Government agrees in principle with recommendations from the Climate Change Authority to facilitate the development of a First Nations people led framework and workforce action plan on decarbonisation and adaptation.

Alleviating cost-of-living pressures

The Government is focused on alleviating cost of living pressures across the economy. In the energy sector, improving energy performance – for example, through energy efficiency – contributes to reducing emissions and can also empower households and businesses to reduce their energy bills. Several measures announced over the last 12 months are helping either by providing direct financial relief, or by reducing the financial barrier for households and businesses to invest in energy efficiency improvements. These include the Government's Energy Price Relief Plan and the \$1.7 billion Energy Savings Package.

Case study

Partnering with First Nations people in the clean energy transformation

As part of the National Energy Transformation Partnership, Commonwealth, state and territory ministers have committed to develop a First Nations Clean Energy Strategy. The Government is working in partnership with First Nations organisations and communities across Australia to ensure the Strategy enables First Nations people to lead and benefit from the energy transformation.

This year, the First Nations Clean Energy Taskforce worked with core project partners – the First Nations Clean Energy Network and the National Indigenous Australians Agency – to hold a series of roundtables with First Nations community members, industry and jurisdictions around Australia. A dedicated website, www.fncces.org.au, provides an access point for First Nations communities and other interested parties to support the Strategy's development.

Further roundtables, regional discussions, online consultation and advice from the First Nations Clean Energy and Emissions Reduction Advisory Committee will continue to create opportunities for First Nations communities in all states and territories to inform the Strategy.

Following public consultation, the Strategy is expected to be delivered by mid-2024.

The Government is developing the National Energy Performance Strategy which establishes a framework for long term co-ordinated action to deliver the Government's vision for Australians to enjoy the economic, climate and health benefits of improved energy performance. The Strategy aims to accelerate demand-side action across 5 focus areas:

- **Building economy-wide momentum** – integrating energy performance in net zero planning and ensuring strong finance and skills sectors to support the transformation.
- **Households** – improving energy performance through access to information, tools and resources, and reducing the barriers facing vulnerable Australians, renters, and apartment owners to access the benefits of improved energy performance.
- **Communities, businesses, and industry** – increasing awareness of, and reducing barriers to, accessing the benefits of energy performance.
- **Energy system** – increasing collaboration with state and territory governments to improve energy performance and increasing demand-side consideration in energy system planning and decision-making.
- **Technology and innovation** – improving access to better energy performing appliances and equipment through regulation, research and development, and commercialisation of innovative energy performance technologies.

The Strategy builds on the \$1.7 billion Energy Savings Package, which will drive down household and business energy costs by making homes and businesses more energy efficient.

The biggest component of the Energy Savings Package is the Household Energy Upgrades Fund, which includes \$1 billion for the CEFC to partner with banks and other lenders to offer concessional loans for household energy upgrades. This will help over 110,000 households lower their energy bills.

Social housing in Australia tends to have low energy efficiency, as most of this housing was built over 20 years ago, before minimum build standards. The new funding, which operates in partnership with the states and territories, includes \$300 million which is estimated to support 60,000 social housing properties to reduce their energy consumption.

In June, the Prime Minister announced a further component of the Energy Savings Package, the Community Energy Upgrades Fund. This \$100 million fund will support local governments through co-funding energy efficiency and electrification upgrades of local government facilities.

Providing households with better information can also help improve energy efficiency. The Nationwide House Energy Rating Scheme is being expanded to provide energy ratings for existing homes, which will help people better understand their home's energy performance. From October 2023, changes to the National Construction Code introduced minimum energy efficiency requirements for new homes to 7 stars (out of 10). As the National Construction Code is adopted, it will reduce the amount of 'locked in' emissions – future emissions caused by decisions made today – in homes.

Additionally, changes to the *Greenhouse and Energy Minimum Standards Act 2012*, which underpin energy efficiency standards, will help to protect consumers from purchasing the lowest performance appliances from the market.

In addition to support for households, under the Energy Efficiency Grants for Small and Medium Enterprises program, small and medium sized businesses can access grants of up to \$25,000 to monitor energy use, conduct energy audits, and replace or upgrade equipment. Almost 700 businesses received grants under the first round of the scheme in 2023.

Consumers choosing to electrify gas appliances can also help to reduce emissions, with this choice largely depending on how rapidly key technologies like heat pumps can be adopted in existing buildings. This can vary depending on building types and designs, as lack of space or additional costs can pose a barrier to adoption. The Climate Change Authority has identified imports of heat pumps as a leading indicator of decarbonisation for the built environment. Between 2019 and 2023, imports grew from around 41,000 to around 184,000.

Looking forward, the Government is maintaining its focus on decarbonising the built environment through the development of the built environment sectoral plan.



Supporting households and small businesses with energy bills

In response to elevated coal and gas prices in late 2022, the Government has partnered with states and territories to deliver the Energy Price Relief Plan.

In 2023-24, under the Energy Price Relief Plan, national retail electricity price increases are expected to be around 25 percentage points lower than expected in late 2022. Additionally, retail gas prices are forecast to increase by 4% in 2023-24 compared to the October 2022-23 Budget forecast of 20%. Inflation is now estimated to be three quarters of a percentage point lower in 2023-24 as a result of the Relief Plan.

Under the Relief Plan arrangements, an emergency cap on gas prices of \$12 per gigajoule has been applied to new domestic wholesale gas contracts by east coast producers. The Government has also introduced the Mandatory Gas Code of Conduct, which came into force on 11 July 2023, to ensure that east coast gas users can contract for gas at reasonable prices and on reasonable terms. It also implemented reforms to the Australian Domestic Gas Security Mechanism to ensure sufficient supply of gas for the domestic market.

The Australian Government worked with the New South Wales and Queensland governments to set an effective price ceiling of \$125 per tonne on thermal coal used for domestic electricity generation in those states, ensuring that input prices are constrained. The Australian Energy Regulator has identified the caps on the price of black coal as a factor contributing to improvements in the availability and pricing of coal powered energy generation, noting that market interventions contributed to more black coal capacity being offered below \$70 per MWh. The Australian Energy Regulator's Chair stated in March 2023 that contract prices had fallen by 50% from the previous October before the Government's intervention, which was important for setting the default market offer.

The Australian Government has partnered with state and territory governments to provide up to \$3 billion in electricity bill relief for eligible households and small businesses through the Energy Bill Relief Fund. More than 5 million households and around 1 million small businesses will be eligible to receive assistance with their electricity bills. The states and territories are administering the rebates to deliver up to \$500 in electricity bill relief for eligible households and up to \$650 for eligible small businesses.

Reducing industry and resources sector emissions

Australia's emissions associated with industry and resources sector activity include:

- stationary energy emissions (22.3% of total emissions in 2023), which arise from burning fuels for direct energy use, in the form of heat, steam, or pressure (including mine site transport)
- fugitive emissions (10.2% of total emissions in 2023), which are the results of losses, leaks and other releases of gas in the atmosphere associated with extracting, processing, and transporting fossil fuels (mostly coal and gas production)
- industrial processes emissions (4.5% of total emissions in 2023) which include emissions from the use of carbonates, chemical feedstocks and reductants.

The Climate Change Authority has identified stationary energy emissions as a leading indicator of decarbonisation, given their large share of Australia's total emissions. Equipment that requires the combustion of diesel on mine sites, and gas in manufacturing and LNG production will need to be replaced with electric or other zero emission alternatives over time.

Reforms to the Safeguard Mechanism

This year, the Government reformed the Safeguard Mechanism to reduce emissions at around 215 of Australia's largest industrial facilities – which produce around 28% of Australia's greenhouse gas emissions – while maintaining their international competitiveness as the world decarbonises. The reforms commenced on 1 July 2023, and are putting large emitters in the mining, manufacturing, transport, oil, gas and waste sectors on a pathway to net zero by 2050. Between now and 2030, the reforms will account for over 200 Mt of abatement – the equivalent of taking two-thirds of the nation's cars off the road.



The Safeguard Mechanism requires Australia's largest industrial greenhouse gas emitters to keep their net emissions below a 'baseline' emissions limit. These baselines will decline on a trajectory consistent with ensuring large industrial emitters make a proportionate contribution to achieving Australia's emissions reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. Between 2023 and 2030, the baseline decline rate is set at 4.9% per year.

The Safeguard Mechanism reforms have been designed to incentivise on-site abatement at Safeguard facilities. In particular, Safeguard Mechanism Credits have been introduced to incentivise facilities to reduce emissions below their baseline.

Facilities can use Australian Carbon Credit Units to help meet their compliance obligations. This provides extra flexibility so facilities can meet scheme obligations at the lowest cost over time, and incentivises cost-effective emissions reduction activities throughout the broader economy, particularly in the land sector. The Government will review the Safeguard Mechanism policy settings in 2026-27 to ensure they are appropriately calibrated.

During consultation on the Safeguard reforms, many stakeholders raised the issue of carbon leakage – where production shifts from countries with more ambitious emissions reduction policies to those with less ambitious policies, potentially resulting in no net change or even increases in global emissions.

To manage the risk of carbon leakage, some eligible trade-exposed facilities can apply for a discounted decline rate below the standard rate of 4.9% per year. The Government has also commenced a Carbon Leakage Review, which is assessing the risks of carbon leakage and exploring options to address these risks, including the feasibility of an Australian carbon border adjustment mechanism. This will involve close consultation with industry, international partners, environmental and research groups, and the community. The review is expected to be finalised by 30 September 2024.

Safeguard Mechanism reforms are complemented by the \$1.9 billion Powering the Regions Fund. This Fund will help decarbonise trade-exposed industrial facilities covered by the Safeguard Mechanism and bring forward investments to reduce emissions at existing industrial facilities in regional Australia.

Design of the Fund was finalised this year and includes 4 competitive grants streams. The \$600 million Safeguard Transformation Stream will support trade-exposed Safeguard Mechanism facilities to invest in low emissions technology. The \$400 million Critical Inputs to Clean Energy Industries grant program will support hard to abate sectors to maintain domestic production during the transformation, with \$200 million available to the primary steel production sector and \$200 million available to the cement, lime, aluminium and alumina sectors.

The \$400 million Industrial Transformation Stream will support greenhouse gas emitting facilities defined under the *National Greenhouse and Energy Reporting Act 2007* in regional Australia, including support for new clean energy industries. These competitive grant programs have opened for applications, and funding decisions will be made in early 2024.

Gas production, use, and emissions in industry

The extraction and processing of gas is a major source of emissions, with Australia becoming one of the world's largest exporters of LNG in recent years. Fugitive methane and CO₂ emissions are released across the gas supply chain from exploration to distribution, while the combustion of gas to power the liquefaction process also generates significant CO₂ emissions.

The Climate Change Authority has identified emissions from venting and flaring in oil, gas, and coal production as a leading indicator of decarbonisation. Flaring and venting emissions peaked in 2019 after steep increases in preceding years, and have been trending downward since.

Export demand for Australian gas includes long-term contracts already in place. These exports also play a role in supporting regional stability, energy security and our international partners' plans to reduce their emissions footprint.

Gas is also a key energy and chemical input for many industries, including for high-temperature heating processes or as a chemical feedstock in manufacturing and for generating electricity.

Replacing methane and other inputs derived from natural gas production in chemical manufacturing processes with low-carbon alternatives poses a challenge. Electrification may not be a viable solution to displace gas combustion in all high-temperature heating processes, nor is it possible for processes using gas as a chemical feedstock to go without. Eliminating these emissions sources, therefore, will largely rely on the availability of low-carbon alternatives like renewable hydrogen, biomethane, and carbon capture, use, and storage (CCUS) technology.

Even more so than from gas extraction, the largest source of fugitive methane emissions in Australia is coal mines, particularly underground mines. In October 2023, the Government opened the Resources Methane Abatement Fund, which will provide \$8.5 million in grants to accelerate the development and deployment of methane abatement technologies, particularly those applicable to coal mining to assist facilities to meet their emissions reduction obligations.

Product use emissions

Emissions from non energy related product use include emissions from the use of hydrofluorocarbons (HFCs), which are mostly used in refrigeration and air conditioning. Emissions from product use are largely unchanged from 2022, accounting for 2.5% of Australia's emissions in 2023.

Australia started a phase-down of bulk HFC imports in 2018 and will reach an 85% reduction from baseline by 2036, in line with international obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer. This phase-down started a year ahead of Montreal Protocol obligations and 25% below the Montreal Protocol baseline.

The Government will start with a ban on the import and manufacture of small air conditioning equipment containing a high global warming potential refrigerant from 1 July 2024. Other measures, including bans on import and manufacture of other equipment containing synthetic greenhouse gases including HFCs, are being developed.



Reducing transport emissions

In 2023, emissions from the transport sector accounted for 21.1% of Australia's total emissions. Transport emissions increased by 7.8% (7.1 Mt CO₂-e) from 2022, reflecting the ongoing recovery from COVID 19 related travel restrictions.

To address transport sector emissions, the Transport and Infrastructure Net Zero Roadmap and Action Plan will identify pathways to net zero by 2050 across all modes, including light and heavy vehicles, rail, maritime and aviation. It will also explore how to enable low emission transport infrastructure and the movement of people and freight.

Light vehicles, including passenger and light commercial vehicles made up 59.7% of transport emissions in 2023 and on road trucks and buses made up 23.4%.

A key priority for the Government is the introduction of a light vehicle fuel efficiency standard. Because Australia is one of the few developed nations in the world without a fuel efficiency standard, Australian consumers are missing out on the ability to choose more efficient, low- and zero-emissions vehicles – such as battery electric or hydrogen fuel cell electric vehicles – powered by renewable energy. The FES will incentivise manufacturers to supply more low- or zero-emissions vehicles to Australia, reducing Australia's road transport emissions while helping to reduce air pollution, public health costs and fuel bills. The Government has consulted extensively on the design of the FES and will release its preferred model for further consultation.

The Climate Change Authority has identified EV imports as a leading indicator of decarbonisation in the transport sector. EV uptake in Australia is growing quickly, with recent increases in both EV imports and sales. In the first nine months of 2023, 8.4% of new car sales were EVs, compared to less than 1% in 2020. Barriers to accelerating this rate include the availability and range of affordable EV models and the availability of charging infrastructure.

The National Electric Vehicle Strategy, released in April 2023, aims to increase the supply of affordable EVs, establish the systems and infrastructure needed to support rapid EV uptake, and encourage increased demand. Under the NEVS, a national mapping tool will be developed to support optimal investment and deployment of, EV charging infrastructure. The NEVS will help to cut Australia's emissions and will see opportunities created in domestic manufacturing and recycling.

The Government will report annually on progress against outcomes of the NEVS, including the progress of the rollout of EV charging infrastructure, in line with the Climate Change Authority's advice. The \$500 million Driving the Nations Fund will roll out EV charging and hydrogen refuelling infrastructure and support investment in EV fleets.

EV uptake is also being encouraged by the Electric Car Discount, which helps to reduce the cost of EVs, and the \$14 million Real-World Testing of Vehicle Efficiency program and Green Vehicle Guide website, which provide fuel efficiency information for consumers.

Beyond road transport emissions, domestic aviation, rail and marine transport contributed around 9.2%, 4.4% and 2.2% respectively to Australia's transport emissions. The Government is developing targeted strategies to decarbonise these transport modes:

- the Maritime Emissions Reduction National Action Plan will help to guide the decarbonisation of our domestic maritime sector and clarify Australia's role in reducing international shipping emissions. It is expected to be finalised in 2024
- the Aviation White Paper will examine how to achieve net zero in the sector, including through sustainable aviation fuel and emerging technologies
- several rail strategies and projects to promote low emissions technology and infrastructure, including the National Rail Manufacturing Plan and high-speed rail.

Finally, some transport modes and sectors will rely on liquid fuels into the 2030s due to technical and cost challenges associated with switching to electricity and hydrogen. Low carbon liquid fuels offer a decarbonisation pathway for these sectors. The Government is investigating the implementation of new fuel standards for renewable diesel and B20 (5.1-20% biodiesel and 80% diesel) and is considering policy and regulatory options to increase the uptake of low carbon liquid fuels.

Electric vehicles in Australia

130,000

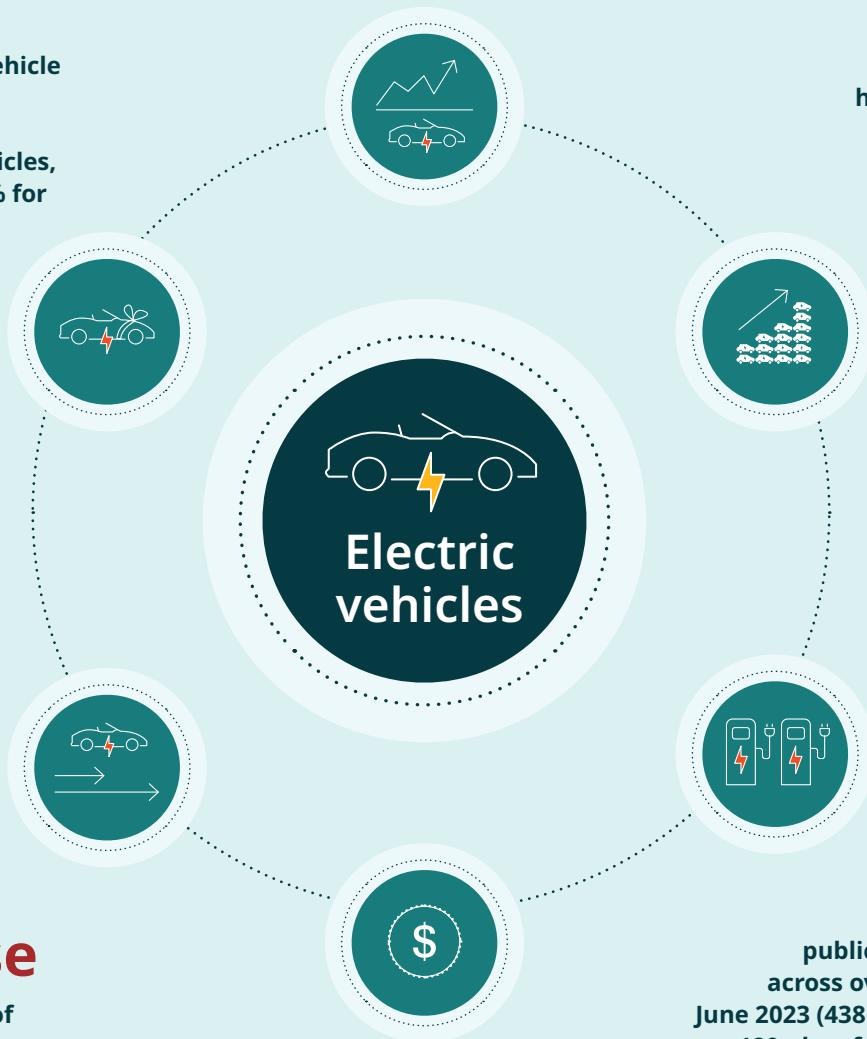
EVs in Australia as at July 2023, according to the Electric Vehicle Council, with the Electric Car Discount supporting this trend.

