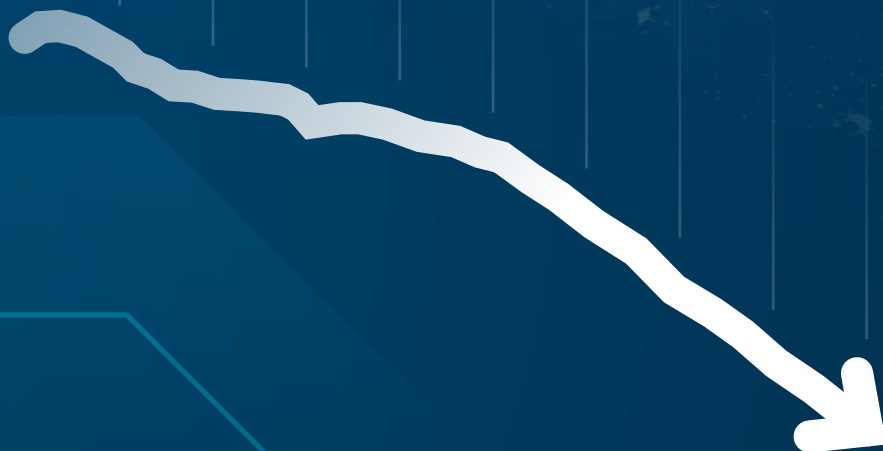




Australian Government

# **The Plan to Deliver Net Zero** *The Australian Way*

2005



2050

# The Australian Way

Australia is setting a target to deliver net zero emissions by 2050. Our plan will take responsible, practical action that is in our national interest.

The global economy has been powered by fossil fuels since the beginning of the industrial revolution. As countries accelerate action on climate change, changes in global demand for our energy exports will present challenges for Australia.

Our Long-Term Emissions Reduction Plan sets Australia on a credible pathway to net zero emissions by 2050, while preserving our existing industry strengths, establishing Australia as a leader in low emissions technologies and positioning our regions to prosper.

Our plan takes a technology-driven approach that is based on current successful policies – not higher taxes.

We will not put industries, regions or jobs at risk. We will take advantage of new economic opportunities while continuing to supply our traditional export markets.

Regional Australia is central to our plan. We will harness existing strengths, unlock new areas of industry growth and diversify economic activity in the regions.

Our plan will create the enabling environment for investment in Australia. It will not shut down coal or gas production, or require displacement of productive agricultural land.

The plan is aligned fully with steps the Australian Government is already taking to secure the nation's future energy needs and supplies of fuel, gas and electricity.

Australia will continue to reduce emissions while keeping our economy growing, maintaining affordable, reliable energy and ensuring our regions remain strong. That's the Australian way.

**Over 1 in 4 Australian homes** have solar panels; the world's highest uptake.



In 2020, Australia deployed renewables at **eight times** the global per capita average.



**\$35 billion** investment in renewable energy since 2017.



**90% of commercial solar cells** globally use Australian technology.



# Our Record

Australia's story so far is one of quiet achievement.

We have reduced emissions faster than many comparable advanced economies, surpassing the United States, New Zealand and Japan.

We beat our 2020 target, and our emissions are currently more than 20 per cent below 2005 levels. Australia's agricultural sector has done the heavy lifting in achieving this.

Latest projections show that under our Technology Investment Roadmap, Australia will beat our 2030 target too.

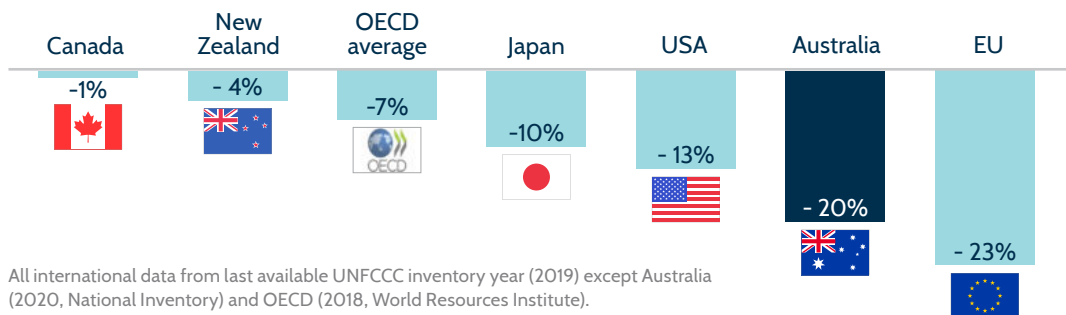
Australia is on track to reduce emissions by up to 35 per cent by 2030, well above our target of 26-28 per cent.

