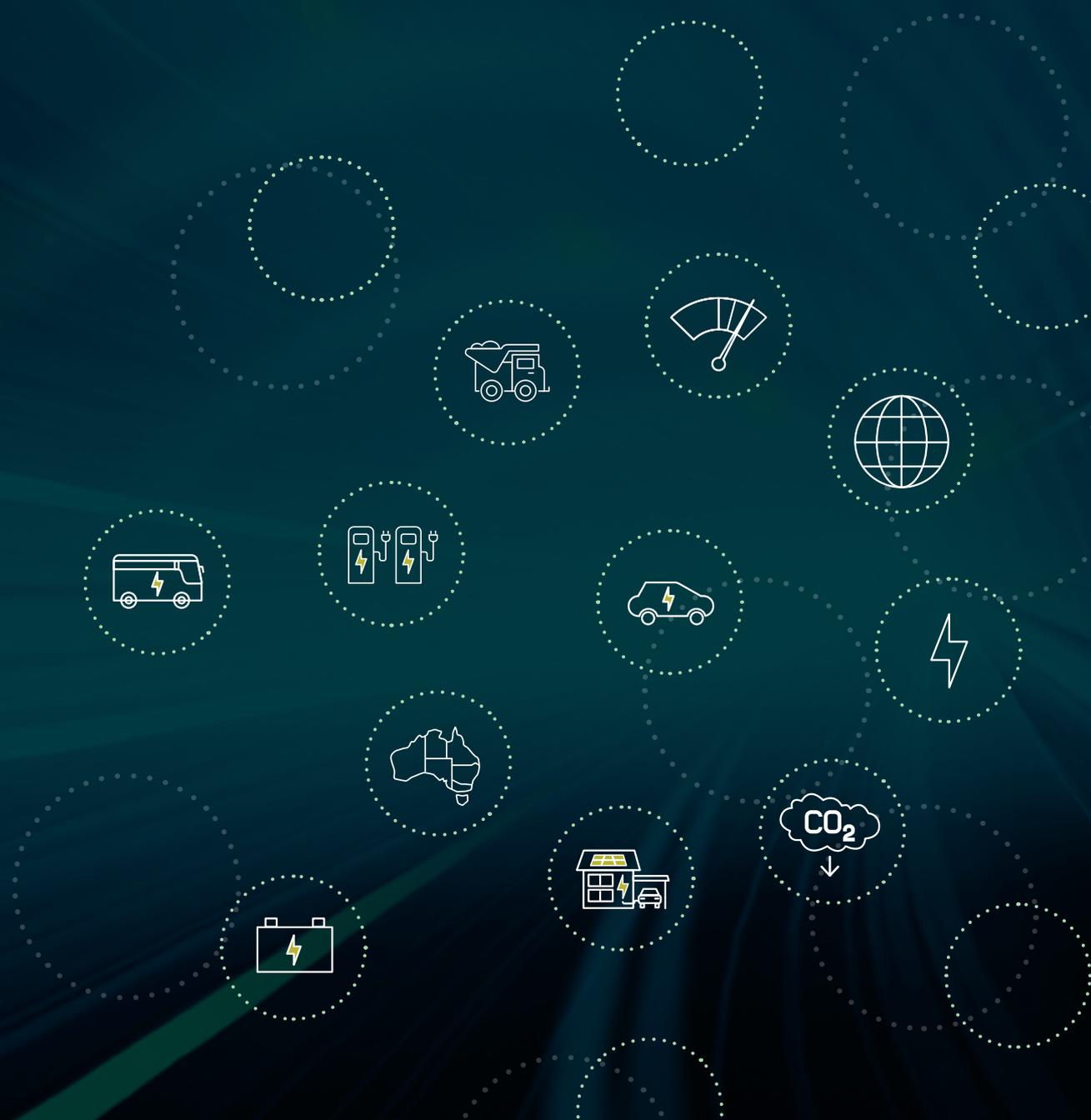




Australian Government

National Electric Vehicle Strategy

Increasing the uptake of EVs to reduce our emissions and improve the wellbeing of Australians



© Commonwealth of Australia 2023

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a Creative Commons Attribution 4.0 International Licence except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@dcceew.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: DCCEEW 2023, *The National Electric Vehicle Strategy*, Department of Climate Change, Energy, the Environment and Water, Canberra, . CC BY 4.0.

This publication is available at dcceew.gov.au/publications.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090 Canberra ACT 2601
Telephone 1800 900 090
Web dcceew.gov.au

Disclaimer

The Australian Government acting through the Department of Climate Change, Energy, the Environment and Water has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Climate Change, Energy, the Environment and Water, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Acknowledgement of Country

In delivering Australia's first National Electric Vehicle Strategy, 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 this ancient connection 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.

Aboriginal and Torres Strait Islander 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 decision-making, especially in our current climate and environmental crisis.

Australia recognises and pays its respects to Aboriginal and Torres Strait Islanders as the Traditional Owners of Australia. We thank our First Nations people for their continuing custodianship of the lands, waters, skies and communities that we live and work within today.

Contents

1. MINISTERS' FOREWORD	IV
2. SUMMARY	1
3. INTRODUCTION	7
WHY DRIVE AN ELECTRIC VEHICLE?	10
4. WHAT WE HEARD FROM CONSULTATIONS	16
5. A FRAMEWORK FOR NATIONAL ACTION	18
6. DELIVERING FOR AUSTRALIA	20
SUPPLY	21
INFRASTRUCTURE AND SYSTEMS	26
DEMAND	30
7. SUPPORTING THE EV TRANSITION	33
8. MEASURING SUCCESS	35
APPENDICES	37
A. APPENDIX A. ABBREVIATIONS, ACRONYMS AND GLOSSARY	37
B. APPENDIX B. DETAILED STATE AND TERRITORY ACTIONS	38



electric

Ministers' foreword



We are pleased to present Australia's first ever National Electric Vehicle Strategy.

Australian consumers have spoken – they want access to electric vehicles (EVs). But this appetite to get more EVs on the road has been constrained by supply – and by a lack of national policy to encourage suppliers to send more vehicles to Australia.

This Strategy marks a turning point: a national, agreed framework to get more EVs on the road, and give Australians access to the benefits which come with them – cheaper to run and better for the climate.

This is a significant milestone on Australia's pathway to net zero.

With transport on track to be Australia's largest emitting sector by the end of the decade, this Strategy is an important step in achieving our emissions reduction goals. It sends a clear message to the boardrooms of vehicle suppliers around the world: Australia wants your EVs.

With demand surging and new EV models selling out in minutes, consumers are voting with their feet and our market is ready to respond – if we have policy settings that enable greater supply of affordable EVs.

At the centre of the Strategy is our new commitment to introduce Australia's first vehicle Fuel Efficiency Standard, to make us competitive with other parts of the world for EV supply. Car companies, motoring clubs, climate groups, businesses, unions and the community have made this call loud and clear.