8.4%

of all new light vehicle sales in the first 9 months of 2023 were electric vehicles, compared to 3.8% for all of 2022.

↑ 2/3

of Australia's EVs have only been on the road since July 2022.



50% ↑ increase

in driving range of the average battery - 349 km in 2021 compared to 233 km in 2016.

↑ 967

public EV fast chargers across over 558 sites as of June 2023 (438 fast charger, and 120 ultra-fast charger sites).

20%

of salary sacrificing arrangements used to purchase EVs in mid-2023 compared 2% in early 2022.

Agriculture and land

In 2023, the agriculture sector was responsible for 17.7% of Australia's emissions, primarily methane and nitrous oxide. Emissions from agriculture increased by 3.8% (3.0 Mt CO₂-e) from 2022, reflecting a return to pre drought livestock populations and crop production. More than three quarters of the sector's emissions are from ruminant livestock (largely cattle and sheep), followed by emissions from crop production (including the use of inorganic fertilisers).

The land use sector is a net 'sink' of emissions (that is, more carbon is sequestered than is emitted from the sector). In 2023, emissions from the land use sector represented a net sink of 63.9 Mt CO₂-e, reflecting the long term decline in the rate of land clearing and the influence of La Niña conditions. The Climate Change Authority has identified the clearing of primary and secondary forest as a leading indicator of decarbonisation in the land use sector. In 2021, the clearing of primary and secondary forest was at its lowest level since 1990. The annual area of primary forest converted has decreased from around 300 kha in 2005 to around 22 kha in 2021. The annual area of secondary forest conversion has decreased from almost around 580 kha in 2005 to 155 kha in 2021.

The first National Statement on Climate Change and Agriculture was published in 2023. It outlines a commitment from federal, state, and territory Agriculture Ministers to work with the sector to increase agricultural productivity, improve climate adaptation and resilience, and support low emissions agriculture. The Agriculture and Land sectoral decarbonisation plan will chart the sector's contribution to Australia's 2035 emissions reduction target and pathway to net zero by 2050.

The 2023-24 Budget included \$302.1 million under the Natural Heritage Trust to support farmers to progress their use of climate-smart practices that improve agricultural productivity, competitiveness, and sustainability. The Budget also provided funding to improve the Australian Bureau of Agricultural and Resource Economics and Sciences' expertise in agricultural data, analysis and technology. This will help identify emerging issues for the sector in the global transition to a net zero economy.

Research and development

Governments and industry are investing in the research, development, and deployment (RD&D) of technologies to reduce agricultural emissions.

For example, through the Methane Emissions Reduction in Livestock program, the Government is supporting RD&D of methane-reducing livestock feed supplements and forage feeds. The Government is also supporting the commercialisation of the red seaweed *Asparagopsis* as a form of methane-reducing livestock feed, by providing \$8.1 million to scale up its production.

The agriculture sector is Australia's primary source of nitrous oxide emissions, mostly associated with the application of nitrogen fertilisers. The Climate Change Authority has identified nitrogen fertiliser use as a leading indicator of decarbonisation in the agriculture sector. Nitrogen fertiliser sales have grown from around 1,000 gigagrams in 2005 to over 1,700 gigagrams in 2021. The application of nitrification inhibitors can reduce emissions from nitrogen fertilisers by more than half, but remain expensive for many applications (CCA, 2023).



3. Cross-cutting issues

Strengthening the ACCU Scheme

The Australian Carbon Credit Unit Scheme offers landholders, communities and businesses the opportunity to run projects in Australia that avoid the release of greenhouse gas emissions or remove and sequester carbon from the atmosphere. It largely supports agriculture and land sector emissions reduction activities. ACCUs are purchased by organisations looking to offset their carbon footprint or meet their emissions reduction obligations, and by Government. One ACCU represents a tonne of emissions avoided or sequestered. The Government expects 18 million ACCUs to be issued in 2023 representing at least 18 Mt of abatement. As at October 2023, over 290 new projects have been registered this year.

The Government is committed to ensuring the ACCU Scheme continues to have high integrity and delivers confidence to participants, the market, and the wider public. In January 2023, the Government released the Final Report of the Independent Review of ACCUs. The review found that the ACCU Scheme is sound and recommended some changes to improve the scheme's administration and the methods by which ACCUs are generated.

The Government accepted in principle all 16 recommendations and implementation is well underway, with initial legislative reforms made in March 2023. Key actions include the revocation of the avoided deforestation method, publication of carbon estimation areas, the appointment of a full-time Chair of the Integrity Committee and new checks and audits for regeneration projects.

The ACCU Review Implementation Plan outlines the next steps in ensuring the roll out of the rest of the reforms, with further legislative changes planned for 2024. These changes will be informed by the detailed consultation undertaken through August to October 2023. A key priority is reform to end the conditional registration of land sector projects without native title holder consent. Consultation has also focused on considering the future role of government purchasing and proponent led method development.

The Carbon Farming Outreach Program will provide training and advice to support farmers and land managers, including First Nations people, to participate in the carbon market and integrate low emission technologies and practices into their operations – consistent with the Climate Change Authority's advice.

Additionally, the Climate Active program helps farmers and land managers reduce, measure and report their emissions, allowing the promotion of sustainable, carbon neutral certified products.

The Government's planned Nature Repair market is intended to operate alongside, and complement, the ACCU Scheme.



Climate Active

Climate Active is the Government's voluntary carbon neutral certification scheme. To become Climate Active Carbon Neutral certified, businesses and organisations calculate the greenhouse gas emissions generated by their activity, such as fuel or electricity use and travel. They reduce these emissions as much as possible by investing in new technology (including renewable energy), changing the way they operate and seeking out lower carbon supply chains. Any remaining emissions can be abated by purchasing eligible carbon offsets. Businesses then disclose this information. As of October 2023, more than 700 Climate Active certifications have been issued to more than 500 businesses. Australian businesses have offset more than 38 million tonnes of carbon emissions since the beginning of the program.

The Government is consulting on proposed updates to the Climate Active program to shape its future direction in the context of a changing landscape for best-practice voluntary climate action. This includes consideration of opportunities to raise the level of climate ambition and better integrate with other government climate objectives.

Carbon storage in the land

Sequestering carbon in vegetation and soils can reduce net emissions and provide wider benefits such as water and soil quality improvement, drought resilience, and more biodiverse landscapes. The land sector is the main source of ACCUs, primarily through regrowing native vegetation, providing many land managers and farmers with an additional income stream. More than 74 million ACCUs have been issued to vegetation projects.

Further opportunities for farmers and other land managers to increase and maintain carbon storage and support nature positive outcomes are being explored through development of the Agriculture and Land Sector Plan.

The Carbon Farming Outreach Program will increase land managers' access to relevant information about integrating practices that increase the amount of carbon stored in the land into their operations.

The National Soil Carbon Innovation Challenge is supporting an improved understanding of soil carbon sequestration potential and uptake of practices that increase and maintain soil carbon storage.

Managing waste and establishing a circular economy

In 2023, emissions from the waste sector accounted for 2.9% of Australia's total emissions. The sector's emissions have been decreasing over the past few decades. The majority of sector emissions are caused by the decay of organic waste in landfills.

Case study

Carbon Farming Advice Scheme: breaking down barriers to participation

A 2019 survey of over 400 Queensland producers identified high costs as one of the key barriers preventing respondents from participating in carbon farming. Others raised concerns that they lacked the knowledge and expertise to participate in carbon market and highlighted the shortage of easy-to-understand information and advice.

The Queensland Government's Carbon Farming Advice Scheme (CFAS) was established the following year to break down some of these barriers. Through CFAS, farmers, First Nations people and other landholders can apply for up to \$10,000 worth of financial assistance to receive advice on the potential for carbon farming on their land from a certified Land Restoration Fund Approved Adviser.



Photo by Darren Jew, Queensland Government.

The Approved Adviser network currently comprises 109 specialists from 5 professional streams, including accountants, agribusiness advisers, environment consultants, project developers and solicitors.

The Queensland Government has run 3 rounds of CFAS since 2020, providing over 170 landholders with more than \$2 million to cover costs like carbon project assessments and legal advice.

Reducing organic waste and diverting it from landfill can help abate emissions. Each tonne of food waste disposed of in landfill has the potential to generate up to 2.1 tonnes of CO₂-e over its lifetime. The Food Waste for Healthy Soils Fund diverts organic waste from landfill for use improving Australia's soils, and has awarded funding of \$38.9 million to 25 organic recycling projects, creating an additional 974,298 tonnes of organic processing capacity.

The use of methane capture technologies can also assist to reduce sector emissions and the Climate Change Authority has identified methane capture rates as a leading indicator of decarbonisation (CCA, 2023). These rates are most helpful when considered alongside waste diversion indicators. Between 2011 and 2021, following the establishment of the ACCU Scheme, the proportion of methane captured at landfills rose from around 30% to almost 45% and Australia currently ranks 8th of 38 countries with reported capture data. The Government is currently investigating opportunities to invest in the more efficient management of capture facilities.

The waste and resource recovery sector has a key role to play in transitioning Australia to a circular economy, which supports emissions reduction by the efficient use of materials. In 2022, Australia's environment ministers committed to achieve a circular economy and the Government is currently developing a National Circular Economy Framework, informed by recommendations from the Circular Economy Ministerial Advisory Group.

The Recycling Modernisation Fund is investing \$250 million in new and upgraded recycling infrastructure and will see over \$1 billion of investment in recycling infrastructure from the states, territories, and industry. Projects announced to date will increase Australia's annual processing capacity by over 1 million tonnes.

Looking forward, the Government is working with states and territories, industry, and non government organisations to strengthen the National Waste Policy Action Plan to make better progress towards the plan's 2030 targets. Additionally, ways to decarbonise the waste sector will be considered in the industry sectoral decarbonisation plan, and circular economy principles will be integrated into each of the 6 sectoral plans. Finally, the waste sector will play a key role in our development as a renewable energy superpower by creating end of life solutions for products like solar PVs and batteries.



Case study

Diverting organic waste from landfill, reducing emissions and improving soil health

GO Organics, located in Boonanarring Western Australia, is an organics processor servicing Perth and surrounding regions. The facility was awarded \$1.75 million from the Food Waste for Healthy Soils Fund to increase its organic processing capacity to support the ongoing rollout of kerbside food organic and garden organic (FOGO) collection services. Funding was matched by the Western Australian Government.

In Australia, around 13 million tonnes of CO₂-e are created as a result of organic waste going to landfill. Diverting organic waste from landfill is a priority with all state and territory governments committing to the provision of FOGO services to metropolitan households and businesses by 2030. Currently, 38% of Australians have access to an organics kerbside service.

For every tonne of organic waste diverted from landfill up to 2.1 tonnes of greenhouse gas are avoided. The GO Organics project will increase processing capacity at the Boonanarring site by 74,500 tonnes each year. 52,000 tonnes of this waste will be FOGO which is currently going to landfill. GO Organics will turn this waste into composts, soil amendments and potting mixes for sale to retail and nearby farming markets.

Carbon capture, use and storage

Carbon capture, use and storage refers to a group of technologies that can capture CO₂, generally from large point sources, including industrial facilities, compress and transport CO₂ through pipelines or by ship, truck or rail to be used in a range of applications, or to be injected into deep geological formations for permanent storage. CCUS can also support the direct removal of carbon emissions from the atmosphere.

CCUS may have a role in reducing emissions from hard-to-abate industries and energy-intensive sectors, such as cement production. While emissions avoidance is preferable, CCUS can help reduce the costs of decarbonisation and provide abatement opportunities for facilities covered by the Safeguard Mechanism reforms.

The Government is supporting the development of this technology through the Carbon Capture Technologies Program which will identify and develop high potential carbon capture and carbon utilisation technologies, broaden their industrial applicability, lower the cost of CCUS technology adoption in Australia and increase Australia's capabilities in ramping up CO₂ abatement.

As identified by the Climate Change Authority, there may be an opportunity for Australia to play a role in supporting the broader Asia-Pacific region to decarbonise by creating an international offshore carbon storage industry. The right regulatory structure will ensure that geological storage projects are delivered in a safe and environmentally responsible manner.

4. Tracking towards emissions reduction targets

Progress against the 2030 target

Australia's Emissions Projections 2023 report provides the latest estimates of Australia's future greenhouse gas emissions to 2035. It shows how Australia is tracking against its 2030 emissions reduction commitments by examining the potential impacts of policies and measures to reduce Australia's greenhouse gas emissions.

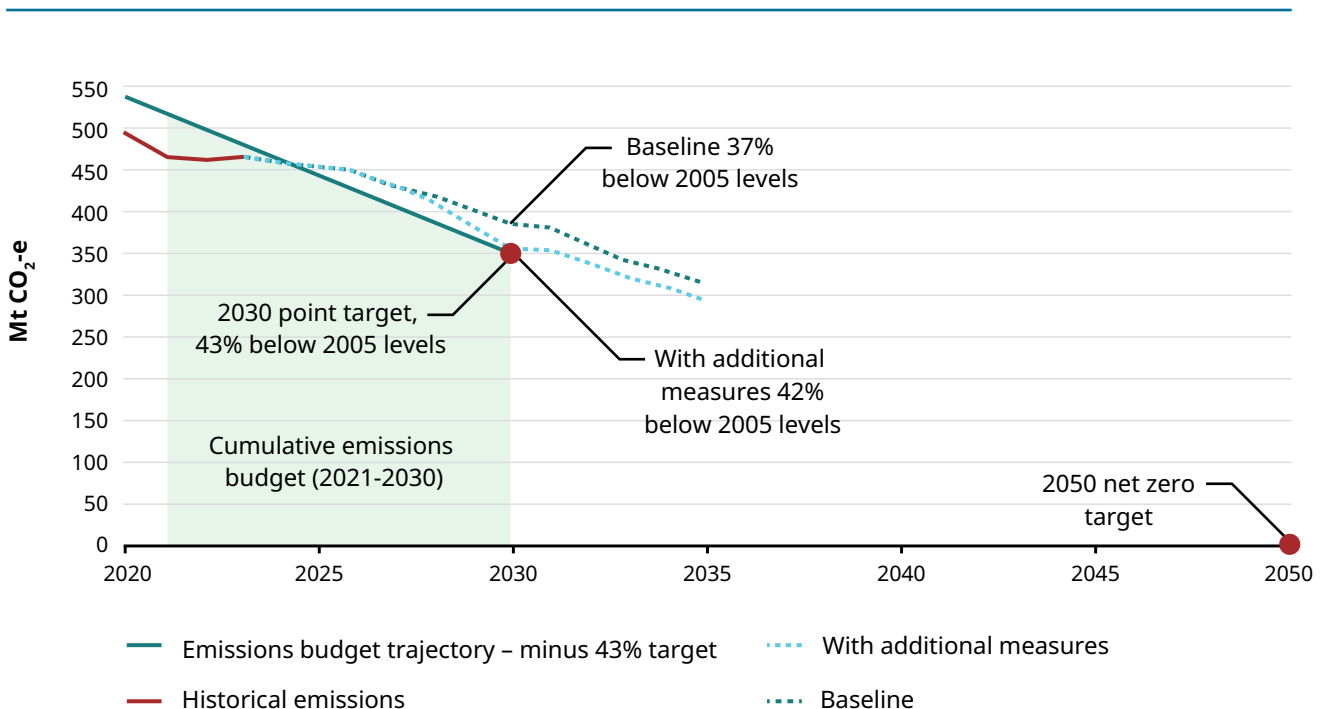
The 2023 emissions projections include a baseline scenario and a 'with additional measures' scenario. The baseline scenario includes federal, state and territory policies which have been implemented or where detailed design is well progressed. The 'with additional measures' scenario builds on the baseline, adding policies that have been announced but where design and consultation are ongoing. In particular, it accounts for the impact of the national renewable electricity target of 82% by 2030 and further measures under the National Electric Vehicle Strategy, principally a fuel efficiency standard for light vehicles.

Under the baseline scenario, Australia's emissions are projected to be 386 Mt CO₂-e or 37% below 2005 levels in 2030. Under the 'with additional measures' scenario, Australia's emissions are projected to be 358 Mt CO₂-e or 42% below 2005 levels in 2030.

Australia's target is also a multi-year emissions budget over 2021 to 2030. Australia is projected to meet its 2030 target on a budget basis under the 'with additional measures' scenario, being 1% below the budget between 2021 and 2030. Under the baseline scenario Australia is expected to be 1% above the budget.

The 'with additional measures' scenario excludes several announced Commonwealth policies, as their emissions reduction impact cannot yet be estimated with confidence. These include Hydrogen Headstart, the National Reconstruction Fund and some streams of the Powering the Regions Fund (Industrial Transformation Stream and Critical Inputs in Clean Energy Industry Stream). The impact of these measures depends on the outcome of grant rounds yet to be run and investment decisions yet to be made.

Figure 5: Tracking against the 2030 target, 2020 to 2050, Mt CO₂-e



Source: DCCEEW (2023c).

The 2030 target is the next waypoint in Australia's efforts to reach net zero emissions by 2050. The 2023 emissions projections show material progress towards the 2030 target, but success will depend on effective implementation of existing and announced government policies. Sustained effort will be needed to decarbonise Australia's economy by 2050 – following the achievement of the 2030 target, net emissions will need to decline by 18 Mt CO₂-e a year on average to meet the net zero emissions target by 2050.