Our plan will maintain this momentum.

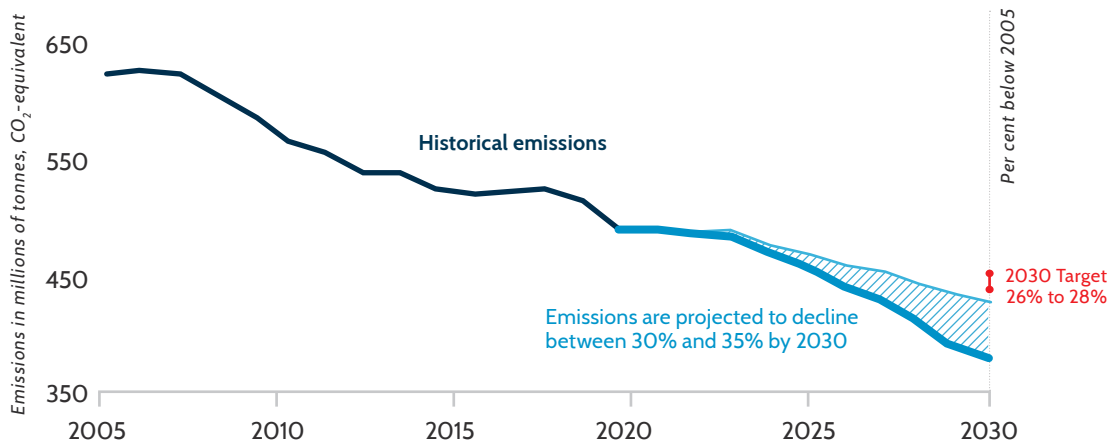
It will drive steady progress over the next 30 years to deliver net zero emissions by 2050.

Since 2005, emissions are more than 20 per cent down and the economy is more than 45 per cent larger.

## We have reduced emissions faster than many comparable economies



## We are on track to beat our 2030 target



# Global Momentum to Tackle Climate Change is Building

As the world moves to combat climate change, our economy will face unique challenges and opportunities.

Big decisions taken by countries, investors, companies, communities and consumers across the world to decarbonise will have important implications for Australia.

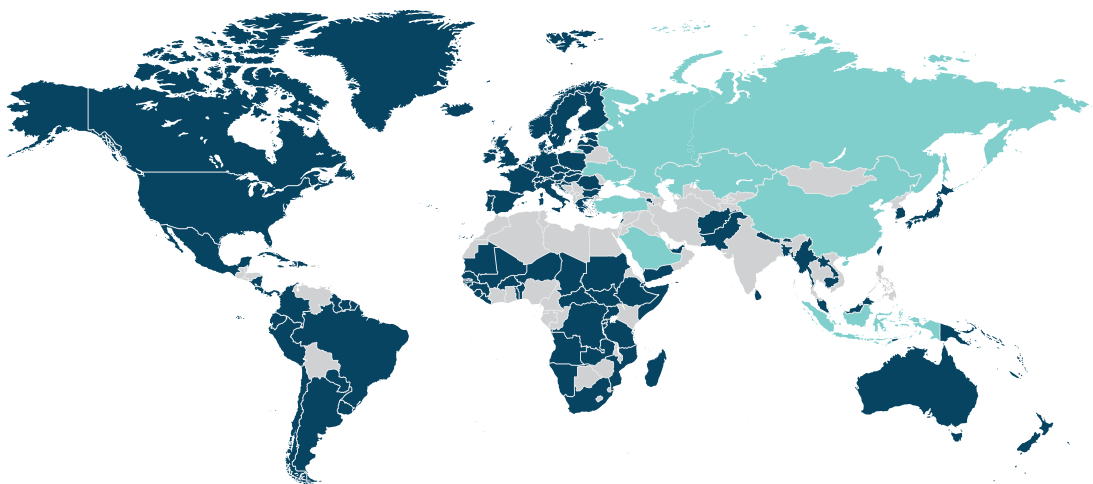
A critical driver for these decisions is the 2015 Paris Agreement on climate change, which aims to stabilise greenhouse gas levels and keep the increase in average global temperature to below 2 degrees celsius, preferably to 1.5 degrees celsius.