Introducing a Fuel Efficiency Standard will encourage car manufacturers to supply more EVs to Australia, improving consumer choice and making it easier and cheaper to access popular EV models. It will also help make, over time, all vehicles on the road more efficient, with new petrol and diesel cars likely to use less fuel, saving Australians money.

Australia has been next to Russia as one of the only advanced economies without a Fuel Efficiency Standard – it's time we took that step. Because if we don't act, Australians will continue to miss out and pay more at the bowser. On average, new cars in Australia use 40% more fuel than the European Union, 20% more than the United States, and 15% more than New Zealand.

The Strategy will also support the integration of EVs into work and homes – including initiatives to support battery recycling, infrastructure planning, apartment building design and rolling out world-leading training for emergency services workers. The framework guides governments who will continue to work together to provide the systems and infrastructure needed to support this early-stage transition. Critically, this transition will bring new skills and employment opportunities for Australians, including green jobs in manufacturing and other sectors that support the energy transformation.

This Strategy builds on the progress we've already made in supporting EV uptake. The Electric Car Discount legislation is already making EVs cheaper and the Driving the Nation Fund is supporting transformational infrastructure including Australia's first National Electric Vehicle Charging Network, to roll out chargers on average every 150 kilometres on our major highways.

It's vital that we get moving and make our direction of travel clear – and this is what the National Electric Vehicle Strategy does.

We look forward to continuing this work with governments, industry, experts and the community to secure the benefits of EVs for all Australians.

The Hon Chris Bowen MP
Minister for Climate Change and Energy

The Hon Catherine King MP
Minister for Infrastructure, Transport,
Regional Development and Local Government

Australia's first National Electric Vehicle Strategy: At a glance

Vision

Increase the uptake of EVs to reduce our emissions and improve the wellbeing of Australians

Objectives

NEW INITIATIVES

EXISTING INITIATIVES

SUPPLY

Increase supply of affordable and accessible EVs

- ▶ Developing Australia's first Fuel Efficiency Standard for new light vehicles
- ▶ Preparing for a recycling, reuse and stewardship initiative for EV and other large format batteries
- ▷ State and territory EV fleet targets, incentives, and commitments – like the Queensland Government's target for 50% of new passenger vehicle sales to be zero emissions by 2030 and 100% by 2036*
- ▷ Net Zero Australian Public Service by 2030, including 75% low emissions vehicles for Commonwealth fleet new passenger vehicle purchases and leases by 2025
- ▷ The Australian Made Battery Plan, National Reconstruction Fund, and Critical Minerals Strategy

SYSTEMS AND INFRASTRUCTURE

Establish the resources, systems and infrastructure to enable rapid EV uptake

- ▶ Developing a national mapping tool to support optimal investment in – and deployment of – EV charging infrastructure
- ▶ Tools and guidance to enable EV uptake for residents of existing multi-residential buildings
- ▶ Funding to support world-leading EV guidance, demonstrations, and training for emergency service workers
- ▷ National network of 117 EV chargers on major highways at an average interval of 150 km, delivered in partnership with NRMA
- ▷ State and territory EV infrastructure and charging investments – like the WA Government's \$22.9 million investment to install almost 100 charging stations at 49 locations*
- ▷ \$500 million Driving the Nation Fund
- ▷ New Energy Apprenticeships and New Energy Skills Program
- ▷ Commonwealth, state and territory collaboration to ready the electricity grid for EV uptake

DEMAND

Encourage increase in EV demand

- ▷ Electric Car Discount amendments to fringe benefit tax and import duty
- ▷ State and territory EV purchasing incentives and subsidies – like the ACT Government's zero interest loans for up to \$15,000*
- ▷ \$20.5 million CEFC green car loans

Outcomes



Expand EV availability and choice



Reduce road transport emissions



Make it easy to charge an EV across Australia



Increase local manufacturing and recycling



Make EVs more affordable



Reduce the cost to Australians of running their vehicles

Commonwealth, state and territory collaboration on

National standards

Remote and regional EV charging infrastructure

EV affordability

Data sharing

Fleet procurement

Education and awareness

Underpinned by

Ongoing collaboration with states and territories

Clear indicators to measure progress against outcomes

Ongoing industry, union and community engagement

Annual updates, with a comprehensive review in 2026

Private and public sector research and investment

International learnings and partnerships

*Further information on other state and territory initiatives is available at Appendix B

Summary

The National Electric Vehicle Strategy (the Strategy) is part of the Australian Government's Powering Australia plan to improve affordability, create jobs, and reduce emissions. It provides a nationally consistent framework to get Australia's road transport sector on a pathway to net zero emissions.

The Strategy kick-starts Australia's transition to a decarbonised transport system – with passenger vehicles as a first priority. This Strategy focuses specifically on light passenger and light commercial vehicles, as they are the major source of road transport emissions. It seeks to accelerate the transition from petrol and diesel-powered internal combustion engine (ICE) vehicles to electric vehicles (EVs), recognising that the technology to do this is available now.

During consultations for the Strategy, stakeholders emphasised the importance of the Australian Government (the Government) taking a national, strategic leadership role in the switch to EVs. They called for national collaboration to shape, plan, and provide the systems and infrastructure needed to support the early-stage transition - enabling supply and choice of affordable EVs for Australians, to meet growing demand.

Stakeholders were clear in calling for a light vehicle fuel efficiency standard as a matter of urgency. Key feedback was that an Australian Fuel Efficiency Standard is critical to achieving the necessary greenhouse gas (GHG) emissions reduction from light vehicles. Overseas, fuel efficiency standard requirements are a strong driver for the supply of fuel-efficient vehicles. This is key to ensuring the low and zero emissions vehicles brought into the Australian market are affordable and offer better consumer choice than is available now. A Fuel Efficiency Standard also allows suppliers to choose the most appropriate mix of vehicle technologies to meet their fleet average target and customer needs. A Fuel Efficiency Standard will continue to allow a range of vehicles to be sold in the Australian market.

Introducing a Fuel Efficiency Standard that is both internationally comparable and appropriate for Australian conditions is an immediate action for the Government. A well-designed Standard will help reduce fuel costs for Australian motorists and improve the supply and variety of EVs coming into the Australian market. Over 85% of the global car market has vehicle fuel efficiency standards, putting other countries well ahead of Australia in the queue for efficient vehicles.

The Government will work in consultation with stakeholders on the design of a Fuel Efficiency Standard for passenger and light commercial vehicles that is broadly consistent with standards in place in major advanced markets and make a strong contribution to meeting our emission reduction goals.

Transport makes up 19% of Australia's emissions (DCCEE 2022a). Passenger cars and light commercial vehicles alone contribute 60% of our transport emissions and over 10% of Australia's total emissions. Transport is projected to be Australia's largest source of emissions by 2030. EVs powered by Australia's abundant renewable energy resources will contribute to achieving our economy-wide emissions reduction target of 43% below 2005 levels by 2030 – and net zero emissions by 2050. Australia also has the capability and capacity to develop manufacturing opportunities to support EV supply, including in component parts and batteries.