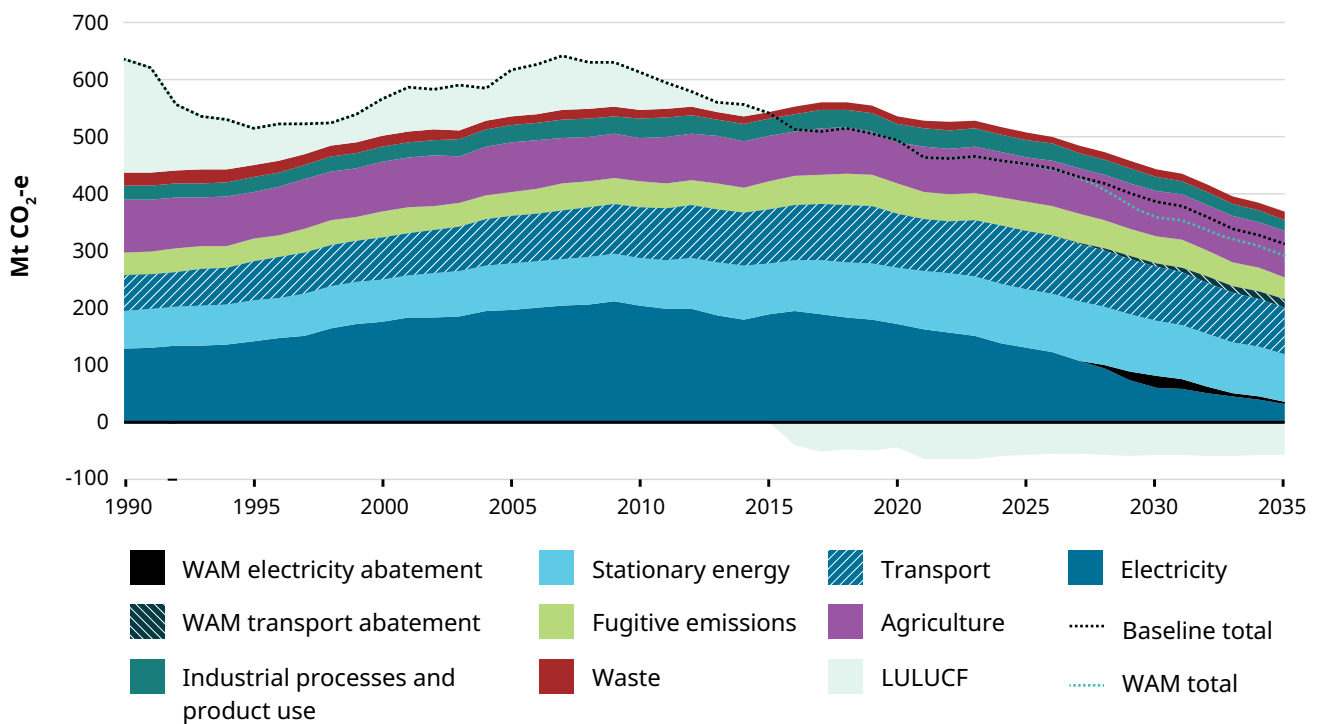
Emissions trends to 2035

Under the baseline scenario, Australia's emissions are projected to decline from 465 Mt CO₂-e in 2023 to 313 Mt CO₂-e in 2035 (49% below 2005 levels). In the 'with additional measures' scenario, Australia's emissions are projected to decline to 292 Mt CO₂-e in 2035 which is 53% below 2005 levels.

From 2023 to 2035, emissions are projected to decline in almost all sectors of the economy under both the baseline and 'with additional measures' scenarios.

The strongest decline in emissions is projected to come from the electricity sector due to the strong uptake and deployment of renewables driven by state and territory renewable targets and plans, and supported by the Commonwealth's Rewiring the Nation program and the Capacity Investment Scheme. The deployment of renewables progressively replaces coal and some gas generation. Electricity emissions in the 'with additional measures' scenario are projected to decline by 92 Mt CO₂-e or 60% between 2023 and 2030 and be 26% lower than the baseline electricity emissions projections in 2030. The decarbonisation of the electricity sector plays an important role in facilitating emissions reductions in other sectors including transport and stationary energy.

Figure 6: Australia's emissions projections in the baseline and the 'with additional measures' (WAM) scenario, 1990 to 2035, Mt CO₂e



Source: DCCEEW (2023c).

Under the baseline scenario, emissions are projected to decline to 2035 in the stationary energy, industrial processes and product use and the fugitive emissions from fuels sectors. This is largely in response to the Safeguard Mechanism reforms which incentivise Safeguard facilities to reduce emissions. The impact of the phase down of HFC imports also contributes to the decline in emissions in the industrial processes and product use sector.

Agriculture emissions are projected to decline slightly from the 2023 emissions peak and remain at roughly the same levels from 2030 (80 Mt CO₂-e) to 2035, as seasonal conditions are assumed to return to the historical average.

Emissions in the waste sector are projected to decline from 2023 to 2030 due to improvements in waste diversion. After 2030, waste emissions increase marginally.

The land use, land use change and forestry sector is projected to remain a substantial net sink to 2035. From a peak of -64 Mt CO₂-e in 2023, the net carbon sink is projected to decrease as the onset of the El Niño period reduces forest regrowth. The net sink in the land sector is then expected to remain relatively stable and be -56 Mt CO₂-e in 2035. This is due in large part to an overall reduction in native forest harvesting driven by policies in Western Australia and Victoria, continued lower rates of land clearing, and sequestration activities under the ACCU scheme.

Transport emissions are projected to increase from 2023 in the baseline scenario, returning to pre pandemic levels by 2024 and be 102 Mt CO₂-e in 2030. While electric vehicle uptake is projected to grow as a proportion of new light vehicle sales to 2030 in the baseline scenario, there are increased emissions from trucks and aviation. From 2030 to 2035, transport emissions are projected to decline because of the growing uptake of lower emissions vehicles. In the 'with additional measures' scenario, which includes the impact of additional measures under the National Electric Vehicle Strategy, transport emissions are projected to be lower in 2030 and 2035.

Delivery of key Paris Agreement milestone

Australia implemented its Paris Agreement voluntary commitment to cancel all Commonwealth-held Kyoto units surplus to its Kyoto-era emissions reduction target requirements. Over 700 million units were cancelled, with each unit representing 1 tonne of emissions avoided or sequestered. Cancellation ensures that the benefit of Australia's overachievement against its Kyoto targets flows to the environment and that new abatement is used to achieve our Paris Agreement targets.

Assessing policy effectiveness

The Climate Change Act 2022 requires that the Annual Statement report on the effectiveness of Commonwealth policies in contributing to the achievement of climate change commitments.

The Government is continuing to track its progress towards our targets and assess what additional action is required to meet it, including through the Annual Statement, the Climate Change Authority's Annual Progress Report, Australia's annual Emissions Projections Report, and annual and quarterly updates to the National Greenhouse Gas Inventory.

Importantly, some of the policies actioned this year, such as the Safeguard Mechanism reforms, and Powering the Regions Fund, are expected to result in direct and quantifiable emissions reduction once fully implemented. Other policies, such as Rewiring the Nation, are critical enablers of emissions reductions. All are crucial in meeting Australia's climate change targets.

The Government is continuing to develop capability to measure and report on climate action through improved Treasury climate modelling, the National Climate Risk Assessment and other initiatives.

Additionally, the Climate Change Authority will continue to refine its work on indicators and policy effectiveness to inform future Annual Statements.

Embedding targets in policy and legislation

To support Australia's pathway to net zero, the Government has continued to build its understanding of climate impacts, and its ability to identify and mitigate climate impacts and risks.

As an example, the 2023 *Intergenerational Report* reflected Treasury's new climate modelling capability, which included modelling of selected physical climate impacts on the economy, and of potential impacts on selected expenditure, revenue and exports over time.

Additionally, this year the Government released Australia's national wellbeing framework, 'Measuring What Matters', intended to underpin policy making at all levels of government. The framework includes indicators – emissions reduction, air quality, protected areas, biological diversity and resource use – that reflect the importance of the environment to a strong economy, thriving industries, a healthy population and quality of life.

The Government is continuing to seek opportunities to embed Australia's emissions reduction targets and climate considerations into relevant legislation and policies, including those that govern Commonwealth entities. Building on the amendments to other Acts made when the *Climate Change Act 2022* was passed, these changes seek to ensure that government institutions and schemes consider how their decisions and operations can contribute to achieving Australia's emissions reduction targets.

In May 2023, Commonwealth, state and territory Energy Ministers agreed to amendments to the National Energy Laws to incorporate an emissions reduction objective into the National Electricity Objective, National Gas Objective and National Energy Retail Objective. The changes passed the South Australian Parliament in September, with full commencement on 21 November 2023, almost 25 years after the start of the National Electricity Market in December 1998. With this overdue reform, these changes require Australia's energy market bodies – the Australian Energy Market Commission, Australian Energy Regulator, Australian Energy Market Operator and Western Australia's Economic Regulation Authority – to consider emissions reduction and targets in their work. The amendment also sends a clear signal to industry, market participants, investors and the public of governments' commitment to achieve a decarbonised, modern and reliable grid.

Other legislative changes in the last year include amendments to the *Industry Research and Development Act 1986* to exclude programs that subsidise the extraction of coal or natural gas, and the passing of the *National Reconstruction Fund Corporation Act 2023*, which requires the National Reconstruction Fund Board to have regard to Australia's emissions reduction targets and the desirability of supporting decarbonisation in performing its functions.

Further changes to embed considerations of emission reduction in public policy have also been made. For example, Infrastructure Australia now requires proponents to consider and provide information about emissions in infrastructure proposals, and their advice to government, infrastructure plan and audits, and infrastructure evaluations must consider Australia's emissions reduction targets. The Government has also revised the Statement of Expectations for a number of institutions, including the Australian Prudential Regulation Authority, Productivity Commission and the Northern Australia Infrastructure Facility to ensure climate change is considered.

5. State and territory action on climate change

Climate action in government operations

The Government has committed to reducing Commonwealth government agencies' emissions to net zero by 2030 (excluding Defence and security agencies). The Net Zero in Government Operations strategy sets out the activities, emissions sources and Australian Government entities (such as departments and agencies) that are included in the APS Net Zero target and reporting. Progress on this is published within the whole of government report, the Net Zero in Government Operations Annual Progress Report.

The Government is also introducing climate disclosure reporting requirements for all Commonwealth entities and Commonwealth companies to provide greater transparency, accountability and credibility in the way climate risks are managed across the public sector. These requirements align with the mandatory climate-related financial disclosure reforms for Australia's large businesses and financial institutions.

The Government has reinstated annual reporting on emissions within the public service, and is on track to meet its commitment to reducing the carbon emissions of its Commonwealth fleet to meet the target of 75% of new passenger vehicle orders to be low-emissions vehicles by 2025.

Australia was also among 19 global partners to launch the Net Zero Government Initiative at the United Nations Framework Convention on Climate Change (UNFCCC) COP27 meeting in 2022. While other countries committed to a 2050 target, the Australian Government committed to reaching net zero in its operations by 2030.

Through the Buy Australian Plan, the Government is also exploring opportunities to use its spending power to take action on climate change and support energy projects. Government procurement is a significant economic lever that can be leveraged to grow domestic industry capability and help prepare our economy for net zero.

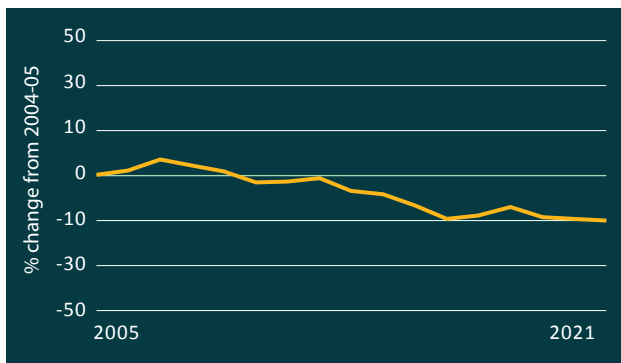
As recognised by the Climate Change Authority, effective collaboration between the Commonwealth, state and territory governments will be essential to achieving Australia's climate and energy goals.

The Energy and Climate Change Ministerial Council provides a forum for the Commonwealth, states and territories to work together on energy sector and climate change reforms. In 2023, ECMC's achievements included law changes to incorporate an emissions reduction objective into the national energy objectives (outlined in the previous section), progressing priority transmission reform, accelerating and enhancing decarbonisation activities, working to secure Australia's east coast gas supply and taking action to address energy price rises for Australian consumers.

The National Energy Transformation Partnership was agreed in August 2022 as a framework for state, territory and Commonwealth collaboration to support a smooth transformation of Australia's energy sector system to achieve net zero. Priority reforms underway under the Partnership include developing the First Nations Clean Energy Strategy, establishing a Capacity Investment Scheme and delivering Rewiring the Nation.

In addition to this collective action, state and territory governments have taken action to set and meet their own emission reduction gas targets as set out on pages 48 to 52.

Figure 7: NSW emissions



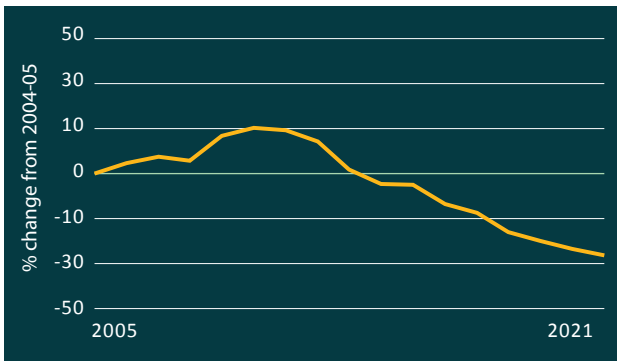
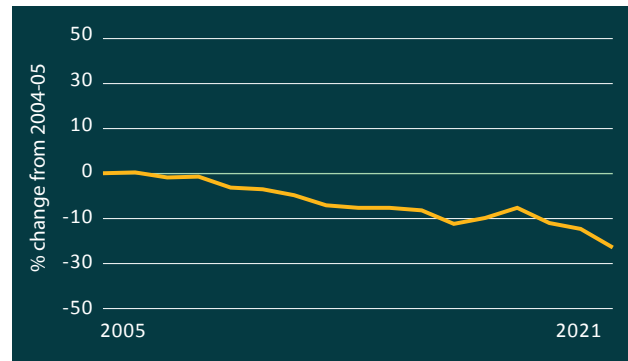
New South Wales (NSW)

In October 2023, the NSW Government introduced legislation to set emissions reduction targets of at least 50% by 2030 on 2005 levels and net zero by 2050. NSW will establish an independent Net Zero Commission to monitor progress to net zero and report annually to deliver parliamentary accountability and transparency.

The NSW Government has also committed to creating the NSW Energy Security Corporation, to partner with industry on projects to provide affordable and reliable energy to NSW.

Key NSW emissions reduction policies and initiatives:

- The Net Zero Plan Stage 1: 2020-2030 supports initiatives targeting energy, electric vehicles, hydrogen, primary industries, technology, built environment, carbon financing and organic waste. It includes:
 - the Electricity Infrastructure Roadmap to support the private sector to deliver 12 GW of new renewable electricity generation, and 2 GW of long duration storage (such as pumped hydro)
 - the Net Zero Industry and Innovation Program, a 10 year plan to accelerate development of clean technology and the transformation towards decarbonised industries
 - the NSW Hydrogen Strategy, which aims to support the development of a commercial hydrogen industry in NSW
 - the Renewable Manufacturing Fund to develop local manufacturing capacity for renewable and electric vehicle components
 - the NSW Electric Vehicle Strategy, which aims to increase electric vehicle sales to more than 50% of new cars in NSW by 2030 and the majority of cars sold by 2035.
- The Primary Industries Productivity and Abatement Program to reduce agricultural emissions and increasing carbon sequestration in vegetation and soils.
- The NSW Environmental Protection Agency released its Climate Change Policy and Action Plan in January 2023, which sets out its regulatory approach to support NSW to achieve its emissions reduction targets.
- NSW will develop its first Climate Change Adaptation Action Plan in 2023.

Figure 8: VIC emissions**Figure 9:** QLD emissions

Victoria

Victoria has targets to reach net zero emissions by 2045 and reduce emissions by 45% to 50% by 2030 and 75% to 80% by 2035, based on 2005 levels. The Victorian Government will soon legislate these ambitious emissions reduction targets by amending the Climate Change Act 2017. The Act provides the legislative foundation to drive transition to a prosperous net zero economy, and a climate-resilient community, through 5-yearly climate change strategies and sector-based emissions reduction pledges.

Recent Victorian action to reduce emissions includes:

- a renewable energy target of 95% by 2035, supported by 2035 targets of 6.3 gigawatts of renewable energy storage and 4 gigawatts of offshore wind
- the Victorian Gas Substitution Roadmap 2022 to guide transition of the gas sector to net zero.
- new gas to electric activities under the highly successful Victorian Energy Upgrades program
- more rebates and loans to install solar PV, heat pumps or solar hot water, and batteries as part of the \$1.3 billion Solar Homes Program
- from January 2024, all new homes requiring planning permits, new public housing, and new public buildings will be all electric
- accelerated renewable energy transition, with 2 Structured Transition Agreements in place for the closure of coal fired power stations: Yallourn in 2028 and Loy Yang A in 2035.
- \$42.2 million for 100 Neighbourhood Batteries
- strong zero emissions vehicles target of 50% of new light vehicle sales by 2030.
- ending native timber harvesting by January 2024
- the \$77 million BushBank program to plant millions of native trees, shrubs and restore wildlife habitat
- approximately \$20 million to help reduce emissions on farms and \$15.3 million for trees on farms through the Victorian Carbon Farming Program
- seven Adaptation Action Plans to build resilience for critical areas, to be updated every 5 years.

Queensland

Queensland is committed to reducing emissions by 30% by 2030 on 2005 levels and achieving net zero by 2050. Queensland is delivering climate action through the Queensland Climate Action Plan 2020-2030 (QCAP), which incorporates the Queensland Climate Adaptation Strategy 2017-2030. The QCAP supports the implementation of several sectoral decarbonisation plans and industry support packages across the Queensland economy.