Over coming decades, we can expect our major trading partners to transform their energy

systems and steadily shift demand away from our carbon-intensive exports.

These shifts will occur with or without an Australian net zero target. Our plan manages these impacts and creates the environment for regional communities to grow based on opportunities in the new energy economy, including in traditional industries like mining and agriculture.

This will benefit our regions, our economy and jobs, while also helping other countries reduce their emissions faster.



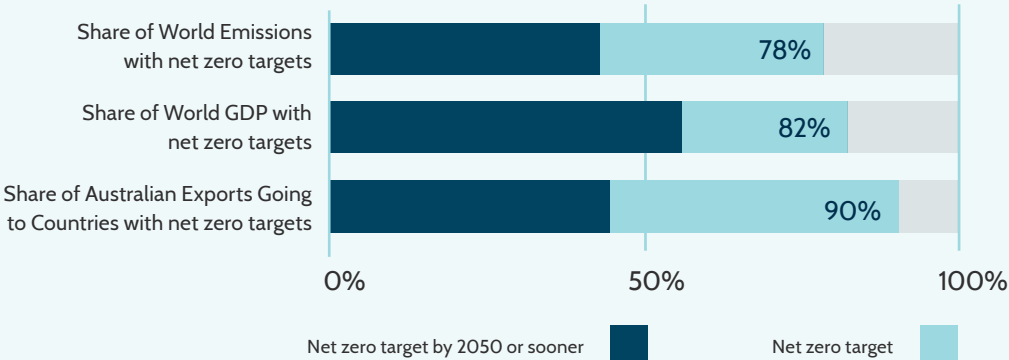
Net zero target by 2050 or sooner

Net zero target

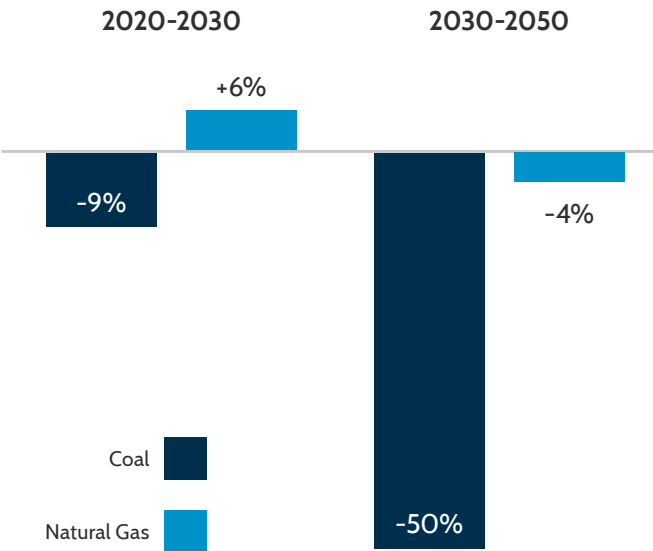
Yet to set target for net zero

# Global net zero targets

133 of the 142 countries with net zero targets are aiming for 2050 or sooner.



# Global fossil fuel demand will change from now to 2050



## What is net zero?

Under the Paris Agreement, signatories (including Australia) are aiming to limit emissions to net zero globally in the second half of the century.

Net zero does not mean we eliminate emissions completely. Rather, we should aim to offset residual emissions through, for example, planting trees or storing carbon underground or in soils. The more emissions are reduced, the fewer offsets we need.

Source: International Energy Agency World Energy Outlook 2021  
Announced Policies Scenario

# Our Plan for Net Zero by 2050

Our technology-driven plan sets out a credible pathway to net zero by 2050, while preserving our existing industries, establishing Australia as a leader in emerging low emissions technologies and positioning our regions to prosper.