Reducing transport emissions is essential if the world is to achieve its net zero ambitions. As a result, global momentum for the transition to EVs is building. Electric vehicle sales account for around 9% of the global car market in 2021; 15% in the UK, 17% in the EU and 4.5% in the US (IEA 2022a).

“We are in a race against time to improve our carbon footprint. The devastating impacts of climate change and the rising cost of fuel and energy means that Australia needs to unite and build up its capability to tackle these important issues. EVs present an important opportunity to reduce the enormous amount of emissions that the transport sector contribute to global emissions.” – Standards Australia

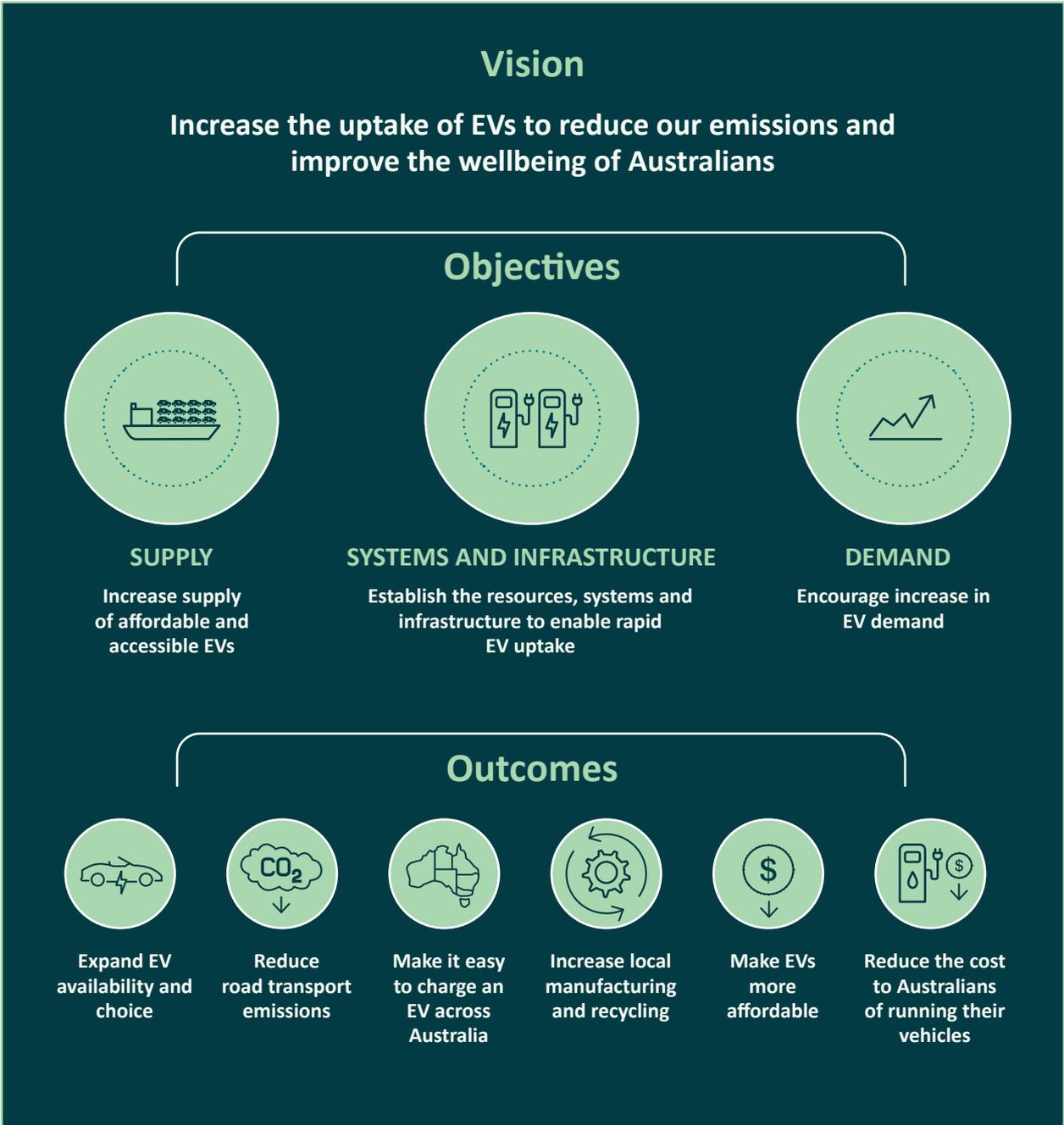
Australia currently lags behind – EV sales accounted for 3.8% of our national car market in 2022 (EVC 2023). But Australians are ready and willing to make the switch. We heard this loud and clear through public consultation on this Strategy, which garnered more than 500 submissions, representing over 200 organisations and over 1,500 individuals (DCCEEW 2023b).

Feedback from the consultations also made clear that improved cost, choice, availability of charging and accessibility for all are fundamental to a successful transition.

The scale and change needed to decarbonise our transport infrastructure and supply chains - and the long lead times involved in replacing vehicle fleets - means we must act now to spur investment.

The Government is committed to delivering low emissions road transport that improves the wellbeing of all Australians. This Strategy incorporates insights learnt from overseas to help make Australia a globally competitive market for EVs, with better access to a broad range of affordable EV models, targeted infrastructure to enable EV use across the nation, and new industries and jobs along the EV supply chain. It identifies the wide-ranging social, economic, business, health and environmental benefits the switch will have for Australia. These include better air quality, new jobs, and reductions in the cost of living over time.





The Strategy provides a framework to guide future investment to support the switch to EVs in Australia. Building on the strong foundation that governments and industry have already put in place, it sets outcomes against which success

will be measured and provides the foundation for further work by the Commonwealth, states and territories to accelerate EV uptake and emission reductions, including through the National Energy Transformation Partnership.

The Government will collaborate with state and territory governments to ensure a national approach on:

- 1. National standards** – to encourage national consistency around standards which impact the effective uptake and use of EVs, like signage, charging infrastructure, accessibility and safety.
 - The role for governments includes ensuring consistent national standards, like accessibility standards for people living with disability, and interoperability standards for charging infrastructure.
 - The Government is consulting to consider the case for mandatory Acoustic Vehicle Alerting Systems for light electric vehicles in Australia, to reduce potential pedestrian collisions. Adopting international standards setting minimum sound requirements for EVs could help ensure pedestrians who are blind or low vision can travel with relative safety and independence when crossing roads and using footpaths.
- 2. Data sharing** – where possible, aligning reporting and sharing of vehicle and infrastructure related data.
 - Data sharing will help us understand where EVs are charging and being driven which will inform the best locations for charging.
- 3. EV affordability** – encouraging initiatives to reduce costs and increase affordability.
 - This may include assessing the impacts of incentives as EV uptake increases.
- 4. Remote and regional EV charging infrastructure** – supporting the roll-out of EV charging infrastructure across regional Australia to achieve a comprehensive national charging network.
 - This could include strategic planning and investment to avoid crowding out private investment while complementing existing transport infrastructure and complementary work to ensure grid

capability to support an Australia-wide EV charging network.