Other key emissions reduction policies include:

- The 2022 Queensland Energy and Jobs Plan commits Queensland to achieve 80% renewable energy by 2035, and to have no regular reliance on coal fired generation for electricity by the same year. It also commits \$15 million to supercharge, coordinate and further plan for renewable hydrogen hubs in key locations across Queensland.
- The Queensland Future Climate Science Program has produced climate projections datasets to support risk assessments and adaptation planning. The program produces updated projections datasets based on the latest generation of global climate models that cover all of Australia.
- More than \$110 million invested as part of the Queensland Hydrogen Industry Strategy 2019-2024 to support development of sustainable hydrogen.
- \$520 million Queensland Low Emissions Investment Partnerships Program.
- TheNew Industry Development Strategy aligns with programs under the Queensland Jobs Fund to capture opportunities in renewable energy, critical minerals processing and product development, battery industry, green hydrogen, circular economy, and bioeconomy.
- The Queensland Critical Minerals Strategy, released in 2023, provides a roadmap for developing a critical minerals sector to provide the resources needed to decarbonise the economy.
- Ongoing sectoral decarbonisation work is being delivered through the Queensland Low Emissions Agriculture Roadmap 2022-2032, Queensland's Zero Emission Vehicle Strategy 2022-2032, Zero Emission Vehicle Action Plan 2022-2024 and the Queensland Resources Industry Development Plan.

Figure 10: WA emissions

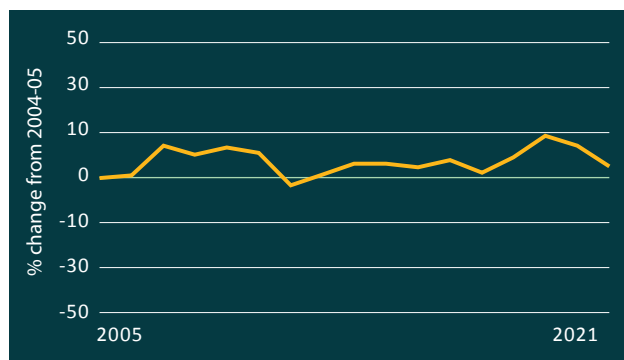
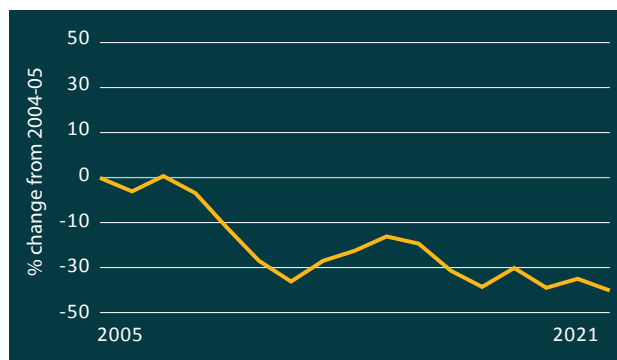


Figure 11: SA emissions



Western Australia (WA)

WA has committed to net zero by 2050 and an 80% reduction in government operational emissions by 2030. WA's emissions remain higher than in 2005 due to strong growth in mining and exports, along with the long-term growth in the state's population. WA's energy transformation is accelerating through a range of initiatives to ensure the economy remains resilient and competitive into the future.

Key WA emissions reduction policies and initiatives include:

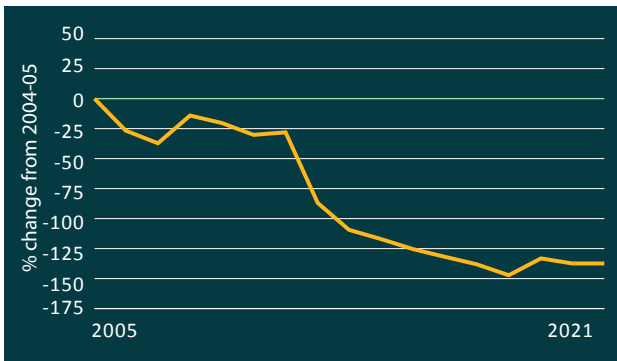
- Climate legislation will be introduced to Parliament in 2023 to establish the state's 2050 net-zero target and requirements for setting of interim targets.
- Early investment planning for transmission infrastructure in anticipated high growth areas in response to the recently completed South West Interconnected System demand assessment.
- Exiting state-owned coal-fired power generation by 2030 through a \$3.8 billion investment in wind generation and storage.
- Up to \$3 billion in financing support through the Commonwealth-WA Rewiring the nation deal to expand and modernise WA's electricity grids.
- Development of Sectoral Emissions Reduction Strategies (SERS) to identify robust and credible emissions pathways to take WA to net zero.
- Investment of more than \$220 million to support the uptake of electric vehicles, including the installation of charging stations across the state, electrification of the bus fleet (in partnership with the Commonwealth), and charging infrastructure grants.
- Investment of more than \$60 million in grant programs focused on reducing emissions and addressing climate change, including the \$19 million Clean Energy Future Fund, the \$15 million Carbon Innovation Grants Program, the \$15 million WA Carbon Farming and Land Restoration Program and the \$15 million WA Renewable Hydrogen Fund.

South Australia (SA)

In 2007, SA legislated emissions reduction targets of 50% by 2030 and achieving net zero by 2050, based on 2005 levels. The SA Government declared a climate emergency in May 2022, and released *South Australia: Responding to Climate Change* to outline the key priorities on climate change.

Recent SA progress on emissions reduction includes:

- the *Hydrogen Jobs Plan*, which will build a world-leading hydrogen power plant, electrolyser and storage facility, and accelerate the growth of the state's hydrogen economy.
- introduction of the Hydrogen and Renewable Energy Bill 2023 to facilitate and regulate hydrogen and renewable energy generation.
- the Carbon Farming Roadmap for South Australia 2022, to address barriers and increase participation in carbon farming. The Growing Carbon Farming Demonstration Pilot provides grants of up to \$100,000 to encourage carbon farming adoption in South Australia.
- The South Australian Research and Development Institute is also leading a \$1.5 million project to develop a new seaweed farming sector in South Australia (which supports livestock methane reduction).
- The *Circular Economy in South Australia's Built Environment Action Plan 2023* highlights opportunities, recommendations, and suggested actions to drive the transition to a circular built environment in SA.

Figure 12: TAS emissions**Figure 13:** ACT emissions

Tasmania

The Tasmanian Government legislated a commitment to net zero or lower by 2030 in November 2022. The 2022 amendments to the Climate Change (State Action) Act 2008 also provide a strategic framework for Tasmania's action on climate change by establishing requirements to develop a climate change action plan, sectoral emissions reduction and resilience plans (ERRPs), and a statewide climate change risk assessment at least every 5 years.

Tasmania's Climate Action Plan 2023-25 sets the Tasmanian Government's agenda on climate change for the next two years. The action plan includes emissions reduction initiatives that will be delivered in 2023-24 including supporting a large-scale trial of feed supplements to reduce emissions from livestock, financial incentives to increase the uptake of electric vehicles and e-mobility devices, and grants to support the planting of trees on private land.

Tasmanian emissions reduction initiatives include:

- developing sectoral ERPPs in consultation with business and industry to ensure a balanced approach to reducing emissions and building resilience to climate change across key sectors, including government operations
- 100% Electric Vehicles by 2030 for the Tasmanian Government fleet as well as incentives for EV uptake statewide
- Tasmania has already reached 100% renewable energy generation capacity and has a legislated commitment to reach 200% by 2040
- \$10 million to replace government fossil fuel boilers with renewable alternatives, with a focus on bio energy solutions
- trials of battery electric and hydrogen fuel cell buses commencing in late 2023 and mid 2024 respectively
- supporting small and medium sized organisations to adopt innovative practices to improve their resource efficiency and reduce emissions through the Business Resource Efficiency Program.

Australian Capital Territory (ACT)

The ACT has legislated greenhouse gas emissions reduction targets of 40% by 2020 (achieved), 50% to 60% by 2025, 65 to 75% by 2030, 90 to 95% by 2040 on 1990 levels and net zero by 2045.

The Climate Change Strategy 2019 25 outlines the ACT's plan to reduce emissions and establishes an initial pathway to net zero, as well as actions to build resilience to climate change impacts.

Key ACT emissions reduction policies and initiatives:

- The Zero Emissions Vehicles Strategy 2022-30 sets a target for 80% to 90% of new light sale vehicles to be zero-emissions vehicles in 2030 and to phase out internal combustion engine vehicles from 2035. These targets are supported by financial incentives and expansion of the public charging network.
- The Powering Canberra: Our Pathway to Electrification position paper outlines the ACT's path to transition from use of fossil fuel natural gas. The ACT is also introducing regulation to prevent new gas network connections in greenfield residential and urban infill developments.
- The ACT is developing an Integrated Energy Plan that will progress electrification and the transition from natural gas by 2045.
- The ACT also has a range of supports in place to improve energy efficiency and sustainability in public housing and for low-income homeowners. In 2023, a minimum energy efficiency standard for all ACT rental properties was introduced.
- The ACT's Climate Change Risk Assessment will help prioritise climate adaptation and resilience to the effects of climate change, and ongoing implementation of Canberra's Living Infrastructure Plan: Cooling the City.

Note: The ACT ensures electricity emissions are zero through its 100% renewable electricity commitment from 2020.

Figure 14: NT emissions



Northern Territory (NT)

In 2020, the NT released Northern Territory Climate Change Response: Towards 2050, which commits the NT to net zero by 2050. The NT Climate Change Response is supported by a 3-year Action Plan that establishes foundational emissions reduction policies and initiatives.

Key NT emissions reduction policies and initiatives include:

- establishing policies and regulations to manage emissions from larger emitters.
- pursuing the commitment to 50% renewable energy for grid connected electricity by 2030 under the Darwin-Katherine Electricity System Plan and an Alice Springs Future Grid Roadmap to 2030
- aiming to deliver an average of 70% renewable energy penetration to the 72 Indigenous Essential Services program remote communities through the Remote Power System Strategy
- establishing the Renewable Hydrogen Strategy 2020 and Master Plan 2021 to establish a local and export hydrogen industry, and the NT Electric Vehicle Strategy 2021.

The NT Government has established a requirement for onshore gas producers to implement a plan to achieve net zero by 2050, established minimum standards for monitoring and managing emissions from upstream activities, and enabled industry to seek approval to use and sell appraisal petroleum in preference to flaring or venting emissions at the source.

The NT Government is also working to reduce its own operational emissions, and is developing a strategy to guide further action to achieve net zero emissions.

6. Adapting to climate change

Even with strong action to reduce emissions, the impacts of climate change will continue to increase over the coming decades due to past emissions.

In May 2023, the World Meteorological Organization forecast a 66% chance that the annual average global temperature will be more than 1.5°C above the pre industrial level for at least one year between 2023 and 2027, and the likelihood is increasing with time (WMO, 2023). This is different from permanently exceeding the 1.5°C level specified in the Paris Agreement, which has been interpreted as average long-term warming.

Australia's climate has warmed on average by 1.48°C ± 0.23 °C since national records began in 1910. Oceans around Australia are acidifying and have warmed by about 1°C since 1900, contributing to longer and more frequent marine heatwaves.

Natural hazards are becoming more frequent and intense. As of 16 October 2023, there have been 29 disaster events declared in Australia during the year, affecting communities across 107 local government areas. This includes bushfires in NSW, Queensland, Victoria and NT; flooding and storms in NSW, Queensland, Victoria, WA and NT; and a cyclone in WA. While individual disaster events cannot solely be attributed to human induced climate change, a range of worsening climate impacts are projected for Australia. This includes more extreme fire weather and drought intensity in southern and eastern Australia, increased heavy rainfall intensity, and fewer cyclones, but a greater proportion of severe cyclones.

In the coming decades, Australia is expected to experience more extreme heat waves, which are likely to lead to increased heat related deaths, particularly for socioeconomically disadvantaged communities (IPCC, 2023).

Case study

Planting trees for a cooler, greener Melbourne

The Victorian Government has invested \$10 million to plant both advanced and young trees across Melbourne's west to help adapt to climate change by providing more shade and green spaces.

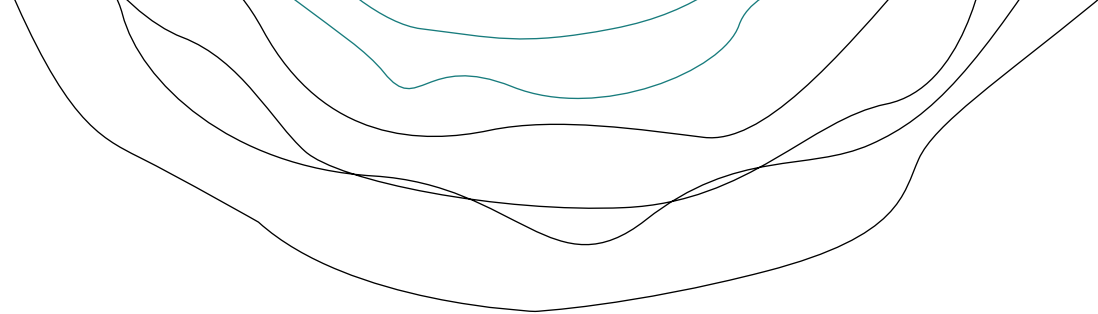
Heat extremes during warmer months are made worse in our urban areas due to reduced vegetation cover and the prevalence of hard materials and dark surfaces that absorb heat. This poses significant threats to the health and wellbeing of people, pets and native wildlife. Urban heat is an increasing threat to cities' liveability and productivity, made worse by more frequent and extreme heat days and heatwaves caused by climate change.

Melbourne's western suburbs experience some of the highest levels of urban heat vulnerability in metropolitan Melbourne. In 2018, Melbourne's west had just 5.5% canopy cover in urban areas, compared to 17.4% in the inner south-east and 25.9% in the east.



Photo by Marcia Riederer.

Planting trees to increase shade and cooling through urban forest and canopy cover can reduce air temperatures across a precinct by up to 2°C, helping to prevent heat-related illness and death, and giving people better access to cooler green spaces. Temperature reductions directly under a canopy tree are greater (around 4°C lower). Tree-planting also benefits biodiversity by introducing varied tree sizes and species and strengthening wildlife corridors. Trees can also help improve air quality by filtering pollutants and support better stormwater management through increased infiltration and reduced runoff.



Heatwaves are also likely to cause damage to infrastructure, including energy networks. Meanwhile, changes to seasonal rainfall patterns are likely to increase the risk of flash flooding, infrastructure damage, and streambank erosion.

Climate change is also placing the environment under increasing pressure, posing risks to Australia's unique ecosystems and biodiversity. At least 19 Australian ecosystems have been reported to show signs of collapse or near collapse. In recent years, pressures on ecosystems showing signs of collapse have become more severe, widespread, and frequent. Climate change, primarily change in temperature, has shown to be a key pressure for 18 ecosystems. While action is underway to reduce emissions, Australia also needs to take practical action to adapt to climate change to protect individuals, communities, and the environment.

National Climate Risk Assessment and National Adaptation Plan

Adapting to climate change will rely on effectively anticipating and managing climate risks and impacts.

The Australian Government has a responsibility to provide national leadership on climate adaptation, ensure the availability of nationally authoritative climate science and information, and manage climate risks to Government assets and services.

As it exercises its leadership role, the Government is taking action to protect Australians from more frequent and devastating extreme weather events, as well as the effects of longer-term changes in the climate. Central to this is the preparation of Australia's first National Climate Risk Assessment and National Adaptation Plan, which will both be completed by late 2024.

The Risk Assessment will help Australians to understand the risks and impacts to Australia from climate change, in areas such as the environment and biodiversity, health, infrastructure, agriculture, and the economy. It has been designed to support meaningful First Nations engagement so it can take into account First Nations values and knowledge.

The Risk Assessment will analyse a prioritised subset of the most important identified climate risks facing Australia. This will provide a baseline for ongoing monitoring of risks as well as a robust evidence base for prioritising adaptation action. In line with stakeholder feedback during the design phase, the Risk Assessment is designed to be repeatable and allow progress to be tracked over time.

The National Adaptation Plan will be the blueprint for responding to nationally significant climate risks. It will provide guidance on how Australia can adapt to the identified risks, scale up those adaptation efforts over time, and build national resilience to climate impacts. Importantly, both processes are being informed by consultation with state, territory and local governments, industry and business groups, local communities and First Nations people.

The National Climate Risk Assessment and National Adaptation plan will also complement the goals and ambition of the Second National Action Plan to implement the National Disaster Risk Reduction Framework, to reduce disaster risk and build resilience.

Adaptation and First Nations people

First Nations people are the traditional custodians and knowledge-holders of the land and waters of Australia, and hold a deep connection to Country.

Climate change is disproportionately affecting First Nations people and communities. This includes the disruption to cultural practice from the loss of land through sea level rise, destruction of cultural sites, and forced migration. In the Climate Change Authority's consultations, First Nations people shared their concerns about protection of cultural heritage, sacred sites and ceremonial grounds from climate impacts. They also noted that loss of culture is impacting communities' physical health and social and emotional wellbeing (CCA, 2023).

The Government is committed to working in partnership with First Nations people to respond to the impacts and adaptation opportunities of climate change. For example, Indigenous Rangers use traditional knowledge and cultural practices, combined with Western science, to manage land, rivers and sea Country.

Case study

Adaptation planning for K'gari using Traditional Knowledge and Western Science

The Butchulla traditional owners of K'gari have partnered with the Queensland Government and the Climate Systems Hub to build an adaptation plan for the island. The process started with discussing and agreeing Butchulla values with community and Elders.

A series of workshops brought together traditional and local knowledge with western science. Together participants looked at what had happened to Butchulla values in the past, what has happened in the present, and what they might be worried about for the future. Different adaptation actions highlighted ways the Butchulla could lead the response to climate risks, including returning to cultural burning, a leading role in biosecurity activities, and building and regaining knowledge and research about K'gari.



The Butchulla people are developing posters, information sheets, and vulnerability stories to share outcomes of the adaptation planning project with the community. The results are also being shared with the K'gari World Heritage Advisory Committee.

The Indigenous Protected Areas program supports Traditional Owners to care for land and sea Country and build resilience to the effects of climate change, including by undertaking cultural burning. The Government has committed to double the number of Indigenous Rangers to 3,800 by 2030, support more women to become rangers, and expand the Indigenous Protected Areas program.