**The five principles that guide our plan will ensure Australia's shift to a net zero economy will not put industries, regions or jobs at risk.**

## Our principles

1. Technology not taxes
2. Expand choices, not mandates
3. Drive down the cost of a range of new technologies
4. Keep energy prices down with affordable and reliable power
5. Be accountable for progress

Australia's Long-Term Emissions Reduction Plan is geared to our unique economy.

It shows how Australia will achieve 85 per cent of the emissions reduction necessary to achieve net zero by 2050. It recognises the high cost today of securing the last 15 per cent of abatement and the role future technology breakthroughs will play in closing that gap.

The focus is on driving down technology costs and accelerating their deployment at scale across the economy.

Over the next decade, our \$20 billion investment in low emissions technology is expected to unlock a total of \$80 billion of private and public investment, including in clean hydrogen, ultra low-cost solar, carbon capture and storage, and energy storage.

The plan includes five-yearly reviews that will enable us to evaluate progress, and adapt to technology advancements.



## Implementing our plan

The Australian Government's Plan is a whole-of-economy plan to achieve net zero emissions by 2050, based on coordinated actions across four areas.



### Driving down technology costs

- Unlocking growth of priority technologies by **driving down costs**:
  - **Clean hydrogen**
  - **Ultra low-cost solar**
  - **Energy storage**
  - **Low emissions steel and aluminium**
  - **Carbon capture and storage**
  - **Soil carbon**
- **Emerging technologies**, such as livestock feed to reduce methane emissions



### Enabling deployment at scale

- **Incentivising businesses** to adopt low emissions technologies
- Building **voluntary carbon markets**
- Helping consumers with **information, knowledge sharing and certification**
- **Building infrastructure** such as Snowy 2.0, EV charging networks and expanded electricity transmission networks
- Planning to **ensure the right infrastructure is in place** as sectors decarbonise
- **Aligning efforts with the states and territories** through bilateral agreements, energy market reform and energy efficiency



### Seizing opportunities in new and traditional markets

- **Expanding markets for minerals and metals** needed in low emissions economies, such as **copper, nickel and lithium**
- Building a **clean hydrogen export industry**
- **Exporting lower emissions fuels**, including LNG and uranium
- Realising opportunities for **low emissions manufacturing and clean energy equipment and services**
- **Growing our agricultural sector** and continuing to **invest in our regional communities**
- Building our workforce by **investing in skills and training**



### Fostering global collaboration

- **Partnering internationally** to accelerate innovation and drive investment
- Engaging through **multilateral technology initiatives**
- Establishing a high integrity **Indo-Pacific Carbon Offset Scheme**



# How Our Plan Will Achieve Net Zero

The Government's technology based approach provides Australia with a pathway to net zero that protects our economy.

- **Continuing our strong record** — Emissions are more than 20 per cent lower than 2005 levels.
- **The Government's Technology Investment Roadmap** — Reaching our technology targets will reduce emissions by a further 40 per cent.
- **Global technology trends** — Shifts in demand for our exports and developments in global technologies will reduce emissions by a further 15 per cent.
- **High-integrity offsets** — Storing carbon in soils and vegetation, and working with our Indo-Pacific neighbours will reduce emissions by a further 10 per cent.
- **Future technology breakthroughs** — investing in future new and emerging technologies to reduce emissions by a further 15 per cent.



**Clean hydrogen**  
under \$2 per kilogram



**Ultra low-cost solar**  
under \$15 per MWh



**Energy storage**  
under \$100 per MWh



**Low emissions steel and aluminium** steel production  
under \$700 per tonne  
and aluminium under  
\$2200 per tonne



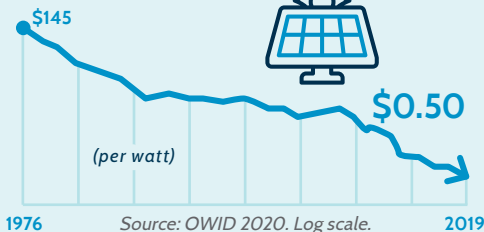
**Carbon capture and storage**  
under \$20 per tonne of CO<sub>2</sub>