- 5. Fleet procurement** – to meet government fleet targets, collaborate with New Zealand and states and territories to aggregate government fleet vehicle purchasing and consider opportunities beyond light vehicles, such as buses.
 - Fleet procurement programs can provide manufacturers with greater confidence to commit EVs to the Australian market while also promoting the rapid development of a second-hand EV market.
- 6. Education and awareness** – to ensure nationally consistent information on the benefits and realities of driving an EV in Australia.
 - This will help Australian households and businesses to make informed purchasing decisions and reap the benefits of cheaper, low emissions transport.

The Strategy includes new initiatives that address stakeholder calls for an equitable and safe transition to EVs, building on existing work underway and collaboration with jurisdictions and industry. This includes preparing for a recycling, reuse and stewardship initiative for EV and other large format batteries, and delivering world-leading EV guidance, demonstrations, and training for emergency service workers.

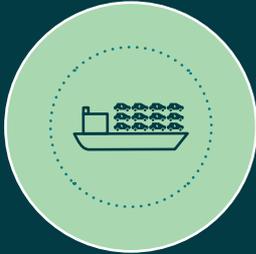
The Government will also develop tools and guidance to enable EV uptake for residents of existing multi-residential buildings, and deploy a proof of concept national mapping tool to help optimise EV charging infrastructure investment, supporting co-planning of charging with energy system investments. These initiatives will inform future Government decisions and will be reported on through annual Strategy updates and through a major review of the Strategy in 2026.

These new initiatives will complement and build on existing Government commitments driving the transition to EVs.

Existing Australian Government initiatives

Objectives

Existing initiatives



Increase supply of affordable and accessible EVs

- Net Zero Australian Public Service by 2030, including 75% low emissions vehicles for Commonwealth fleet new passenger vehicle purchases and leases by 2025
- The Australian Made Battery Plan, National Reconstruction Fund, and Critical Minerals Strategy



Establish the resources, systems and infrastructure to enable rapid EV uptake

- National network of 117 EV chargers on major highways at an average interval of 150 km, delivered in partnership with NRMA
- \$500 million Driving the Nation Fund
- New Energy Apprenticeships and New Energy Skills Program



Encourage increase in EV demand

- Electric Car Discount amendments to fringe benefit tax and import duty
- \$20.5 million CEFC green car loans

We will review the Strategy regularly to measure success and will publish an annual update on progress, measured against the Strategy's six outcomes. Given the rapid pace of innovation in transport decarbonisation, we will conduct a major review of the Strategy in 2026, ensuring the Strategy remains fit for purpose and suited to Australia's needs and conditions.

“The world is accelerating in this transition so it would be imperative to act as soon as possible. The first priority is to introduce an ambitious fuel efficiency standard to improve EV supply models which are greatly being considered by more and more Australian consumers as their next vehicle. The resulting EV market should be regularly reviewed in line with other global markets, which would lead to Australia establishing itself as a leader in this new industry.”

– The University of Queensland E-Mobility Team

Global momentum is driving change.
Electric vehicles account for around:



9%
of global car sales



3.8%
of car sales in
Australia



15%
of car sales in the
United Kingdom



17%
of car sales in the
European Union

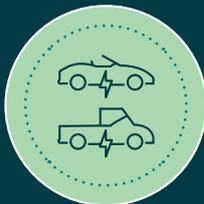
In Australia...



3.8%
of all new cars
purchased in 2022
were EVs



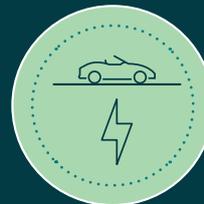
86%
increase
from 2021



70
different EV models
38 BEVs and **32** PHEVs



+2,390
public charging
sites



+83,000
EVs now on
our roads

Introduction

The Australian Government’s Powering Australia plan sets out how we will meet our climate commitments to reduce national emissions to 43% below 2005 levels by 2030 – and net zero emissions by 2050.

Transport makes up 19% of Australia’s emissions (DCCEEW 2022a). Passenger cars alone contribute almost 10% of Australia’s emissions. Figure 1 shows transport emissions trending up – they have increased 10.5% or 8.6 Mt CO₂-e (metric tons of carbon dioxide equivalent) since 2005 (DCCEEW 2022a). Transport emissions were lower in 2020 compared to previous years because of the COVID-19 pandemic. However, in April - June 2022, emissions increased 2.6% on the previous 3 months, reflecting a return towards normal levels of transport activity.

“To ensure Australia is on track to achieving net zero emissions by 2050, Australia must significantly increase the uptake of EVs within the current decade.”
 – Carbon Neutral Delivery Partners

The world is moving rapidly to decarbonise road transport. EV use is increasing internationally, and innovation is constantly improving the technology. In 2012, 120,000 electric cars were sold worldwide annually; in 2021, more than 120,000 were sold each week (IEA 2022a).

“There are opportunities to be seized as the world makes this transition. Australia is rich in the resources necessary to enable zero emissions vehicles, meaning there are new job and investment opportunities that will deliver for our economy going forward.”
 – Business Council of Australia



Global EV use is increasing

...|

2012 120,000 sold annually

.....|

2021 120,000 sold each week

Figure 1: Australia’s transport emissions, actual trend, by quarter, June 2005 to June 2022



Australia is behind many other advanced and emerging economies in EV uptake, but demand is growing. EV sales accounted for around 9% of the global car market in 2021 – 15% in the UK, 17% in the EU and 4.5% in the US (IEA 2022a). By comparison, the EV market share in Australia increased from 2.05% in 2021 to 3.8% of new light vehicle car sales in 2022 (EVC 2023). The range of choices in this market is also increasing – to keep pace with the rest of the world and meet our emissions targets, we need to accelerate this trend.

Reducing transport emissions takes time, so we need to start now. EVs and other new vehicle technologies give us a significant opportunity to bring down emissions. Light vehicles have a lifetime of 15 – 20 years so fleet turnover can take decades to achieve.

Australia’s economy stands to gain from the global change to EVs - we have the mineral resources, capital and skills potential to assist this transition. This presents enormous opportunities for increased prosperity.

“The skills, experience and knowledge to create new cars, including EVs, is still at work in our country, and this is a rare chance to make Australia a significant contributor to the global EV economy with vehicle design, development and manufacturing.” – Premcar Pty Ltd

Light passenger and commercial vehicles made up 62% of Australia's transport emissions in 2019, and 60% in 2022. Emissions are projected to reduce by only 6 Mt by 2035, compared to 2019 levels* if we continue using the same types of transport.