The Government has committed \$15.9 million to engage with First Nations people on climate adaptation, including the establishment of a centre focused on the Torres Strait and Northern Peninsula Area. The centre is being co designed with senior leaders and the Torres Strait Regional Authority, and will enable a coordinated regional response to climate change on sea level rise and infrastructure, water and food security, sustaining and strengthening culture, economic stability, access to renewables, and other opportunities. Three regional roundtables have been held with senior leaders this year, and in September 2023, senior leaders in the region agreed to high level principles for implementation of the Centre.

The Government is providing more avenues for Aboriginal and Torres Strait Islander perspectives, knowledge and practices to contribute to international climate action. Australia is working with its international counterparts to elevate Indigenous knowledge in the Intergovernmental Panel on Climate Change (IPCC), including by supporting Indigenous-led publications that can be included in future IPCC assessments and enhancing IPCC expert nomination and support arrangements to encourage greater participation by Indigenous people.

Australia is also empowering Pacific governments and communities to respond to climate change and engage in international processes to inform and shape climate action. This year, Australia initiated a series of collaborative outreach and engagement programs to communicate the key findings of the latest IPCC assessment. Future work will focus on identifying opportunities to enhance Pacific Islands experts' participation in the next IPCC Assessment.

Australia's bid to co-host a COP, in partnership with the Pacific, is also intended to raise the voices of First Nations people, including by profiling First Nations peoples' work on climate action.

Disaster risk management

The Government is investing in strengthening Australia's disaster resilience and taking a connected approach to disaster preparedness, response, recovery, and risk reduction. Natural hazards are one of the main ways that Australians experience the impacts of climate change.

In August 2023, Emergency Management Ministers endorsed the Second National Action Plan to implement the National Disaster Risk Reduction Framework, which guides Australia's domestic efforts to reduce disaster risk, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030. The Action Plan recognises that disaster risk reduction activities must be genuinely inclusive, and provides a pathway for all governments, sectors, groups and the community to take aligned action to build resilience, reduce disaster risk and work towards common goals.

The Government is also investing in disaster resilience and risk reduction through the Disaster Ready Fund, which is providing up to \$1 billion over 5 years (from 1 July 2023) for initiatives that support Australians to manage the physical, social, and economic impacts of disasters caused by climate change and other natural hazards.

This includes investment in infrastructure to improve disaster prevention and preparedness, such as flood levees, seawalls, firebreaks, and nature-based solutions including constructed wetlands and reefs. Projects that target systemic risk reduction to build community resilience and capability are also eligible for funding.

Under the first round of the Disaster Ready Fund, 187 disaster resilience and risk reduction projects will receive a share of \$200 million in Commonwealth investment. Funding is being matched by state, territory or local governments or other project proponents where possible, delivering a combined investment of nearly \$400 million.

To support communities impacted by disasters, the Commonwealth also provides financial assistance through the Disaster Recovery Funding Arrangement. These cost-sharing arrangements alleviate the financial burden for states and territories of responding to a natural hazard and enables state and territory governments to support the recovery of people, capabilities, and communities.

To ensure that investment in risk reduction, resilience, recovery, and response are effective, an independent review of Commonwealth Disaster Funding has been undertaken to provide a pathway for the Government to:

- incentivise investment in risk reduction
- provide value for money, including the thresholds at which Commonwealth support starts and the level of cost sharing and eligibility for accessing assistance
- ensure consistent, equitable, and well targeted delivery
- promote confidence in the disaster management system.

Health and wellbeing

Climate change poses many risks to health and wellbeing, including:

- through increased temperatures, which can cause heat-related illness, exacerbate chronic diseases and contribute to the spread of diseases carried in food, water, or by vectors such as mosquitoes and ticks
- through air pollution, which can contribute to multiple diseases, including respiratory conditions such as asthma and lung cancer
- by affecting people's mental health, their workplace environment, and how they work
- by affecting housing and living conditions and possibly forcing people to leave their homes and communities
- by compromising health-supporting infrastructure, such as health facilities, roads, bridges, buildings, power lines, and water supply networks.

Australia's first National Health and Climate Strategy will soon be published. It will establish a plan to protect the health and wellbeing of people in Australia from the impacts of climate change – including more frequent and severe weather events, extreme temperatures, and poor air quality. The Strategy will identify ways to manage the health impacts of climate change, reduce the carbon footprint of the health system, and promote the health co-benefits of emissions reductions.

Additionally, all levels of government are working together to implement the National Disaster Mental Health and Wellbeing Framework, which will deliver more consistent services to communities to support their psychosocial needs as they are impacted by, and recover from, increasingly frequent and severe disasters.

Protecting and repairing Australia's environment

The overall state and trend of Australia's environment is poor and deteriorating, with impacts including habitat loss, invasive species, resource extraction, and pollution. Protecting and restoring Australia's natural environment can strengthen the resilience and adaptive capacity of species and ecological communities to the effects of climate change.

A healthier environment will moderate intensifying climatic conditions and reduce the risk of CO₂ losses through drought and bushfire, while providing the natural capital (soils, water, and ecosystems) needed for communities and industry to remain resilient and productive (IPCC, 2023). It will also increase the base amount of permanent carbon sequestered biologically in soils, plants and organisms.

The Government is working to protect and restore the natural environment through the Nature Positive Agenda – the programs, projects, laws, policies, reforms, and 'on ground' activities targeted at environmental decline and creating circumstances in which nature can thrive. This includes introducing regulations which protect our environment while accelerating environmental approval processes to support key sectors in the transition to net zero.

An independent regulator, Environment Protection Australia, will provide oversight of Australia's national environmental laws, while Environment Information Australia will ensure reliable, broad access to environmental data across Government and industry. This will enable faster regulatory decisions and improved information on climate-exposed habitats, species, and places.

Restoring the environment will help to strengthen the resilience and adaptive capacity of threatened species and ecosystems. The Natural Heritage Trust is supporting action to repair World Heritage properties, restore Ramsar wetlands, and conserve threatened species and ecosystems. The Urban Rivers and Catchment Program is helping community groups, non-government organisations, councils, First Nations groups, regional organisations, and state and territory governments to carry out projects that clean up and restore urban, outer urban, and regional centre rivers and waterways.



Photo by Justin Mallee.

Case study

Adaptation planning for rare rainforest trees

The Gondwana Rainforests of Australia are the largest area of subtropical rainforest in the world. The rainforest is also one of Australia's largest carbon stores. Human-induced climate change poses the greatest threat to these species. Less reliable rainfall, sparser canopy cover and more frequent and intense extreme weather events – including drought, bushfires and storms – are all expected consequences of climate change.

In response, the NSW Government has created a holistic adaptation plan to support the rainforest to adapt to the changing climate. The plan focuses on the Tweed Caldera, a group of national parks and reserves which lie largely on the landforms created by the erosion of the Tweed Shield Volcano.

With the help of world-leading research, scientists with expertise in threatened species conservation, and advanced climate modelling, the project team has developed practical climate adaptation strategies for the Tweed Caldera.

Importantly, the NSW Government is building knowledge, skills and capacity for adaptation into the future.

The recent decision from the World Heritage Committee to not list the Great Barrier Reef as 'In Danger' acknowledges the increased action Australia is taking to protect the Great Barrier Reef. This includes increased action on climate change, significant investments in Reef protection and restoration, and work to improve water quality and fisheries management. Over \$1.2 billion in funding was committed by the Australian Government in 2022 for the protection and restoration of the Reef.

National strategies and targets for biodiversity and species will also help to protect the environment. For example, the 2022-2032 Threatened Species Action Plan aims to recover threatened species, prevent future extinctions, improve the condition of priority places, and conserve at least 30% of Australia's land mass by 2030.

The Nature Repair Market will make it easier for businesses and philanthropic organisations to invest in projects that protect, manage and restore nature. These could include projects like improving or restoring native vegetation or protecting rare grasslands that provide a habitat for endangered species. These reforms would enable the Clean Energy Regulator to issue Australian land managers with tradeable biodiversity certificates that can be sold to businesses, organisations, governments, and individuals.

An increasingly hot and dry climate will require careful management of Australia's water resources. The Government is working closely with states and territories to safeguard and sustain water resources, for example by:

- improving the health of the Murray-Darling Basin through sustainable environmental flows and funding for science.
- infrastructure projects with states and territories through the National Water Grid Fund.
- creating necessary adaptive measures relating to water management in the face of a changing climate and evolving/emerging industries.
- providing adequate quantities of acceptable quality water to meet the needs of regional and urban communities.
- providing water for productive or economic use, and recognising and delivering water to meet the cultural, spiritual, social, environmental, and economic needs of First Nations.

7. National security

Climate change presents unprecedented challenges to Australia's national security. These challenges stem from the economic, strategic, political and social challenges of dealing with climate impacts both domestically and internationally.

As severe weather events – including heat, drought, storms, and flooding – happen with greater frequency and intensity, countries' capacity to respond may be eroded. More extreme weather events may destroy or degrade transport, energy, water, health, defence and other critical infrastructure, as well as directly threatening injury and death. Greater extremes of heat and humidity are likely to increase deaths from heatstroke and cut outdoor workers' productivity. The recent Northern Hemisphere heatwaves showed how such damage can cascade, causing widespread, costly supply chain disruption.

Extreme weather events have already proven to have significant impacts on Australia's energy security and critical infrastructure. Floods have caused shutdowns of coal fired power plants in Victoria and Queensland, bushfires continue to threaten transmission and distribution infrastructure, and droughts impact both hydroelectric generation and coal fired generation (where water is used for cooling). These events place increased strain on Australia's energy networks, and this fragility could be used as a climate change-based force multiplier for hostile actors. The threshold for damage to Australia's energy networks from sabotage may be significantly lower during high demand/low supply periods, such as extreme weather seasons.

Climate change is expected to continue driving water insecurity across the globe. Increased rainfall variability and more regional extremes expose more people to droughts and floods that destroy crops, decrease agricultural productivity, reduce energy supply and increase disease. Greater water stress and extreme weather can disrupt farm output, affecting nutrition, health and livelihoods, which could lead to breakdowns in social cohesion and regional instability.

Climate is a growing focus within our major security partnerships, including high level discussions at the Australia–US Ministerial Consultations (AUSMIN) and the Australia–UK Ministerial Consultations (AUKMIN). At AUSMIN last year, new collaboration was agreed to share assessments and advice on national and regional security risks posed by climate change including information sharing between defence departments and establishment of a new Senior Officials' Working Group on Climate Security Risk.

The World Economic Forum's Global Risks Report 2022 ranks 'biodiversity loss and ecosystem collapse' as one of the most likely and impactful climate risks humanity will face in the next 10 years. Human health, food security, and livelihoods will be impacted, as will the economy. Biosecurity problems will mount as changing weather patterns create unprecedented potential for pests and diseases to spread to Australia, posing risks to the management of our borders and supply chains. Invasive plants, animals and diseases could reduce forestry and agricultural productivity. Meanwhile, it is anticipated fisheries will become more contested as high ocean temperatures and acidification reduce ocean productivity and alter the range of fish stocks, which could have flow on impacts for Australia's maritime security.

Climate change is likely to accentuate economic factors already fuelling political instability, with intrastate conflict, population displacement, food insecurity and civil unrest having risen in the past decade. Infrastructure failure, extremist activity and disruptive protests could compound the impacts of disasters, water shortages or food and energy price spikes, and further erode some countries' political legitimacy. This would likely diminish their capacity to address the challenges they face, and increase the risk of conflict as countries compete for increasingly scarce resources.

Traditionally important exporters and supply chains may become less reliable, resulting in the potential for more and increasingly complex disruptions. Supply chain security, diversification and stockpiles of critical goods may be ever more important considerations. Export bans have multiplied, risking price spikes and political tensions, particularly in poorer states.

Implications for Australia's region

The independent findings of the Defence Strategic Review recognised climate change as a national security issue with significant implications for Australia and the Indo-Pacific region. Climate change could lead to mass migration, demands for peacekeeping and peace enforcement, and intra- and inter-state conflict while increasing demand for humanitarian assistance and disaster relief tasks at home and abroad.

Dealing with climate extremes is likely to place additional stress on national coordination arrangements and domestic crisis management agencies, stretching Australia's emergency capabilities that deploy domestically and internationally.

Climate change is likely to worsen global problems caused by rapid population growth, corruption, poor governance, weak infrastructure and conflict. Climate change will likely drive migration and displacement both within Australia and in many regional states, increasing the risk of ethnic or sectarian tensions or conflict over scarce land or water resources. Additionally, nations most vulnerable to sea level rise are likely to look to Australia and other countries for closer economic integration, including through migration and expanded labour schemes. The Australia-Tuvalu Falepili Union is an example of Australia's commitment to working with the Pacific family to address shared challenges on climate change and security. The International Developments section of this Statement provides more detail on the Falepili Union.

Climate change may also impact nations' ability to cooperate to solve common problems, likely causing multilateral forums to become increasingly contested. This could in turn constrain countries' ability to achieve necessarily ambitious climate and emissions reduction targets.

Australia is working to address these threats through a whole-of-government effort. The Government has agreed in-principle to 2 recommendations from the Defence Strategic Review:

- the Commonwealth should work with the states and territories to develop national resilience and response measures for adverse climate change at the local level without the need for ADF support, except in the most extreme emergencies
- defence should be the force of last resort for domestic aid to the civil community, except in extreme circumstances.

In support of these recommendations, the Government is simultaneously exploring alternative Commonwealth capabilities to support state and territory-led domestic crisis response efforts across our communities.

Recognising the damage that climate change and extreme weather can cause, the *Security of Critical Infrastructure Act 2018* requires operators of Australian critical infrastructure to develop all-hazard risk management programs to identify and appropriately manage these risks as far as is reasonably practicable.

The Government agreed with the recommendation of the *Defence Strategic Review* that Defence should accelerate its transition to clean energy to increase our national resilience, with a plan to be presented to the Government by 2025.

Internationally, diplomatic and aid budgets may be increasingly called upon to help countries in the region better prepare for natural hazards and Australia has been working with vulnerable states in our region to help them build their resilience. As part of Australia's new International Development Policy, from 2024-25 at least half of all new bilateral and regional official development assistance investments valued at more than \$3 million will have a climate change objective, with a goal to reach 80% in 2028-29.

Economic and supply chain implications

As governments across the world move to secure energy supply and meet emissions goals, Australia is likely to face challenges from global economic volatility and greater trade and technology frictions. Developing low emissions technologies, including distributed renewable energy systems, batteries and CCUS may become new sources of global competition for economic and strategic opportunities.

The global transition to clean energy will substantially boost global energy security due to more evenly distributed, abundant renewables and growing transport electrification, but could also create new dependencies and investment flows. Intermittent or reduced energy supply combined with challenges resupplying critical inputs, such as fuel, may harm both Australia's emergency response and warfighting capabilities. Maintaining a secure and affordable supply of legacy fuels during the transition is a priority for the government, as is the resilience of critical infrastructure in the face of extreme weather events or cyber attacks.

Australia can continue to play a key role in energy security globally and in our region by maintaining close relationships with our trading partners. Energy cooperation would encompass a broader range of trade and investment flows and the national security implications of foreign investment into energy and other critical systems will be a key issue.

Australia is well positioned to benefit from global decarbonisation through harnessing our renewable and mineral resources and securing investment in clean technology supply chains and energy-intensive industry. These advantages include renewable energy and mineral resource endowments, project expertise, strong environmental, social and governance credentials, a well-educated population, stable government and robust infrastructure. Lower-cost renewable energy is key to supporting industrial and residential consumers and creating opportunities for manufacturers, including opportunities for green metals such as steel and aluminium.

Cascading risks

A number of climate scientists and organisations such as the OECD have considered the risks that continued warming beyond existing targets could cross as-yet-unseen thresholds and trigger abrupt, cascading impacts.

Examples of potential tipping points include the sudden destabilisation and loss of major ice sheets, which would raise sea levels and impact ocean currents. Warming temperatures could trigger the melting of permafrost and the release of massive amounts of CO₂ and methane far exceeding global greenhouse gas budgets. This would in turn exacerbate warming trends significantly beyond current levels.

These events could accelerate the rate of warming and sea level rise faster than states can mitigate or adapt. They could in turn contribute to other even more severe risks such as the collapse of the Gulf Stream or loss of critical habitats such as coral reefs or the Amazon rainforest.

The complex interconnected nature of the global climatic and ecological systems means that the tipping point thresholds cannot be confidently identified prior to their being breached, and the cascading effects from that point are subject to uncertainty as to the specific sequence of events.

The currently identified national security threats from climate change already present serious risks to Australia and the region, but they will become more severe and more frequent the further warming targets are exceeded. The relationship between the level of warming and the threats faced is not linear; the threats will compound and expand exponentially the hotter the planet becomes.



8. International developments

In 2023, Australia continued playing an active role in multilateral discussions and strengthening bilateral partnerships to support the global and domestic climate agendas.

The Paris Agreement remains the pre-eminent forum for international collaboration on climate change. Under the Agreement, countries have committed to take progressively more ambitious action until, collectively, that action is adequate to achieve the Agreement's goals of limiting global temperature increases to well below 2°C and pursuing efforts to hold increases to 1.5°C; increasing the ability to adapt to the impacts of climate change, fostering climate resilience and low greenhouse gas emissions development; and aligning global financial flows with low greenhouse gas emissions and climate-resilient development.

At the annual UNFCCC climate conference (COP28) in Dubai in December 2023, countries are due to make important decisions to accelerate global climate efforts, including on the Global Goal on Adaptation and new funding arrangements for loss and damage. Additionally, COP28 will deliver the first Global Stocktake of collective progress towards the goals of the Agreement to inform major Paris milestones in 2024 and 2025.

In 2025, countries are due to submit their second Nationally Determined Contributions (NDCs), containing 2035 or 2040 targets. These targets must collectively place global emissions on a trajectory to net zero by mid century to keep warming to 1.5°C with no or limited overshoot. The Government will consider advice from the Climate Change Authority and the range of achievable emissions reduction measures to be outlined in the Government's 6 sectoral plans under development in formulating an ambitious 2035 target for Australia.

Australia is working closely with international partners in multilateral discussions on climate change under the Paris Agreement and UNFCCC, and other forums like the G20, to secure outcomes that set us up well for these important decisions over the next 2 years.