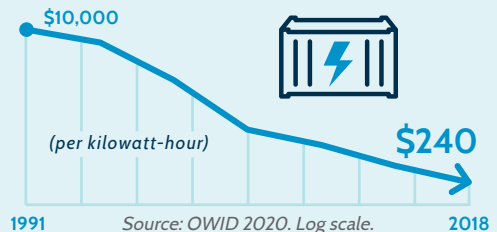
**Soil carbon measurement**  
under \$3 per hectare per year

## As new technology gets better and cheaper, it drives rapid uptake

### Solar Panel

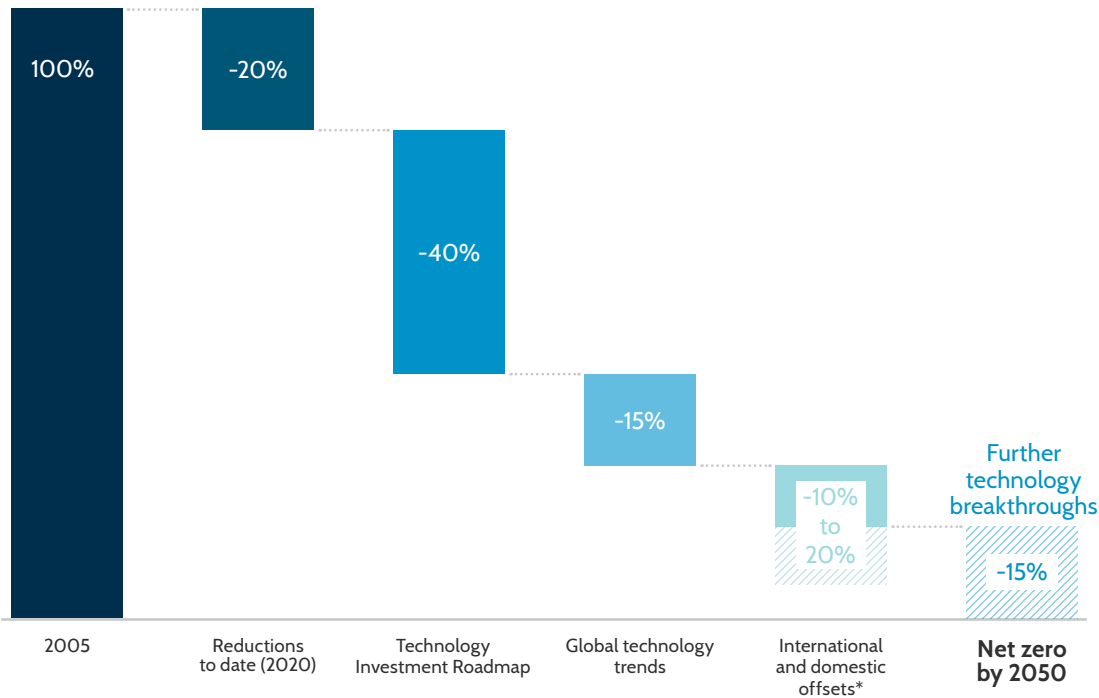


### Lithium-ion Batteries





# How we will reach net zero by 2050



Source: Based on McKinsey and DISER analysis.

\*Sources of offsets include voluntary soil carbon of up to 20 per cent, depending on cost reductions in technology and voluntary demand.



# The Best Plan for Australia

Our plan will ensure Australia is well placed to take advantage of new economic opportunities in a way that builds on our existing strengths.

Decisions by other countries will affect the demand for many of our traditional exports.

Our choice is clear: failing to act would increase the risk Australian businesses will face higher investment costs over the coming decades, while a credible plan to achieve net zero emissions by 2050 can build on our existing industries and capitalise on the new energy economy.

Our plan is expected to increase our national income per person by almost \$2,000 in 2050, compared with no policy action.

It is estimated to create more than 100,000 new direct regional jobs by 2050, including in critical minerals, clean hydrogen, green steel and alumina. Our plan is also expected to put downward pressure on electricity generation costs, helping to grow energy-intensive industrial jobs, while delivering more affordable household electricity bills.