To meet our national emissions reduction commitments, we must reduce Australia’s road transport emissions by replacing ICE vehicles (petrol and diesel) with lower-emitting alternatives, like EVs, as our main form of light road transport.

**A comparison has been made between 2019 and 2035 as 2019 is the latest inventory year not impacted by the COVID-19 pandemic.*





Why drive an electric vehicle?

Emissions reduction and global trends

Globally, transport consistently makes up nearly a quarter of total emissions and has the highest reliance on fossil fuels of any sector (IEA n.d.). Road transport contributes around 75% of that share (IEA 2022f; Ritchie 2020). Decarbonising our transport system will help reverse this trend. Secondary emissions from charging an EV from the electricity grid are already lower than emissions from equivalent ICE vehicles and will reduce further as our electricity grid decarbonises (IEA 2022d). By 2030 we expect to generate 82% of Australia's electricity from renewables.

Evolving technology, lower operating costs and energy flexibility

For households, EVs offer substantially lower operating costs and reduce exposure to volatile global fuel prices. On average, a petrol car consumes around 10 litres per 100 km and costs around \$2,400 to fuel each year. The average EV consumes around \$400 worth of electricity per year (EVC 2022a). EVs can turn electricity into drivetrain energy very efficiently, converting over 77% of the electrical energy from the grid to power at the wheels. They also use regenerative braking which lowers energy costs (U.S. Department of Energy n.d.).

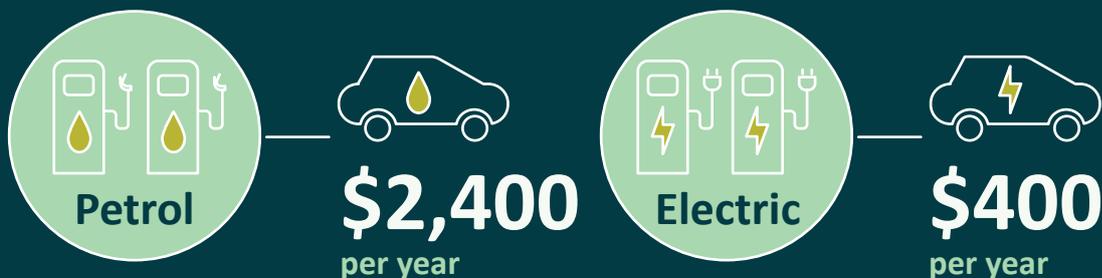
In comparison, ICE vehicles only convert around a quarter of the energy from liquid fuels such as petrol or diesel (U.S. Department of Energy n.d.). EVs also tend to have lower maintenance costs, as there are only a few hundred parts in an electric car, compared to 2,000 plus moving parts in an ICE vehicle (Raftery 2018).

“The shift towards electromobility not only has a positive impact on greenhouse gas emissions and air quality. It also generates new business areas, for example charging industry, vehicle-to-grid technologies, increased demand for solar power plants, battery manufacturing, etc.”

– The International Council on Clean Transportation

As well as using less energy, some EVs can provide energy storage for houses and the electricity grid. Innovation in bidirectional charging, which allows EVs to both receive and discharge energy, will enable more EV models to contribute electricity to power homes and the grid. EVs could also play a key role in storing and later dispatching excess power generated from solar photovoltaic (PV) and other renewable energy systems, and potentially assist in electricity grid management (AEMO 2022).

On average a petrol car costs around \$2,400 to fuel each year.



The average EV costs around \$400 in electricity per year. EVs also tend to have lower maintenance costs.

This and future technology advancements could give Australian households the flexibility to choose where their energy comes from, more control of their bills, and less reliance on imported fossil fuels. Almost one in three Australian homes already have rooftop solar PV, which can be used to power EVs, offering electricity cost savings and further reducing emissions (DCCEEW n.d.a).

Health and safety benefits

Greater adoption of EVs will help reduce air pollution and will have wide-ranging health and environmental benefits, via the reduction in nitrogen oxide and particulates. Research has shown that even at low penetration rates, EV uptake results in better air quality and reduced asthma-related emergency room visits (Garcia et al. 2023).

“Electric vehicles provide a great opportunity for removing these noxious fumes from our cities and reducing public health costs by billions of dollars over the coming decades.”

– The Electric Vehicle Council of Australia

Long-term exposure to air pollution from ICE vehicles has negative human health effects. Air pollution from vehicle emissions is estimated to have caused as many as 1,715 deaths in Australia in 2015, 42% more than the road toll that year (BITRE 2016; Schofield et al. 2017). Recent estimates by the University of Melbourne indicate mortality associated with vehicle emissions may have been significantly underestimated – with researchers suggesting emissions may result in as many as 11,105 premature deaths in Australian adults each year (Walter & Say 2023).

Air pollution is linked to respiratory disease, cancer and dementia (BITRE 2022; Health Effects Institute 2017; Manisalidis et al. 2020; Yao et al. 2022). It is also linked to social equity, as the poorest in society tend to be exposed to higher levels of pollution than people with higher incomes (Australian Conservation Foundation 2018). Exposure to pollutants is particularly harmful to children, elderly people, pregnant people and people with pre-existing health conditions.

By comparison, battery EVs have zero tailpipe emissions. The switch to EVs may also deliver health benefits from reduced noise pollution.

Modern cars are designed with occupant safety in mind. While evidence suggests EVs are less likely to catch fire than ICE vehicles (EV FireSafe 2022), this does not mean we can ignore the potential for EV battery electric shocks or fire related incidents. These are presenting potential new risks and challenges for emergency responders, trades workers, and technicians. This is a key consideration for governments, working together to ensure the safety of all Australians as the transport system transitions.

To address these risks, the Department of Infrastructure, Transport, Regional Development, Communications and the Arts recently conducted public consultation on proposed new rules prescribing safety requirements for a wide range of EVs such as cars, SUVs, utility vehicles, commercial vehicles and buses (DITRDCA 2023).

The Australian Competition and Consumer Commission (ACCC) is also scoping product safety issues and potential hazard prevention strategies in relation to lithium-ion batteries. Consultations closed on 3 February 2023, with a final report being prepared which will identify potential risk mitigation strategies in relation to lithium-ion batteries (ACCC 2023).

Manufacturing, jobs and industry

The transition to EVs presents a significant opportunity to develop new jobs and skills in Australia. Across the supply chain, from manufacturing through to maintenance, new skills will be needed to support the rollout of EVs. We have the mineral resources, capital and capability to maximise this opportunity.

“The Australian automotive industry is training staff in anticipation of the transition to electrification... We are heading into the most significant technological change since moving to the ‘horseless carriage’. It is exciting, and we must demonstrate automotive professions are full of promise and opportunity.”