A chief challenge will be ensuring all major emitters – including developing countries – are prepared to take necessary action, and how to give these countries the confidence that decarbonisation will strengthen and not compromise economic development. This will enable them to take on ambitious commitments in their next NDCs in 2025.

Australia maintains an active presence in multilateral clean energy forums, including Mission Innovation, the Clean Energy Ministerial and the International Hydrogen Trade Forum. Australia is the inaugural chair of the International Energy Agency Critical Minerals Working Party to improve work on critical minerals, including guidance on securing a supply of critical minerals, supporting market transparency, and embedding environmental, social and corporate governance considerations into the supply chain. Australia chaired the Conference on Critical Materials and Minerals in 2023, to exchange information on policies and technical R&D collaboration.

In 2023, Australia joined the First Movers Coalition as a Government Partner, signalling its dedication to fostering innovative solutions to accelerate the supply of clean energy and address critical policy levers to effectively combat climate change. Australia also joined the Climate Club, an alliance of nations that aims to decarbonise industry and pursue net zero emissions by 2050. Australia will work closely with other members of the Club on advancing ambitious mitigation policies, decarbonising and transforming industries, and boosting international climate cooperation and partnerships.

Recognising the important role of trade in addressing climate change, Australia played an active role in multilateral trade and climate discussions including at the World Trade Organization and the OECD. In January 2023, Australia joined the Coalition of Trade Ministers on Climate.

Supporting our Pacific partners' response to climate change

Climate change is the single greatest threat to the livelihoods, security and well-being of the peoples of the Pacific. The costs of climate change are large and growing – especially for Australia's Pacific partners.

Australia is stepping up its international climate engagement, particularly in the Pacific, to tackle the climate crisis. This includes supporting the region's transition to renewable energy, helping countries build climate resilience, increasing our climate finance contributions, and sharing our innovations in climate adaptation. Australia is providing \$1.9 billion in development assistance to the Pacific this financial year, with significant spending on climate change. Australian climate support to the Pacific is longstanding and spans bilateral, regional and global investments, with climate change integrated throughout the development program.

Australia is responding to Pacific calls for more targeted climate financing solutions. Australia has announced that it will contribute to the Pacific Resilience Facility, once design and other arrangements have been finalised, and rejoin the Green Climate Fund to work towards increasing access for the Pacific. The Pacific Resilience Facility will be a Pacific owned and led climate finance mechanism. The Facility will fund small scale, locally led climate and disaster resilient projects across the region.

Australia is also working with the region to adapt to the impacts of climate change, including through investments in climate-resilient infrastructure, with at least \$350 million planned across the region through the Pacific Climate Infrastructure Financing Partnership.

The Australia–Tuvalu Falepili Union is also an example of Australia's commitment to working with the Pacific family to meet the challenges of our time, including climate change. It recognises the special circumstances faced by Tuvalu as a low lying nation and that climate change is its greatest national security concern.



The Hon Pat Conroy, Minister for International Development and the Pacific with the Hon Seve Paeniu, Minister for Finance and Economic Development of Tuvalu in Funafuti, Tuvalu on August 29, 2023.

Under the Falepili Union, Australia will support Tuvalu's efforts to enable its people to continue to live and thrive in their territory including through an additional contribution of \$16.9 million to Tuvalu's Coastal Adaptation Project. At the same time, Australia recognises the people of Tuvalu need alternatives as climate change impacts worsen. The Falepili Union also establishes a special mobility pathway, with a dedicated intake of up to 280 people annually, that will allow Tuvalu citizens to come to Australia to live, work and study.

When it comes to climate action, the nations of the Pacific have led the way for a long time and have shaped global debate. Australia has joined the Pacific as they push policy and clarify international law to lift global ambition, including on challenging questions of climate mobility and the status of states in the face of sea level rise.

In August 2023, Minister Bowen convened a Pacific Climate Change Ministers meeting, following the Pacific Small Islands Developing States Regional High level Dialogue. This open conversation about the existential threat of climate change to the region and the importance of working together in the Pacific was an important step in discussing priorities for COP.

Southeast Asia

Supporting the energy transition in the rapidly growing economies of Southeast Asia is another key priority for Australia, both to drive down global emissions, and to ensure Southeast Asian partners contribute to and benefit from the clean energy supply chains that will underpin a decarbonised future.

The transition to a clean energy economy is a significant challenge and opportunity for Australia and Southeast Asia. Australia has the expertise and technology to assist the region with its energy transition, and there is scope to attract investment to support Australia's clean energy manufacturing objectives. On 6 September 2023, the Prime Minister launched Invested: Australia's Southeast Asia Economic Strategy to 2040 (the Moore Report) at the ASEAN Indo Pacific Forum. The Moore Report provides a practical roadmap to increase two way trade and investment between Australia and our region, including in support of the green energy transition.

Under the ASEAN Comprehensive Strategic Partnership, we supported the development of the ASEAN Strategy for Carbon Neutrality. To promote ASEAN-Australia cooperation in addressing climate change and the energy transition, Australia (represented by Ambassador for Climate Change Kristin Tilley) co-chaired – with Laos and Vietnam – the ASEAN-Australia High-Level Dialogue on Climate Change and Energy Transition in September 2023.

Australia is deepening its collaboration with Indonesia on access to affordable clean energy, sustainable finance and climate resilience, through the Australian Indonesia Ministerial Energy Dialogue and the \$200 million Australia Indonesia Climate and Infrastructure Partnership. Established in June 2022, the Dialogue convenes annually as a platform for sharing information on energy and mineral resources policies and programs

In July 2023, the Prime Minister and Indonesian President Widodo announced that the first \$50 million of the Climate and Infrastructure Partnership will establish a fund to unlock investment into climate and clean energy focused Indonesian small and medium enterprises. Leaders also welcomed Export Finance Australia's plan to establish a US\$200 million capital financing facility with PT Perusahaan Listrik Negara to support Indonesia's energy transition. In September 2023, the Prime Minister announced the second tranche of funding under the Climate and Infrastructure Partnership, including \$50 million to de-risk private infrastructure projects, \$100 million to support Indonesia's sustainable and just energy transition agenda, and the establishment of a bilateral mechanism to advance collaboration on the EV ecosystem.

In June this year, the Prime Minister announced a \$105 million package to support Vietnam's energy transformation and green growth agenda. In August, the Foreign Minister announced funding of \$94.5 million for climate change adaptation in the Mekong Delta.



Conclusion

In recent years, Australia has seen historically severe weather-related events, including catastrophic bushfires and floods. These events drive home the importance of reaching net zero emissions and effectively adapting to climate change.

The Government is getting on with this critically important work. Over the last 18 months the Government has laid the foundations to reduce Australia's emissions in line with the targets legislated in last year's *Climate Change Act*. The impacts of these policies are projected to start to flow through to actual emissions over the coming years – but there is more work to do. Important emissions reduction policies like the Guarantee of Origin and successful projects for the Hydrogen Headstart program should be finalised over the coming year. The National Climate Risk Assessment and National Adaptation Plan, which will be finalised in 2024, will help focus Australia's efforts to adapt to the impacts of climate change.

Annual Statements provide an opportunity to reflect on each year's achievements and challenges, and to highlight where further work is needed. Next year's Annual Statement will continue to provide transparency and accountability on Australia's progress towards its targets. As part of this, it will reflect new information on the Safeguard Mechanism, as required by amendments made during the reform process in early 2023.

By 2025 Australia will be required to submit its 2035 emissions reduction target under the Paris Agreement. This will be informed by Climate Change Authority advice and the sectoral emissions reduction plans being developed. These plans will reflect input from communities, businesses, investors, workers, experts, and individuals – reflecting that all Australians have a role to play in the net zero transformation.

Australia's transformation into a renewable energy superpower will be critical to reaching net zero and to our future prosperity. The energy transformation is underway to deliver cheap, reliable renewable energy – reaching our target of 82% renewables will be critical to meeting our 2030 target and to ensuring Australia can be internationally competitive in new industries like renewable hydrogen, green metals, critical minerals processing, and manufacturing of generation and storage technologies including solar and batteries.

The Government recognises the scale of the task ahead, and its challenges. We look forward to making sure that Australia's net zero transformation is an equitable one, with our regions and First Nations people sharing in the benefits, and having their voices heard. And we look forward to continuing to report to the Australian people through the Annual Climate Change Statement on the progress we are making to an inclusive transition.

Glossary

Abatement	Reducing greenhouse gases in the atmosphere, including mitigation and sequestration.
Adaptation	In human systems, the process of adjustment to actual or expected climate and its effects, to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.
Carbon credit	A tradeable unit that represents 1 tonne of carbon dioxide equivalent (t CO ₂ -e) stored or avoided by a project.
Carbon farming	The process of changing agricultural practices or land use to increase the amount of carbon stored in the soil and vegetation (sequestration) and to reduce greenhouse gas emissions from livestock, soil or vegetation.
Carbon offset	A type of carbon credit that represents a reduction in emissions – whether prevented from entering the atmosphere or removed from the atmosphere – that is used to compensate for emissions that occur elsewhere.
Circular economy	A way of delivering nature positive outcomes, lifting economic productivity, and supporting Australia's net zero commitments – through the sustainable and efficient use of resources in the economy.
Climate Change Authority	An independent body established under the Climate Change Authority Act 2011. The Climate Change Authority's function is to provide expert, independent advice to the Government on climate change policy.
Mt CO₂-e	Million tonnes of carbon dioxide equivalent. The amount of carbon dioxide emissions that would have an equivalent effect on climate change from other individual or mixtures of greenhouse gas emissions. Is used to standardise different greenhouse gas emissions impacts on climate change to be reported as a single value. Usually shown in tonnes (t CO ₂ -e) or million tonnes (Mt CO ₂ -e).
Conference of the Parties (COP)	The decision-making body of the UNFCCC. All States that are Parties to the Convention meet every year and review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements.
Critical mineral	Critical minerals are metallic or non-metallic materials that are essential to our modern technologies, economies, and national security, and whose supply chains are vulnerable to disruption.
El Niño	An atmosphere and ocean circulation phenomenon that results in warm ocean equatorial waters off South America and the central Pacific Ocean, and cool ocean waters in the western Pacific Ocean (including off northeastern Australia). El Niño typically brings reduced rainfall, warmer temperatures, shifts in extreme temperatures, increased frost risk, reduced tropical cyclone numbers, later monsoon onset, increased fire danger in southeast Australia, and decreased alpine snow depths.
Emissions budget	A cumulative amount of emissions that can be emitted, e.g. 4,000 Mt CO ₂ -e during a specified time period, e.g. 2021–2030.
Emissions intensity	A measure of the amount of emissions associated with a unit of output – for example, emissions per unit of gross domestic product or electricity production.
Fugitive emissions	Emissions that are released across the coal, oil, and natural gas supply chains during exploration, production, processing, refining, storage, transmission and distribution of fossil fuels.
Green bonds	Green bonds are debt instruments where the proceeds, or an equivalent amount, are applied to finance or re-finance climate change or environmental projects, in part or in full.
Green metal	Iron, steel, alumina and aluminium produced with low or zero greenhouse gas emissions.
Greenhouse gas	Any gas (natural or produced by human activities) that absorbs infrared radiation in the atmosphere, leading to warming effects. Greenhouse gases include carbon dioxide, methane and nitrous oxide.

Industrial Processes and Product Use (IPPU)	Includes emissions from chemical feedstocks, reductants, carbonates and HFCs, which are used in refrigerants and air conditioning.
Intergovernmental Panel on Climate Change (IPCC)	The United Nations body for assessing the science related to climate change.
Land Use, Land Use Change and Forestry (LULUCF)	Emissions and sequestration from activities occurring on forest lands, forests converted to other land uses, grasslands, croplands, wetlands, and settlements.
Mitigation	Reducing greenhouse gas emissions in order to stop climate change getting worse.
National Electricity Market (NEM)	Australia's largest electricity grid, supplying the nation's east coast including Queensland, New South Wales (which includes the ACT), Victoria, Tasmania and most of South Australia. Electricity is generated, used in each region and traded across regions. High voltage transmission lines transport electricity from generators to electricity distributors, who deliver it to homes and businesses on lower voltage 'poles and wires'.
National Greenhouse Gas Inventory	Estimates of anthropogenic emissions and removals of greenhouse gases that occur within Australia's jurisdiction, prepared consistent with United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement rules and guidelines.
Nationally Determined Contribution (NDC)	A submission by a party to the Paris Agreement that articulates the party's efforts to contribute to the global task of decarbonisation and adapt to the impacts of climate change.
Net zero emissions	An overall balance between greenhouse gas emissions and removals.
Paris Agreement	An international agreement adopted under the United Nations Framework Convention on Climate Change in 2015. Under the Paris Agreement, the global temperature goal is to keep warming to 'well below' 2°C compared with pre-industrial levels, and to 'pursue efforts to limit the temperature rise to 1.5 degrees Celsius'
Safeguard Mechanism	A legislated scheme that requires Australia's largest greenhouse gas emitters, or 'safeguard facilities', to keep their net emissions below an emissions limit (a baseline).
Sequestration	Carbon sequestration is the process of capturing and storing atmospheric greenhouse gases. Greenhouse gases can be stored in biological ecosystems, underground geological formations or in manufactured products.
Stationary energy	The burning of fuels for energy used directly, in the form of heat, steam or pressure.
United Nations Framework Convention on Climate Change (UNFCCC)	The United Nations convention that supports the global response to climate change, with the ultimate aim of preventing dangerous human interference with the climate system.

Government Response to the Climate Change Authority's Annual Progress Report

Introduction

The Australian Government recognises the importance of the Climate Change Authority's second Annual Progress Report in the accountability framework set out in the *Climate Change Act 2022*. The report informs and advises the Climate Change Minister ahead of the Minister providing an annual update to the Australian Parliament on the impacts of climate change and progress being made towards meeting the greenhouse gas emission reduction targets set out in that Act. The report and its recommendations outline key issues and impacts for all Australians, including those in regional and remote communities and First Nations Australians. The Government has been cognisant of those impacts when developing this response and will continue to do so as relevant recommendations are implemented.

The Government acknowledges that Australia's 2030 target is ambitious and agrees with Climate Change Authority that it can be achieved if all levels of government, industry and the broader Australian community work together. The Government's 2023 Annual Climate Change Statement highlights the progress made this year towards meeting the 2030 and net zero targets.

Importantly, Climate Change Authority's advice has been made as the Government continues to implement key policies and programs. Of particular note, the Government has committed to developing a Net Zero 2050 plan for Australia's transition to a net zero economy. In developing this plan, the Government will determine Australia's emissions reduction target for 2035, and will develop six sectoral decarbonisation plans, covering all major emitting sectors of the Australian economy (energy and electricity, resources, industry, built environment, agriculture and land, and transport). These sectoral plans will identify means of reducing emissions from each sector in line with Australia reaching net zero.

The Government has responded individually to each of the 42 recommendations in Climate Change Authority's report. This approach reflects the legislative requirement to respond where the Government does not agree with Climate Change Authority's advice and provides additional information about future action where the Government accepts Climate Change Authority's advice.

Table 1: Criteria for Government response

Response	Rationale
● Agree	The Government agrees with the recommendation's intended outcome and implementation approach.
● Agree in principle	The Government agrees with the recommendation's intended outcome, but further consideration is required on the approach to implementation
● Note	Further consideration of all aspects of the recommendation is required.
● Disagree	The Government does not agree with substantive elements of the recommendation.

Recommendation 1

Provide further support for Australian climate change research through a coordinated, expanded national research program on climate science. Under the research program:

- Australia's network of monitoring stations, buoys, and access to satellite data should be maintained and expanded.
- Research focusing on compounding and cascading hazards, climate system tipping points, seasonal forecasting of extreme weather events, Southern Ocean science, Antarctic sea-ice and ice sheets should be given additional attention.
- First Nations people should lead the incorporation of First Nations' knowledge into our understanding of the climate system and the solutions to climate change.

● Agree-in-principle

There is significant investment in climate science through the National Environmental Science Program Climate Systems Hub to 2026-27.

The Government considers that an expanded national research program should have a broader focus than this recommendation suggests. Consultation with the climate science research community will help to develop Australian Government priorities for the next phase of government investment post 2026-27.

In regard to First Nations knowledge, the Government agrees that this should be incorporated into our understanding of the climate system and is already actioning this through the National Environmental Science Program Climate Systems Hub, First Nations focussed research, and through development of a climate centre focussed on the Torres Strait and Northern Peninsula Area, as well as the establishment of the First Nations Clean Energy and Emissions Reduction Advisory Committee. The Government is also working to elevate Indigenous knowledge in Intergovernmental Panel on Climate Change (IPCC) reports and improve Indigenous peoples' participation in IPCC processes, including through supporting Indigenous-led publications that can be included in future IPCC assessments and enhancing our domestic IPCC expert nomination and support arrangements, to encourage greater participation by Indigenous people.

Recommendation 2

Lead the establishment of best-practice protocols for conducting extreme weather event attribution studies to ensure different studies are comparable and clearly understandable.

● Noted

While consistency in conducting extreme weather event attribution studies is useful, Climate Change Authority has not made a strong case for the Government to lead the establishment of best practice protocols. The Government through the National Environmental Science Program and the Australian Climate Service is developing a prototype capability to conduct and communicate extreme event attribution studies. Work led by the Bureau of Meteorology investigates the communication of these studies and provides recommendations for high quality, usable attribution communication. The work underway is likely to include protocols for operational attribution, which will ensure that studies informing an attribution service are comparable. However, new techniques may be developed that do not follow those specific protocols but are still considered good practice.

Recommendation 3

Secure agreement with all levels of government on a framework to ensure that climate change risk and adaptation are factored into all policies and programs and their implementation, including but not limited to critical infrastructure, building codes, health, social services policies (such as those on public housing), transport, environmental protection, national security, and sectoral decarbonisation plans.

● Agree-in-principle

The existing Commonwealth-State agreement on roles in climate adaptation articulates a clear leadership role for the Commonwealth Government. For example, the Adaptation Working Group under the Energy and Climate Change Ministerial Council supports cross-jurisdictional consideration of key adaptation issues.