Our plan to reach net zero by 2050 will also strengthen our influence in priority areas of international engagement.



Each Australian will be almost  
**\$2,000 better  
off by 2050**  
compared with no  
policy action.



Our plan is estimated to  
deliver **more than  
100,000  
new jobs**  
for Australians by 2050.



Household **electricity bills will  
be lower than today**, and lower  
energy costs will secure and grow  
energy-intensive industrial jobs  
across Australia.



The real value of Australia's exports is  
**expected to more  
than triple** between  
2020 and 2050.



Source: Based on McKinsey and DISER analysis.





# The Best Plan for Industry

Achieving net zero emissions by 2050 will involve all industries adopting cost-effective technologies at scale.



## Agriculture

Agriculture has long been at the forefront of Australia's efforts to reduce emissions.

Australia can reach net zero emissions by 2050 without imposing restrictions on our farmers or converting productive agricultural land to carbon forests. In fact, our farmers stand to benefit from voluntary delivery of carbon sequestration and biodiversity while continuing to supply 'clean, green and safe' agricultural products to the world.

We will continue investing in emerging technologies that will boost farm productivity and output while reducing emissions. These include new feed supplements to reduce livestock emissions and improved land management to increase soil carbon.



## Electricity

Electricity sector emissions are projected to fall by 90 per cent from 2005 levels under our plan, largely enabled by the falling price of energy storage to maintain affordable and reliable power. This will reduce emissions across all sectors of the economy, and especially the transport sector.
















## Resources and Heavy Industry

Australia is uniquely blessed with natural resources for both the traditional energy and new energy economies. While emissions-intensive exports like coal and gas will face global headwinds in the long term, there will be demand for these exports for many years to come. This gives Australia time to future-proof our economy and workforce, including establishing new industries like clean hydrogen production.

Output from heavy industry is predicted to more than double by 2050 under our plan. Electrification and energy efficiency will allow the mining and energy sector to significantly and rapidly reduce emissions. Smelters and refineries are already moving to power their plants with renewables, and resources companies are exploring alternatives to diesel fuel, including electric or hydrogen-powered vehicles.

# How the Technology Investment Roadmap will grow our industries and reduce emissions

 Industry, mining and manufacturing	 Hydrogen will create new industries and help existing industries to make cleaner products.	 Low emissions steel, aluminium and cement are new opportunities for Australian manufacturing.	 Carbon capture and storage will mean clean Australian resources can keep meeting global demand for decades to come.
 Electricity	 Ultra low-cost solar will provide the cheapest electricity in history.	 Energy storage will keep our grid reliable and secure.	
 Agriculture	 Soil carbon will give farmers a new source of income while making their land more productive.	 Feed supplements will improve productivity and let the Australian livestock industry provide low emissions meat to the world.	
 Transport	 Energy storage through low-cost batteries will make electric vehicles cheaper than conventional cars.	 Hydrogen and its derivatives could become the clean fuel of choice for aviation and shipping.	



# The Best Plan for the Regions

Australia's regions have always powered the growth and prosperity of the nation, providing energy, resources, food and fibre to the world.

Our plan has the wellbeing and prosperity of regional communities at its core.

It is important to recognise two things. Firstly, that the impacts of global action on climate change will unfold gradually over time. And secondly, that for most regions, factors other than decarbonisation will define their future prosperity (demographic changes, internal migration, tourism, rising agricultural productivity and emerging industries supplying future export markets).

That gives us the opportunity to act now to harness existing regional strengths, unlock new areas of growth and diversify economic activity in regions impacted by changes in global demand for our energy exports.

Under our plan, we will continue to back our regions with record investments in transport and digital infrastructure, by growing Australian agriculture, resources and manufacturing, expanding trade opportunities for regional exporters, providing for the health and education needs of regional Australians and preparing for the implications of climate change, including through future drought funding, greater disaster resilience and affordable insurance for Northern Australia.

In partnership with local communities and businesses, the Australian Government will secure a strong future for regional Australia as part of our plan for net zero emissions by 2050.





Western Australia is estimated to see around 34,000 new jobs in mining and heavy industry by 2050, with the Pilbara ideal for hydrogen production and export. Resources companies are adapting their operations with the take up of renewables and new technologies like hydrogen trucks, further lowering emissions.