– Australian Industry Alliance

Savic Motorcycles are manufacturing high-performance electric motorcycles in Australia. Established in 2016, the company's motorcycles are designed and assembled in West Melbourne. Savic Motorcycles will be delivering its C-Series motorcycles to customers across Australia by mid 2023. The company is set to open its first dealership in Melbourne in early 2023.

Australia is the world's largest producer of lithium, contributing over half of global mined production in 2021 (IEA 2022c). The value of our lithium exports is forecast to increase more than 10 times over 2 years, from \$1.1 billion in 2020-21 to almost \$14 billion in 2022-23, with continued growth over future years. This is not just an export resource: the development of a battery industry could contribute \$7.4 billion annually to our economy and support 34,700 jobs by 2030 (Prime Minister of Australia 2022).

The International Energy Agency forecasts that demand for minerals to use in EVs and battery storage could grow at least 30 times by 2040 (IEA 2022a). These critical minerals include lithium, copper, nickel and magnesium. Australia has a lot of them – in fact, half of all raw materials used in battery production are already mined in Australia (Geoscience Australia n.d.; Prime Minister of Australia 2022; Sydney Energy Forum 2022; USGS 2022). With globally significant deposits of vanadium, cobalt, lithium and other essential materials, Australia has the opportunity to make the batteries used domestically and create jobs by exporting them to the world.

Momentum continues in Australia to engineer and produce EVs. **SEA Electric** is making a mark in the transport sector by manufacturing electric commercial vehicles. Since forming in 2012, the company has expanded from its Australian roots to a global presence and has deployed vehicles approaching 4 million collective kilometres of operation across 8 countries. Its Australian assembly facility has doubled in size to continue to expand production of electric trucks and utility vehicles.

"If Australia can rapidly decarbonise its grid and provide industrial-scale renewable electricity at low cost, there is an even greater case for local refining and further value-adding to Australian battery minerals." – Tesla



Image provided by Tritium

Technology and infrastructure innovation

There is strong demand for EVs in Australia, but consumers perceive upfront cost, driving range between charges, charging infrastructure, charging times, and running costs to be key barriers to greater uptake of EVs (Bleakley 2023; Brewer 2022). Rapid technological change and a transforming market are changing those perceptions (CPRC 2022). The Government has a role to play in reducing the cost of driving an EV and encouraging Australians to switch to EVs.

“Driver partners have a high desirability to switch, 57% of drivers told us they wanted to buy an EV in the next five years with only 11% saying they did not. The top two reasons given were first, lower running and maintenance costs, and secondly, to reduce climate emissions and live in a healthier city with less fumes.” – Uber

Cost: While EVs are currently more expensive to buy than ICE vehicles, the average upfront cost is falling as new mid-range EVs become available in Australia. The new Electric Car Discount introduced by the Government in 2022 exempts eligible EVs from fringe benefits tax (FBT) and is complemented by the removal of the 5% import tariff on EVs, helping to reduce upfront costs and making EVs more affordable for more Australians. In addition, the average EV driver could save around \$2,000 on fuel costs each year and faces lower maintenance costs than those for the average ICE vehicle (EVC 2022a).

While many automotive manufacturers are rolling out new EVs, some companies are converting ICE vehicles into electric ones. Brisbane-based **Roev** is converting two of Australia’s bestselling utes into EVs – the Toyota Hilux and the Ford Ranger.

Evolution of the average driving range for battery electric vehicles



2011 139 km



2016 233 km



2021 349 km
(up to 550 km)

The average battery electric vehicle driving range has increased around **50% since 2016**

Source: IEA 2022e



Image provided by Roev

Driving range: EVs today have driving ranges of around 300-450 km, with some new models able to drive for up to 550 km on a single charge. Most EVs can already meet the needs of the average Australian who drives about 38 km per day - around 12,100 km a year (EVC n.d.). This will only improve as battery technology continues to evolve.

“In the coming years, the cost and infrastructure obstacles which have kept EVs exclusive and beyond the reach of mainstream consumers are likely to disappear.” – NRMA

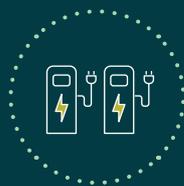
Charging infrastructure: While the vast majority (as much as 80%) of EV charging takes place at home, investment in public charging infrastructure has been steadily increasing over the past 4 years. At December 2022 there were more than 4,900 public chargers located at over 2,390 sites around the country (EVC 2023). This number will increase as the Government and states and territories have made commitments to invest in public charging infrastructure.

To ensure all EV drivers can safely and reliably travel around Australia, the Government is partnering with the NRMA to install a ‘backbone’ of fast-charging infrastructure - a network of 117 chargers located on major highways across the country at an average interval of 150 km. The chargers will be interoperable with all EVs and accessible by all motorists (Prime Minister, The Hon Anthony Albanese MP 2022). States, territories and industry are playing key roles in the roll out of charging infrastructure, making sure buildings are EV ready, and investing in EV charging stations, including in commercial buildings and car parks.

The Australian Government’s National Measurement Institute (NMI) has been engaging with industry to determine a regulatory approach for accurate measurement of EV charging and this work is ongoing. Internationally, NMI have been working with the International Organisation of Legal Metrology who late last year published a guide (OIML G 22) providing information on how EV Supply Equipment could be evaluated and tested to provide confidence that they give accurate measurements of energy.

Founded in Australia in the 2000s, **Tritium** has grown significantly and in 2022 began trading on the Nasdaq stock exchange. Recently, the company secured its largest ever order from a single customer from bp, to roll out fast chargers in the US, the UK, Europe, and Australia. Tritium offers a range of chargers from 50kW to 350kW and has expanded to a global annual production capacity of up to 35,000 fast charger units between its US and Australian facilities.

Charging time: Residential chargers can fully charge an EV in around 6 to 12 hours, depending on vehicle battery capacity and location. Public fast to ultrafast direct current (DC) chargers can fully charge a typical EV within 15 minutes to an hour, depending on battery size and the vehicle’s maximum charging speed.



Private sector charging infrastructure

The private sector is ramping up investment in EV charging infrastructure. For example, Ampol recently established its charging business AmpCharge. Through AmpCharge, Ampol will initially deliver around 360 fast charging bays at approximately 140 sites across New South Wales, Queensland, Victoria and Western Australia. These charging stations are being delivered with the support of both ARENA and the New South Wales Government (Ampol n.d.). In November 2022, bp launched its electric vehicle charging brand bp pulse in Australia. The company has ambitions for around 600 ultra-fast charge points in Australia (bp 2022).