The National Adaptation Plan, to be delivered at the end of 2024, will further develop a shared understanding of nationally significant adaptation actions, and who is responsible for leading them. Determining responsibility will be guided by the existing agreement and consultation conducted in developing the National Adaptation Plan. The Commonwealth is also developing the Climate Risk and Opportunity Management Program for the Australian Public Service. This will include an online tool to assist with management and reporting of climate risks and this will be made available to all tiers of government to use when it is completed in 2024.

Recommendation 4

Legislate for the National Climate Risk Assessment to be undertaken, and the National Adaptation Plan updated, a minimum of every 5 years, and for ongoing monitoring and evaluation of the Plan.

● Noted

The first National Climate Risk Assessment and National Adaptation Plan will be crucial policy tools that take a comprehensive assessment of nationally significant risks and provide a national blueprint for responding to them, consistent with the Paris Agreement. The National Climate Risk Assessment is well underway and the National Adaptation Plan has commenced with a series of stakeholder consultations, which will be followed by an Issues Paper.

The methodology for the Risk Assessment was designed to be repeatable and to allow progress to be tracked over time. Stakeholder engagement on the design and delivery of the Risk Assessment found strong support for a repeatable and iterative process for assessing and monitoring risks, as well as adaptation progress in the future. This monitoring and evaluation framework for the National Adaptation Plan will be developed over 2024, with feedback sought on the draft monitoring and evaluation framework as part of the draft National Adaptation Plan prior to finalisation.

Consideration will be given to the most appropriate frequency of repeating the assessment once the first assessment has been completed.

Recommendation 5

Facilitate the development of a First Nations peoples-led framework to engage with First Nations people on decarbonisation and adaptation matters, building on the principle of free, prior and informed consent.

● Agree-in-principle

The Government is developing a First Nations Clean Energy Strategy (including guiding principles for Australia's clean energy transformation); a National Environment Standard for First Nations engagement and participation in environmental decision-making; and the National Adaptation Plan and National Climate Risk Assessment. The Government is working with the First Nations Clean Energy and Emissions Reduction Advisory Committee in developing these products.

To avoid duplication, the Government will consider the utility of a specific framework for First Nations engagement on decarbonisation and adaptation following the development and delivery of these key policies and programs.

Recommendation 6

Facilitate a First Nations peoples-led action plan to enhance First Nations workforce opportunities in decarbonisation and adaptation, and remove barriers to employment.

● Agree-in-principle

The Government has previously commissioned Jobs and Skills Australia to undertake a capacity study on the workforce needs for Australia's transition to a clean energy economy. The final report of this study, *The Clean Energy Generation: Workforce needs for a net zero economy*, was published on 3 October 2023 and included 50 recommendations aimed at ensuring Australia has the skills and workforce required to meet our clean energy ambitions. The report included analysis of the proportion of First Nations people working in the clean energy workforce, opportunities and barriers for full participation in the clean energy sector, as well as a number of recommendations to improve clean energy outcomes for First Nations groups and communities.

Informed by the report and other previous work, the First Nations Clean Energy Strategy, National Energy Workforce Strategy, National Adaptation Plan and other processes will help improve opportunities for First Nations people in the clean energy, decarbonisation and adaptation workforce.

The First Nations Clean Energy Strategy is being developed with advice from the First Nations Clean Energy and Emissions Reduction Advisory Committee and informed by roundtables with First Nations communities across Australia. The Strategy will help facilitate workforce and business development by identifying options and activities to build First Nations participation in workforce and supply chains – complementing the National Energy Workforce Strategy that will align existing workforce policies with energy sector’s needs, propose initiatives to address identified gaps, and provide a platform to coordinate workforce planning across government and industry, including increasing participation for First Nations Australians. The Government will consider the utility of an additional process following the development of these key policies and programs.

Recommendation 7

Support adaptation and transition decision-making, and improve transparency and accountability, by developing simple and accessible tools to explain climate and energy concepts.

● Agree

The Government understands the importance of giving Australian businesses, households and communities clear and concise information on how a changing climate and the transition to a clean energy economy will impact their circumstances. The Government is continually working on ways to improve understanding of climate and energy concepts to support communities and decision-makers with simple and accessible tools.

For example, the Climate Systems Hub, funded through the National Environmental Science Program, delivers the latest climate research to a range of stakeholders through innovative and targeted approaches. The Hub recently used a storyline approach in the Pilbara region to help distil an overwhelming amount of information into a few compelling narratives to help water planners and decision makers understand possible futures.

The Government has committed to ensuring large businesses and financial institutions provide Australians and investors with greater transparency and accountability when it comes to their climate-related plans, financial risks, and opportunities. As part of this commitment, the Government will introduce standardised, internationally-aligned reporting requirements for businesses to make disclosures regarding governance, strategy, risk management, targets and metrics – including greenhouse gases. Mandatory climate-related financial disclosures will ensure information on risks and opportunities faced by Australian companies due to climate change is disclosed in a consistent and transparent way. This will enable investors to make fully informed investment decisions and regulators can effectively oversee systemic risks to the financial system.

Within government, the Climate Risk and Opportunity Management Program is a key enabler to disclosure, intended to build Commonwealth entities’ climate risk management capability. It will support agencies to identify, assess, prioritise, and manage climate risks and opportunities within policies, programs, projects and services. The Program outlines how the Government will embed climate risk management into decision making, guidance documentation that details the methodology for Commonwealth entities to meet climate risk management requirements, and online learning and development modules to increase climate risk knowledge and maturity across the Commonwealth public sector. There is also a support service that provides expert advice to Commonwealth public sector employees on how to undertake climate risk analysis.

Recommendation 8

Coordinate with state and territory governments on a comprehensive and integrated plan to reach the 82% renewable generation target, including development and implementation of a mechanism to ensure the necessary investment in the supply of renewable electricity.

● Agree

The Government is committed to reaching 82% renewables generation in major electricity networks by 2030 and recognises the importance of working with jurisdictions to support achieving higher renewable penetration.

As ageing thermal generators become less reliable and exit the grid, reaching 82% by 2030 is vital to energy reliability and affordability, as well as emissions reduction.

The National Energy Transformation Partnership (the Partnership) is the framework for state, territory and Commonwealth governments to work together on reforms to help transform Australia's energy system to achieve net zero.

Under the Partnership, the Government is working to agree new bilateral Renewable Energy Transformation Agreements to maximise opportunities, ensure reliability and address non-market barriers to investment. Priority reforms which will support reaching the 82% target, include:

- expanding the Capacity Investment Scheme (CIS) to encourage investment in renewable energy, including 9 GW of dispatchable capacity and 23 GW of variable renewable capacity
- developing a First Nations Clean Energy Strategy
- delivering the Rewiring the Nation Program
- progressing a National Energy Workforce Strategy
- developing a National Renewable Energy Supply Chain Action Plan.

The expanded CIS is expected to bring new investment and renewable energy generation and storage to Australia by decreasing financial risks for investors and encouraging more investment in capacity when and where it is needed.

The Government has committed to the development of 6 sectoral decarbonisation plans to feed into a national Net Zero Plan. On 7 July 2023, Commonwealth, state and territory ministers unanimously agreed to support development of the national 2050 Net Zero Plan. As part of the national Net Zero Plan, the Energy and Electricity Sectoral Decarbonisation Plan is under development and will take into account existing initiatives including the Partnership with states and territories and the Government's 82% renewable electricity target by 2030.

Recommendation 9

Together with the state and territory governments provide the following information to the Australian Energy Market Operator each financial year for it to publish (in a similar format to the Connections Scorecard): number of renewable energy projects submitted for development approval or EPBC Act referral, number of renewable energy projects provided development consent or approval under the EPBC Act, and the average time from submission to approval.

● Agree

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) regulator publishes regulatory approvals and publishes information about performance against statutory timeframes each quarter for decision-making under the EPBC Act. This information is broken down by sector, including for renewables projects. The EPBC regulator will work with Australian Energy Market Operator to access and report this information.

Recommendation 10

Build on the recommendations in the Samuel Review to prioritise and expedite the EPBC Act assessment process for large-scale renewable energy generation projects, while maintaining rigorous consideration of environmental impacts.

● Agree

The Government is currently pursuing action to accelerate approval timeframes for renewable energy projects under the EPBC Act.

Reforms to environmental laws including enhanced environmental information, national standards, strategic assessments, regional planning, and accreditation of states and territories will provide further streamlining opportunities in support of faster decision-making and better environmental outcomes.

Recommendation 11

Respond to the Community Engagement Review on energy infrastructure no later than 30 April 2024, and implement measures to support best practice community engagement and benefit sharing, including with First Nations communities, as soon as possible thereafter.

● Agree

Community engagement on energy infrastructure is essential to the delivery of the clean energy system we need to reduce emissions and maintain energy affordability and reliability. The Community Engagement Review is a key process to improve community engagement and align project benefits with community interests, and is running alongside on-going community consultation across the Government's climate and energy programs. The Government will respond to recommendations made in the Community Engagement Review's Report in early 2024.

Recommendation 12

Work with state and territory governments to accelerate the rollout of network infrastructure to support the deployment of large-scale renewable energy projects.

● Agree

The Commonwealth is working with state and territory governments to facilitate the delivery of critical transmission infrastructure, including to support the development of renewable energy zones for which states and territories perform some key planning functions.

The Government is accelerating delivery of key transmission projects through the \$20 billion Rewiring the Nation program aimed at upgrading and expand Australia's transmission grid. The Government is also working to ensure the regulatory framework is set up to deliver this infrastructure through a number of changes to the National Electricity Rules. This includes, for example, improving how community engagement and early planning works are conducted, providing greater flexibility in the revenue-setting framework to mitigate financiability risk, and ensuring the benefit of Rewiring the Nation concessional finance can flow through to consumers.

The Australian Energy Infrastructure Commissioner is also undertaking a review to identify how to improve community engagement in the planning and delivery of renewable energy infrastructure (see Recommendation 11).

The Government is also conscious of the role environmental approvals play in project delivery of critical transmission projects. The Government is reforming national environmental laws to strengthen and streamline the EPBC Act (see Recommendation 10).

Together, these initiatives are expected to accelerate the delivery of transmission infrastructure, while maintaining crucial community, environmental and consumer protections.

Recommendation 13

Work with state and territory governments to provide incentives to ensure sufficient renewable energy storage projects that can provide between 4 to 12 hours of storage are deployed by 2030 (through the Capacity Investment Scheme or other mechanisms).

● Agree

Through the Capacity Investment Scheme (CIS), the Government, in coordination with state and territory governments, will unlock funding for renewable capacity in electricity networks across Australia.

This will ensure greater reliability and support uptake of renewable energy generation. As such, it will complement existing Commonwealth and state and territory targets for reducing the impacts of climate change. In 2023, the first phase is being implemented in NSW (where Commonwealth support expanded the NSW Energy Infrastructure Roadmap's firming tender more than doubling NSW's commitment of 380 MW) and jointly in SA and VIC (to target 600 MW of dispatchable renewable capacity with medium equivalent duration across both states). On 22 November, the results of the NSW tender were announced, with 6 projects totalling 1,075 MW winning the bids, equivalent to 8% of the total 2022-23 NSW summer peak demand. The first phase will inform the national implementation of the CIS in 2024 across the country.

Recommendation 14

Provide funding via ARENA and the CEFC to accelerate the commercialisation and deployment of deep storage options.

● Agree

The Government provides funding to Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC) that can be, and is, used for these purposes under the Advancing Renewables Program and Rewiring the Nation Program.

Accelerating the commercialisation of large-scale long duration energy storage is one of ARENA's key strategic priorities and it has made several investments through its Advancing Renewables Program to enable this. This includes multiple investments across a variety of technologies, including several into the Battery of the Nation initiative.

For example, ARENA is supporting the deployment of deep storage technologies through almost \$40 million in grants to Raygen Resources. The Raygen Solar Thermal Power Plant at Carwarp in northern Victoria uses advanced solar and thermal technologies to generate 4 MW of renewable power backed with 2.8 MW / 50 MWh of storage for around 17 hours duration.

The CEFC has made its first investment via the Rewiring the Nation Program committing \$100 million to support the delivery of substantial clean energy projects in NSW. The CEFC investment will support renewable generation, long duration storage and grid infrastructure as part of the ambitious NSW Electricity Infrastructure Roadmap, which aims to transform the State's energy system through the delivery of whole of system benefits.

Recommendation 15

Implement measures to ensure there is adequate abated domestic gas supply for firming renewable electricity generation and other purposes, while the domestic use of gas is phased down over time with the deployment of lower and zero emissions alternatives.

● Agree-in-principle

The Government's climate and energy policies are driving a substantial increase in renewable energy, energy efficiency and electrification across the economy. As we continue to deploy more renewable energy, gas will continue to play an important role in the reliability and stability of the energy market. The flexibility of gas as a firming fuel and a key manufacturing input will be required as the transition accelerates domestically and in the region.

Announced in the 2023-24 Budget, the Government is developing a Future Gas Strategy to support Australia and our regions transition to net zero. The Strategy will be long-term, helping governments, industries, communities and individuals make decisions and plan for the future.

Addressing both gas supply and the affordability of gas has been a key focus of the Government's Mandatory Gas Code of Conduct. The Government works closely with the States and Territories through the Energy and Climate Change Ministerial Council and National Energy Transformation Partnership to support the efficiency of gas and energy markets. Policies to drive reduced emissions from gas include the reformed Safeguard Mechanism, Capacity Investment Scheme, Powering the Regions Fund, National Reconstruction Fund, Clean Energy Finance Corporation, Australian Renewable Energy Agency industrial programs and the \$1.7 billion Energy Savings Package (announced through the 2023-24 Budget) to help households, local councils, and businesses to access energy upgrades, including electrification.

Recommendation 16

Coordinate with state and territory governments to agree on timing for the retirement of fossil fuel generators and measures to support local workforces and communities affected by closures.

● Agree-in-principle

The Government will engage with State and Territory jurisdictions on the retirement of ageing fossil fuel generators and supporting local communities throughout the transition to clean energy sources. The Government is establishing the Net Zero Authority to play a key role in regions impacted by the retirement of coal fired power stations.

Recommendation 17

Accelerate the early phase-out of higher global warming potential refrigerants, where alternatives are available, including bans for pre-charged equipment imports.

● Agree

The Government will explore options to accelerate the phase out of higher global warming potential hydrofluorocarbon (HFC) refrigerants where alternatives are available.

Australia's phase down of HFCs under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* is reducing consumption of HFCs through an annual quota on imports of bulk HFCs that decreases every two years until reaching an 85% reduction from baseline in 2036. The Government will consider additional policies where necessary to further reduce use of HFCs for refrigerants and other purposes, where safe, commercially available and technically appropriate alternatives are available.

Options may include regulating import and manufacture of equipment containing HFCs. The first such measure will come into effect on 1 July 2024 with a ban on the import and manufacture of certain small air conditioning equipment using HFC refrigerants with a global warming potential of over 750. Consultation began in 2023 on measures to reduce reliance on higher global warming potential HFC refrigerants in commercial refrigeration.

Recommendation 18

Review the opportunities and report on barriers and incentives for pre-mine drainage of coal mine methane from open cut mines.

● Agree-in-principle

The Government will continue to work with industry, academia, and state and territory governments to understand the opportunities and barriers for pre-drainage of coal mine methane from open cut mines.

Through the 2022-23 October Budget, the Government committed \$8.5 million over 2 years to the Resources Methane Abatement Fund which makes grants available to universities and research organisations to undertake development, prototype verification and validation, and demonstration level projects of methane abatement technologies related to coal and gas industries. Various priority technologies were identified for the Fund, including "enhanced coal mine methane drainage".

Recommendation 19

Introduce measures complementary to the Safeguard Mechanism for reducing fugitive emissions from the oil and gas sectors, including:

- implementation of international best practice measures for reducing methane emissions from flaring activities that do not perversely encourage venting emissions;
- development of standards in line with international best practice to support methane leak detection and repair across equipment, technologies and operational practices;
- introduction of requirements for existing oil and gas facilities to sequester all CO₂ emissions produced.

● Noted

The Government has sent strong policy signals to the oil and gas sector through the Safeguard Mechanism reforms and joining the Global Methane Pledge (among other initiatives) to provide incentives for industry to reduce fugitive emissions and sequester CO₂. Whether additional complementary measures could drive additional abatement will be considered in the Resources Sector Plan being developed as part of the Net Zero Plan. States and Territories may also wish to consider their regulatory frameworks to facilitate the delivery of methane reduction activities in these areas.

Recommendation 20

Implement a Fuel Efficiency Standard for new light vehicles as soon as possible and that progressively reduces the emissions intensity to zero by no later than 2040.

● Disagree

The Government has already indicated that it will put in place a Fuel Efficiency Standard for new light vehicles. This will ensure that Australians can choose cars that are cleaner and cheaper-to-run and save money at the fuel bowser.

The Government is undertaking consultation and analysis on the right settings for an Australian Fuel Efficiency Standard. Around 2,700 submissions were provided to the Government's consultation process in April, and work has been proceeding on analysis of options. However, the Government has not set specific net zero targets for individual sectors, and it would be premature to set a target for new light vehicles.

In developing its Fuel Efficiency Standard, there are a range of factors that the Government is giving consideration to. These include the need to get the best, most fuel efficient vehicles to Australians, and to maximise the choice that consumers have.

Recommendation 21

Complete a review of policy and regulatory settings for electric vehicles by 2024 (including subsidies to purchase electric vehicles, fees and charges to own and drive electric vehicles and taxes and tax concessions) to ensure incentives are effective and efficient in reducing emissions and driving electric vehicle uptake.

● Noted

Electric vehicles (EV) made up 8.4% of new light vehicle sales in the first three-quarters of 2023; sales over that period are 84% more than total electric vehicle sales in 2022. The Electric Car Discount, introduced in November 2022, is strongly reinforcing this trend.

Under the National Electric Vehicle Strategy (NEVS), the Government has committed to collaborating with states and territories to ensure a national approach on EV affordability, which may include assessing the impacts of incentives or discounted financing as EV uptake increases.

More broadly, the NEVS sets out a vision to increase the uptake of EVs to reduce our emissions and improve the well-being of Australians. It introduces a framework designed around three key objectives and six outcomes to support the transition, with a focus on putting systems and infrastructure in place and increasing EV supply to meet growing demand.