Queensland is estimated to see more than 12,000 new mining and heavy industry jobs linked to growing export markets. Gladstone can capitalise on hydrogen, renewables, and low emissions materials opportunities. Townsville is set to host the world's first green zinc facility.

The Hunter Valley's skilled workforce and energy infrastructure position it to capitalise on opportunities in hydrogen and clean manufacturing, like green steel making.



Our \$464 million Clean Hydrogen Industrial Hubs are part of our more than \$1.2 billion committed to building a Australian hydrogen industry, with seven priority locations: Bell Bay, the Pilbara, Gladstone, Latrobe Valley, Eyre Peninsula, the Hunter, and Darwin. Clean hydrogen exports could support 16,000 jobs in Australia by 2050, plus an additional 13,000 from the construction of related renewable energy infrastructure. Australian hydrogen production for export and domestic use could be worth more than \$50 billion in 2050.



## Supporting our Regions



\$464 million for **Clean Hydrogen Industrial Hubs**, which will co-locate hydrogen production and industrial users to create jobs and capitalise on new export opportunities. In total, we have committed over \$1.2 billion to developing our hydrogen industry.



**\$2 billion loan facility for Australian critical minerals projects**, with over \$200 million of additional support through the Modern Manufacturing Initiative, Clean Energy Finance Corporation and the Northern Australia Infrastructure Facility.



More than \$300 million for **Carbon Capture, Use and Storage**, including through hubs to help fund development of shared infrastructure between co-located CO<sub>2</sub> emitters.



Around \$1 billion co-investment in the **Recycling Modernisation Fund**, waste export ban, and more to create 10,000 jobs and divert 10 million tonnes of waste from landfill by 2030, with 23 of the 78 committed RMF projects in regional and remote Australia.



Around \$550 million under the **Modern Manufacturing Strategy** supporting the establishment and growth of modern manufacturing in our regions.



\$3.5 billion to fund water infrastructure through our **National Water Grid Fund**.



Nearly \$1.4 billion through our **Building Better Regions Fund** for regional and remote community infrastructure projects and events.



\$1.9 billion for the **Great Barrier Reef 2050 Long-Term Sustainability Plan** to support a healthy reef and tourism jobs.



Supporting the agriculture sector's ambitious **Ag2030** goal to lift agriculture, fisheries and forestry to a \$100 billion industry by 2030, with \$866.8 million announced in the 2021-22 Budget on top of substantial ongoing measures.



\$5 billion **Future Drought Fund** to ensure the resilience of our farmers and regional communities in the face of future droughts.



A record \$6.4 billion commitment to skills and training in 2021-22, including the **JobTrainer Fund** and the **Boosting Apprentices Commencements wage subsidy**, and **10 Industry Training Hubs** committed in regions across Australia to improve opportunities for young people in areas of high youth unemployment.



Our **Job-ready Graduates package** has created more university places for Australian students, including more support for regional students and universities.

# The Plan to Deliver Net Zero The Australian Way

## What it is:

It is a uniquely Australian plan, because compared to other countries, we have different challenges and opportunities.

It is an energy, trade and economic plan, not just an environmental one.

It is about delivering real results through technology, not taxes.

It is focused on Australia's national interest and securing our strengths by determining our own destiny.

It keeps our traditional advantages in the regions while supporting the growth of new industries.

It guarantees we keep downward pressure on energy prices and locks in reliable power.

## What it's not:

It is not a plan at any cost.

It will not shut down coal or gas production or exports.

It will not impact households, businesses or the broader economy with new costs or taxes.

It will not cost jobs – not in farming, mining or gas.

It will not increase energy bills.

It is not a revolution but a careful evolution to take advantage of changes in our markets.

It is not set and forget and has an 'insurance policy' review mechanism to make sure it keeps delivering for regional Australia.



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## The Plan to Deliver Net Zero: The Australian Way

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*In reaching the conclusions outlined in this document, the Australian Government has also drawn on other analyses published by internal and external expert bodies, both in Australia and globally.*

*All dollar figures are approximately \$AUD 2020, adjusted for inflation.*







Australian Government

2021