More than **1,500** individuals
and over **200** organisations
provided their feedback in over 500 submissions

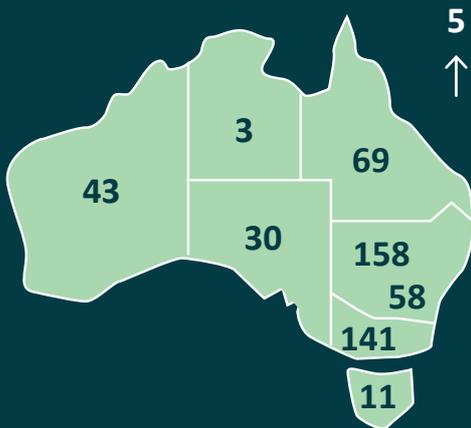


277
organisations



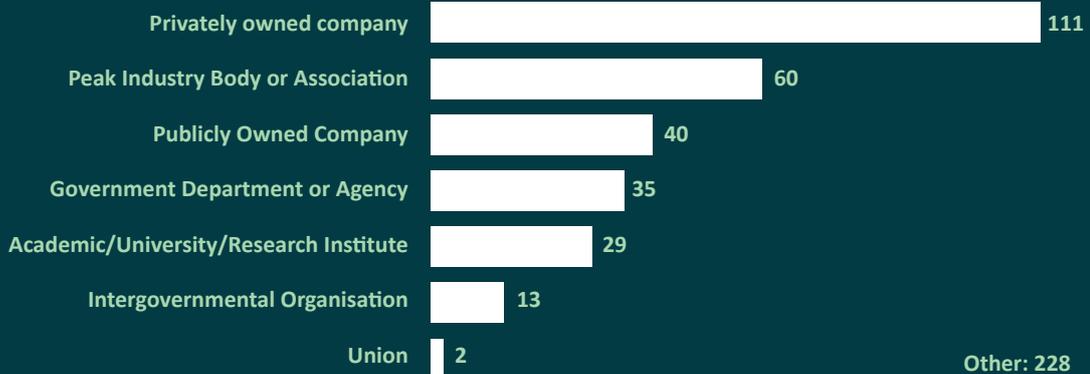
241
individuals

Location



158	New South Wales
141	Victoria
69	Queensland
58	Australian Capital Territory
43	Western Australia
30	South Australia
11	Tasmania
3	Northern Territory
5	Outside Australia

Sector



What we heard from consultations

In September 2022, the Australian Government released a consultation paper inviting views to help shape the Strategy. We received more than 500 submissions in response – representing more than 1,500 individuals and over 200 organisations. This reflects the importance and priority the community places on the transition to EVs.

The feedback we received has contributed to the development of the framework, objectives and outcomes in this Strategy. The consultations have also helped to identify priorities for national collaboration and will inform future initiatives.

Feedback indicated broad support for the Australian Government to deliver the following:



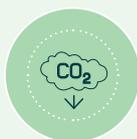
1. Fuel Efficiency Standard

There was strong support from stakeholders for a Fuel Efficiency Standard to encourage greater supply of EVs, reduce light vehicle emissions, and save Australians money on fuel.



2. Charging infrastructure

The Strategy should ensure adequate supply of charging infrastructure across Australia. This includes sufficient publicly available EV charging, charging proficiency, and charging options for renters and people living in apartment buildings.



3. Emissions reduction

The Strategy should help Australia meet its 2030 and 2050 emissions reduction targets. This includes the potential for and use of renewable energy sources, such as solar, wind, hydropower, bioenergy, hydrogen and geothermal to create alternative transport fuels.



4. Supply and demand

The Strategy should support a domestic market for the supply and demand of EVs, including domestic manufacturing, creating a second-hand market and pathways for end-of-life batteries and vehicles.



5. EV accessibility

The Strategy should ensure all Australians can access the benefits and are not left behind as the country shifts to a decarbonised road transport system. Issues include affordability, accessibility, cost, and transport options in regional and remote areas; and standardised charging infrastructure that is safe, accessible and where people need it to be.



6. Regulation and government

The Strategy should identify fit-for-purpose regulatory, policy and tax settings to deliver EV affordability, appeal, uptake, longevity and efficiency.



7. Safety and standards

The Strategy should consider safety requirements and standards to enable EV uptake in Australia. This includes standards to support safe EVs, road safety, navigation and charging equipment, and electrical safety standards for EV charging station installation and maintenance.



8. Alternative transport

The Strategy should consider the use of other forms of transport and options to convert public transport to low- or zero-emissions alternatives.