The framework will guide Australia through to 2030 and beyond, helping achieve Australia's broader road transport emissions reduction objectives. It is a national strategy, developed and delivered in collaboration with states and territories, industry, unions, business and community groups. Annual reviews will ensure any future initiatives are fit for purpose and meet the needs of the communities they are intended to benefit.

The Government is also considering policy and regulatory options to support transport electrification through the Net Zero 2050 sectoral decarbonisation plans.

Recommendation 22

Develop metrics to monitor progress of the rollout of electric vehicle charging infrastructure in the first National Electric Vehicle Strategy annual review. This should take account of the infrastructure needs of regional and rural Australia in terms of the number, distribution and speed of chargers.

● Agree

Through the Driving the Nation Fund, the Government has doubled the Commonwealth's investment in electric vehicle and hydrogen refuelling infrastructure. Through this fund, the Government has partnered with the National Roads and Motorists' Association to deliver 117 fast chargers on national highways; and is supporting the trial of new technologies and innovations in charging infrastructure through funding delivered by the Australian Renewable Energy Agency.

The Government will report annually on progress against outcomes of the National Electric Vehicle Strategy, including the rollout of charging infrastructure. The Government is also developing a proof-of-concept national mapping tool to support optimal investment in, and deployment of EV charging infrastructure across Australia

Recommendation 23

Work with the electric vehicle charging industry during the first National Electric Vehicle Strategy annual review to develop policies and if needed, regulation, to ensure that:

- public electric vehicle chargers report in real time whether chargers are available;
- there is a consistent approach to electric vehicle charging formats, including available plug types, payment systems and applications necessary to find and access chargers.

● Agree-in-principle

The Government is working with state and territory governments to create minimum operating standards for government supported Electric Vehicle (EV) charging infrastructure. These standards aim to ensure that Australia's EV charging network meets Australians' needs, including considerations relating to payment, data, customer service, availability and accessibility. The minimum operating standards are being developed with states and territories.

Recommendation 24

Consider immediate policy and regulatory options to reduce emissions in existing road vehicles such as by allowing and incentivising lower emissions fuel blends.

● Agree-in-principle

The Government is considering policy and regulatory options to reduce the emissions intensity of liquid fuels, including through the Net Zero plan and sectoral decarbonisation plans. As a first step to enable greater use of low carbon liquid fuels to reduce emissions the Government is investigating implementing new fuel standards for renewable diesel and B20 (5.1-20% biodiesel and 80% diesel).

Recommendation 25

Encourage uptake of lower emissions heavy vehicles by:

- undertaking a cost benefit analysis for a Fuel Efficiency Standard for heavy vehicles by the end of 2024, to adopt a standard to reduce emissions from heavy vehicles over time.
- reviewing regulatory barriers to zero emissions truck uptake and addressing these by the end of 2024.

● Disagree

The Government is not pursuing a Fuel Efficiency Standard for heavy vehicles. The Government is considering a range of measures to address barriers and incentives to enable the uptake of low emissions heavy vehicles (HV) within the Transport and Infrastructure Net Zero Roadmap and Action Plan. In the immediate term, the Government has already put in place Euro VI noxious emissions standards for HVs.

However, the Government does not consider that a HV fuel efficiency standard (FES) is likely to be the best approach. A HV FES would be more complex to implement than a FES for light vehicles, as there is currently no internationally accepted approach for measuring heavy vehicle fuel efficiency at a whole vehicle level (each market with HV FES has a different approach and to date only the manufacturers have expressed an interest in developing a harmonised approach in this area). A HV FES for Australia would need to take into account the range of vehicles supplied to Australia and our unique operating conditions. The Government is currently designing a FES for light vehicles, and it would be appropriate to consider the lessons learned from that process before considering the more complex HV FES.

Instead, the Government is developing a holistic approach for the transport sectors, as part of the Transport and Infrastructure Net Zero Roadmap and Action Plan. This will give consideration to the regulatory barriers to zero (and lower) emissions trucks and policies appropriate for our national circumstances.

Recommendation 26

Fund an extensive challenge-based program of research and early-stage commercialisation of agriculture emissions reduction technologies.

● Agree-in-principle

The Government recognises the importance of supporting the research, development and early-stage commercialisation of technologies to reduce emissions from agricultural industries. As an example of existing support, the Government's Methane Emissions Reduction in Livestock (MERiL) program provides \$29 million to support research, development and deployment of low emission livestock feed supplements and forage feeds. Stage 1 provided \$4 million to support research into the emission reduction and productivity benefits of feed supplements (such as Asparagopsis and 3-NOP) and forage feeds (such as Desmanthus). It has also supported the development of a livestock emission framework for feed technologies to estimate emission reductions from the use of feed supplements. Stages 2 and 3 of MERiL will provide \$20 million over five years to support the development of technologies to deliver low emissions feed supplements to grazing animals.

Further work is required to inform the implementation approach to achieve this outcome, including through the development of the Net Zero Agriculture and Land sectoral decarbonisation plan.

Recommendation 27

Develop a program to support farmers to measure, reduce and disclose their emissions in line with an established government standard, provide advice on actions farmers can take to reduce emissions, and help them to implement high priority actions.

● Agree-in-principle

Existing and emerging programs, such as the Australian Carbon Credit Units (ACCU) Scheme and the Carbon Farming Outreach Program, provide support to participants to measure, reduce and disclose their emissions. The ACCU Scheme allows farmers and land managers to earn ACCUs by undertaking projects that demonstrably reduce carbon emissions or sequester carbon.

The Carbon Farming Outreach Program provides \$20.3 million over four years to 2025-26 to help Australian farmers and land managers, including First Nations peoples, to make informed decisions about participation in carbon markets and adoption of low emissions technologies and practices. The program includes \$17.5 million in grants to engage independent and trusted advisers to provide training and support to farmers and land managers across Australia; and a training package on carbon farming which is currently under development by the University of Melbourne.

The Government will explore whether additional support is required as part of the development of the Agriculture and Land sectoral decarbonisation plan.

Recommendation 28

Explore the potential for time-limited incentives to support broad uptake of fertilisers with nitrification inhibitors.

● Agree-in-principle

The Government will explore options to reduce fertiliser use emissions as part of the development of the Net Zero Agriculture and Land sectoral decarbonisation plan, including through intersections with the Industry Sectoral decarbonisation plan.

Recommendation 29

Enhance the delivery of impartial, practical guidance and support to landholders to enable them to make informed decisions on sequestering carbon on their farm to best suit their business, including retaining carbon for their own business, supplying the ACCU scheme offsets market, or establishing farm forestry and agroforestry.

● Agree

Through the Carbon Farming Outreach Program, the Government is funding independent and trusted advisers to deliver training and tailored advice to farmers and land managers on participating in carbon markets and integrating low-emissions technologies and practices (including carbon sequestration) in their operations.

Recommendation 30

Work with state and territory governments to update the national waste policy action plan to specify achievable actions to increase the avoidance, recovery and recycling of organic waste across its lifecycle to reduce organic waste going to landfill. These actions should clearly address the barriers limiting the diversion of organic waste from landfill, including government operated landfill sites.

● Agree-in-principle

The Government is funding states and territories to deliver new and improved organic recycling facilities across Australia, helping to divert food organic and garden organic waste from landfill. The Government is also funding Fight Food Waste Limited to develop and implement food waste reduction initiatives across the food supply chain.

The Government is working with states and territories, industry and non-government organisations to strengthen the National Waste Policy Action Plan to make better progress towards the plan's 2030 targets. An update of the plan is scheduled to be completed in 2024.

Recommendation 31

Work with states and territories to require landfill gas capture at all landfill sites where there is sufficient gas flow. Where gas flow is not sufficient, regulation should require other treatment of landfill gas to oxidise methane, such as biocovers.

● Agree-in-principle

Landfill gas methane management projects are currently incentivised under the ACCU Scheme. The Government has agreed-in-principle to implement recommendation 10 of the Independent Review of ACCUs, which stated that baselines for crediting landfill gas methane management projects be reviewed and revised to incorporate upward sloping baselines.

The Government will explore further options to reduce emissions from landfills in developing the Industry sectoral decarbonisation plan. This will build on the ACCU Scheme reforms, and take account of relevant cost implications.

Recommendation 32

Develop and publish a National Carbon Market Strategy.

● Agree-in-principle

The Government will consider the role of carbon markets in the development of the Net Zero Plan.

The Plan will articulate Australia's vision for ensuring robust and high-integrity carbon markets, and will set out the role of offsets in a net zero economy. It will outline how the Government intends to engage in carbon markets to meet its emissions reduction targets, and the Government's role in supporting high integrity carbon markets. The development of the Plan will also be informed by the Government's work to implement the recommendations from the Independent Review of ACCUs.

Recommendation 33

Develop a sophisticated modelling capability to analyse and forecast sequestration, for example through a partnership between the government, industry, and academia.

● Noted

Multiple modelling capabilities exist or are being developed across government (including Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), Treasury and the Department of Climate Change, Energy, the Environment and Water) and other sectors, and there are existing channels for cooperation.

Recommendation 34

Incentivise the development of long-lived and engineered forms of sequestration by supporting research and development and as technologies develop, through carbon markets or other financial instruments.

● Agree

Long-lived sequestration is being incentivised through the Safeguard Mechanism. Engineered forms of sequestration may be further incentivised by establishing the legislative and permitting framework for the transboundary movement of CO₂ for offshore storage under the seabed. Additionally, the Carbon Capture Technologies program and International Carbon Capture, Use and Storage (CCUS) Research Partnerships Program will support research and development of new technologies.

Recommendation 35

Take a leading role to reduce the domestic and international regulatory barriers preventing the uptake of engineered sequestration and carbon dioxide removal technologies methods.

● Agree-in-principle

Australia has an existing legislative framework for offshore carbon capture and storage.

The Government has committed to a review of the environmental management regime for the offshore petroleum and greenhouse gas storage activities under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA) to ensure it is fit-for purpose for a decarbonising economy. Australia is also taking steps to ratify the 2009 amendment to Article 6 of the London Protocol. This would enable the export and import of CO₂ for sub-seabed sequestration.

The Department of Climate Change, Energy, the Environment and Water is working with key trading partners on understanding the legal, policy and regulatory matters that need to be addressed for the cross-border movement of carbon dioxide for offshore storage, and to inform the requirements for developing bilateral instruments.

The Department is working with international counterparts to identify technical solutions to reporting the emissions impact of Direct Air Carbon Capture and Storage in national greenhouse gas inventories within the existing Paris Agreement reporting framework.

Recommendation 36

Extend the Small-scale Renewable Energy Scheme post-2030 to ensure continued support for electrification and expand the scheme to include household batteries and private electric vehicle chargers.

● Noted

The Government recognises there will be a further major role for distributed and consumer energy resources, including rooftop PV, orchestrated distributed storage and electric vehicle supply equipment (EVSE), in achieving 2030 renewables and emissions targets.

The Government has sent strong policy signals through the Small-scale Renewable Energy Scheme (SRES) to provide incentives for uptake of rooftop PV, which in turn encourages electrification of households and small businesses, with this support to continue to 2030. The Government is well-progressed in the roll-out of 400 community batteries under the Community Batteries for Household Solar program, and has announced joint solar energy sharing programs with the ACT and Victoria for apartment dwellers, including renters and low-income households, through the Community Solar Banks program. As noted above, the Government is also strongly supporting the continued roll-out of EV Supply Equipment through the National Electric Vehicle Strategy, under which the Government has doubled the Commonwealth's investment in electric vehicle and hydrogen refuelling infrastructure.

Recommendation 37

Establish methods to track the numbers, locations and speed of private electric vehicle charger installations, to inform metrics on the successful roll-out of charging infrastructure. The government should publish these figures each year, and ensure the data is available to AEMO for grid management purposes.

● Agree

Commonwealth, state and territory Energy Ministers have agreed to workplans to support EV grid integration, including tasking the Australian Energy Market Operator (AEMO) to establish a common mechanism for sharing data on EV Supply Equipment (EVSE). AEMO proposes to achieve this by requiring that networks report EVSE standing data on its Distributed Energy Resources Register.

Recommendation 38

Implement policies to increase the accessibility of electrification options. This includes, for example, through provision of zero interest financing to reduce up-front costs and provision of funding for public and Indigenous housing to convert to all-electric.

● Agree-in-principle

The Government aims to empower Australians with choices to make energy performance upgrades that reduce their costs, including measures that support energy efficiency, rooftop solar, and switching to electric appliances where they want to. The Government has policies in place to increase the accessibility of energy performance upgrades, including electrification. This includes the \$1.7 billion Energy Savings Package, announced through the 2023-24 Budget, to help households, local councils, and businesses to access energy upgrades, including electrification. The package includes \$1 billion to the Clean Energy Finance Corporation to provide low-cost finance for home upgrades that save energy; \$300 million to support upgrades to social housing, co-funded and designed in partnership with the states and territories; and \$100 million to support local governments to improve energy performance of local government facilities. Low-cost financing is also being offered by the private sector to enable Australians to make the switch to electrification.

Recommendation 39

Work with state and territory governments to agree on a coordinated, nationally consistent approach to phasing out new gas connections for residential and small commercial buildings and phase-out for existing gas connections.

● Disagree

Domestic use of gas differs considerably between states and territories and decisions on planning and gas connections are a matter for state and territory government. The Government does not support a national ban on gas connections to new homes. The Government aims to empower Australians with choices, as outlined in the response to Recommendation 38. Commonwealth, state and territory governments will continue to work cooperatively through the National Energy Transformation Partnership on reforms to help transform Australia's energy sector to net zero, while ensuring energy remains reliable, secure and affordable.

Recommendation 40

Identify and remove barriers to installing private vehicle chargers and vehicle-to-grid capability, while ensuring building codes adequately mitigate safety risks.

● Agree-in-principle

As part of the National Electric Vehicle Strategy, the Government will undertake research to develop tools and guidance to enable EV uptake for residents of existing multi-residential buildings.

The study will deliver publicly accessible guidance and assessment tools to help governments, building owners, owners' corporations and occupants understand EV charging energy demand and management, safety requirements, costs, and optimal and rational charging solutions based on relevant factors such as building age, location, size and availability of physical and technical infrastructure. Once this study is completed, the Government will consider whether further measures might be required.

The Government is also progressing actions that will set the foundations for a future where the value of EVs is maximised for consumers and industry, including national minimum standards for interoperability, removing regulatory barriers to help network providers support bi-directional charging in their networks, and trials to demonstrate technical feasibility. The Government has also established an inter-jurisdictional Consumer Energy Resources Working Group, which has a specific focus on EV grid integration and vehicle-to-grid capability. These actions are important steps towards removing barriers to installing private vehicle chargers and enabling vehicle-to-grid capability.

Recommendation 41

Include a Research, Development & Demonstration (RD&D) Strategy as a key feature of Australia’s Net Zero Plan. The strategy should consider the need for dependable framework conditions that promote innovation, safeguards competitiveness, and amplifies co-operation between government and private sector, as well as tracking progress towards goals.

● Agree-in-principle

The Net Zero Plan, and supporting sectoral decarbonisation plans, will highlight the crucial role Australia’s scientific institutions and national research and development infrastructure will play in driving the transition of Australia’s economy to net zero emissions. They will also consider the role a healthy innovation ecosystem will play in developing and accelerating adoption of the key technologies and practices needed to reduce emissions across all sectors.

Recommendation 42

As part of development of the Net Zero Plan, develop a set of agreements with the state and territory governments for coordination and cooperation on climate change mitigation, adaptation and resilience, and Australia’s transition to a net zero economy.

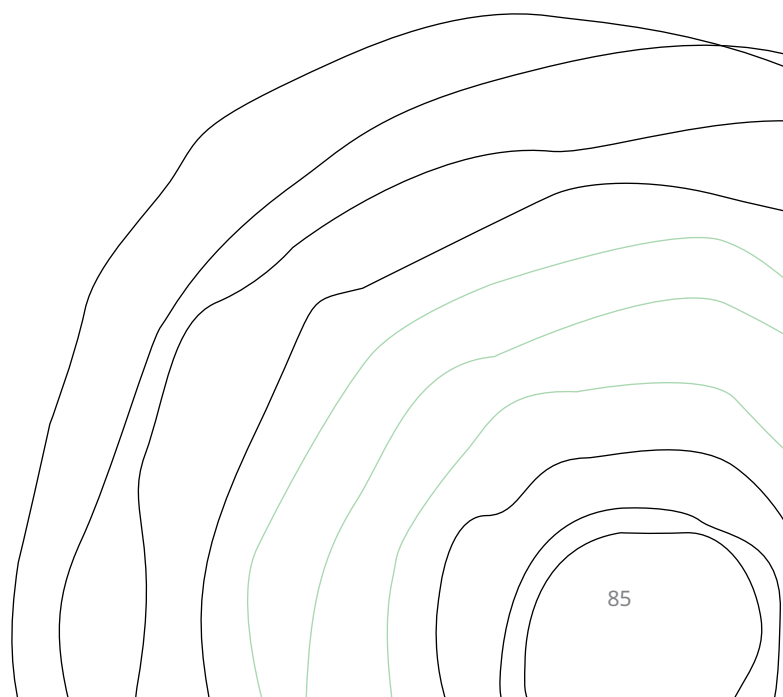
● Noted

The Commonwealth is working with state and territory governments through the Energy and Climate Change Ministerial Council to ensure our coordinated plan to transition Australia to a net zero economy is robust, ambitious, achievable and accepted.

All jurisdictions have net zero goals of 2050 or earlier and have been taking significant action to reduce their emissions in line with these goals. To support these goals, the Government will engage with states and territory governments during the development of the Net Zero Plan.

Energy and Climate Ministers have agreed to take nationally coordinated action to reduce emissions, with a strong focus on ensuring all Australians will benefit from the opportunities of a decarbonised economy. Ministers agreed to support the development of the national 2050 Net Zero Plan to guide investment and regulatory change to deliver economic growth and opportunity in a decarbonising global economy. They recognised calls from industry for sector-specific guidance as part of the plan, to provide certainty over emissions reduction pathways to 2050.

The Commonwealth will continue to engage with state and territory through the Energy and Climate Change Ministerial Council and other ministerial councils or equivalent forums to coordination and alignment between jurisdictions.





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