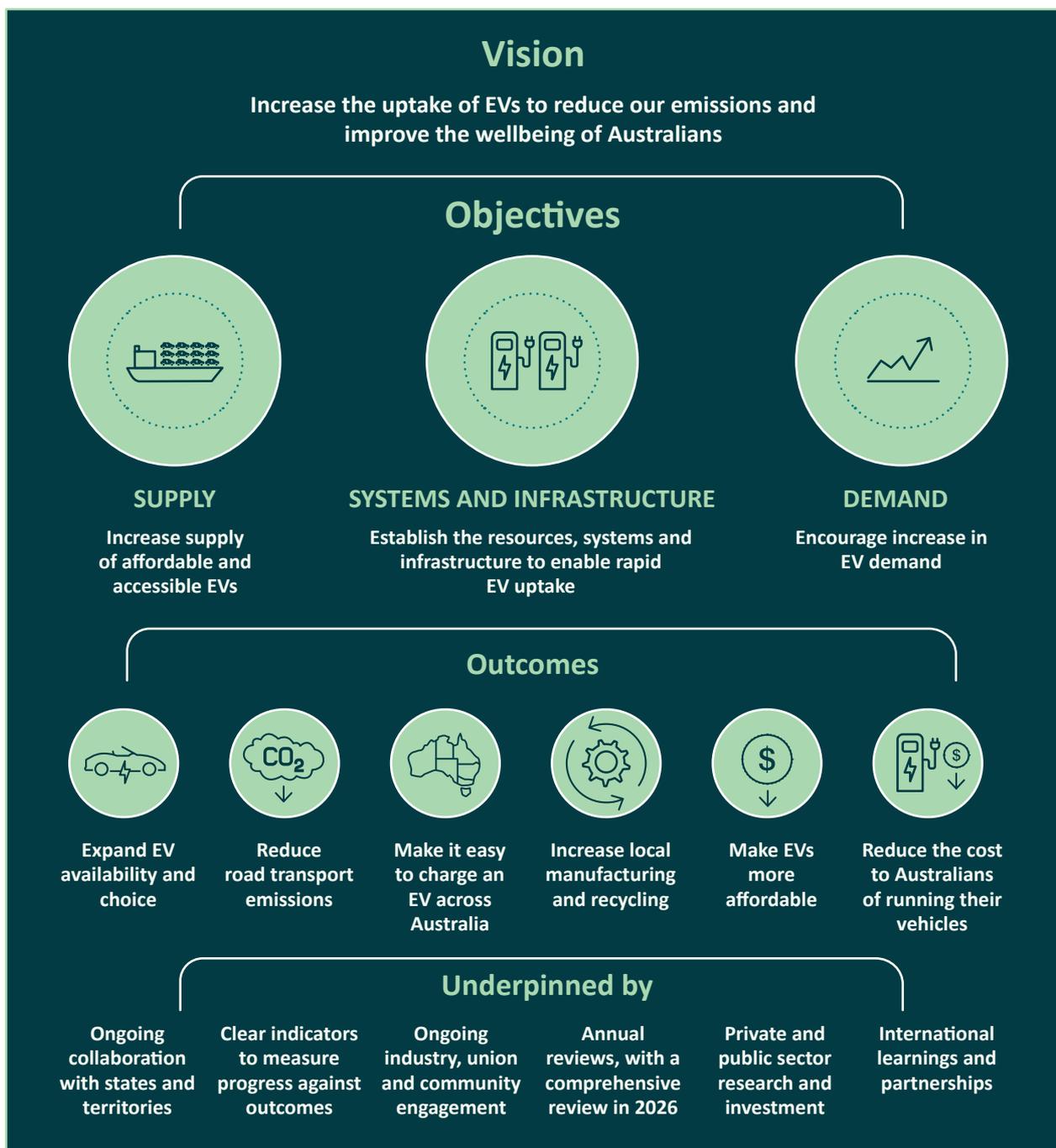
A framework for national action

This Strategy sets out a vision to increase the uptake of EVs to reduce our emissions and improve the wellbeing of Australians.

It introduces a framework designed around 3 key objectives and 6 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 us through to 2030 and beyond, helping us achieve our broader road transport emissions reduction objectives.

This 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.



States and territories have already introduced a range of initiatives to support EV uptake

NT

Northern Territory launched its Electric Vehicle Strategy in July 2021. The strategy aligns with the NT energy target of 50% renewable by 2030 and Climate Change Response Plan Net Zero by 2050.

The NT Government is supporting residential, business, destination and fast charging through grant schemes and strategic planning.

QLD

The Queensland Zero Emission Vehicle Strategy 2022–2023 is accelerating Queensland towards a cleaner, greener transport future while making sure the state's energy network supports the transition.

Queensland's Electric Super Highway fast charging network will provide comprehensive coverage of regional and rural Queensland across more than 54 locations, once complete.

NSW

New South Wales launched its \$633 million Electric Vehicle Strategy in June 2021 to support and accelerate the uptake of light electric vehicles. The state is taking action on electric heavy vehicles and supporting local manufacturing of EVs.

The NSW Government is providing \$105 million in fleet incentives to help local councils and businesses buy new electric vehicles.

WA

Western Australia launched its Electric Vehicle Strategy in November 2020, as part of the WA Climate Policy.

The WA Government is investing \$22.9 million to install almost 100 charging stations at 49 locations to allow travel around WA in an EV.

ACT

The Australian Capital Territory launched its Zero Emissions Vehicles Strategy 2022–30 in July 2022, setting out the actions necessary to meet ambitious emissions reduction targets.

The ACT is aiming to achieve 80–90% of new light vehicle sales in the ACT being zero emissions vehicles in 2030.

SA

South Australia is focused on driving the transformation to EVs, to realise its ambition of at least 50% reduction in greenhouse gas emission by 2030 and net zero emissions by 2050.

The SA Government is providing a grant to the Royal Automobile Association to build, own and operate a statewide EV charging network.

VIC

In May 2021 the Victorian Government released its \$100 million Zero Emissions Vehicle Roadmap.

This includes a target for 50% of light vehicles to be ZEV by 2030, Australia's first ZEV subsidy of \$3,000, \$19 million for EV charging, and a target for all new public transport buses to be ZEV from 2025, supported by a \$20 million trial.

TAS

The Tasmanian Government's Climate Action 21: Tasmania's Climate Action Plan 2017–2021 included a range of measures to support the transition to electric vehicles, by focusing on addressing the barriers to electric vehicle uptake.

The Tasmanian Government has set a target to transition its fleet to 100% electric by 2030.



Delivering for Australia

Australia has an ambitious climate change agenda. Expectations are high, domestically and internationally, following Australia's legislated commitment to an economy-wide emissions reduction target of 43% below 2005 levels by 2030 and net zero emissions by 2050. The Strategy kick-starts Australia's transition to a decarbonised transport system – with passenger vehicles the first priority.

The Strategy reflects a strong collaborative approach. Its starting point is the Government's partnership with other countries to reduce emissions, in line with our global goal to keep warming to well below 2°C and pursue efforts to keep it to 1.5°C. The Strategy will be delivered in partnership with all Australian states and territories.

"The National EV Strategy needs to recognise and be consistent with the objectives of other Australian Government strategies and plans, as well as State and Territory Governments EV strategies."

– ANCAP

The states and territories are already working to support EV uptake and have introduced a range of initiatives to lower emissions across the transport sector. These include providing financial support to individuals and businesses, setting government fleet targets, decarbonising public transport, making sure buildings are EV ready, co-investing with industry to provide EV charging infrastructure and providing incentives and trials to encourage the use of electric bikes, motorbikes and scooters. A summary of existing state and territory actions is at Appendix B.

The Government is building on state and territory efforts through a range of initiatives to reduce the cost of EVs and ensure Australians can access the EV charging infrastructure they need.

"AEVA strongly supports collaboration between the Federal government and the State and Territory governments to deliver an equitable, fair and responsible strategy for transport emissions reduction."

– Australian Electric Vehicle Association

We are also partnering with states and territories on initiatives to promote electric transport and reduce emissions, and will lead national collaboration on standards, data sharing, and charging infrastructure.



The Australian Government is partnering with the Western Australian Government to deliver an electric bus network for Perth. The budget includes \$125 million towards electric bus charging infrastructure, which will be matched by the Western Australian Government through the local manufacture of 130 new buses. The Australian Government is also partnering with states and territories to create a national green hydrogen highway refuelling network on Australia's busiest freight routes.

Supply

OBJECTIVE 1: INCREASE SUPPLY OF AFFORDABLE AND ACCESSIBLE EVS

The primary barrier to EV adoption in Australia remains a lack of vehicle supply (EVC 2022b). Encouraging supply of a wider range of affordable and accessible EVs will help us transition to a decarbonised transport sector and meet growing consumer demand.

What we are doing

The Australian Government will implement a national light vehicle **Fuel Efficiency Standard** to improve the supply and variety of EVs into the Australian market – and tackle the cost-of-living pressures of inefficient cars. Over 85% of the global car market already has vehicle fuel efficiency standards. This includes the European Union, United States, United Kingdom, China, Japan, Brazil, India, Canada, South Korea, New Zealand, and Mexico.

Overseas, 'fuel efficiency standard' requirements are a strong driver for the supply of fuel-efficient vehicles, including EVs. A Fuel Efficiency Standard will also be key to ensuring that Australians can access the most affordable and diverse EVs available globally. The absence of a fuel efficiency standard in Australia has been cited as a key reason why EV models are not supplied to the Australian market. This view was supported through consultation submissions by global carmakers, motoring associations, and independent experts, including the Federal Chamber of Automotive Industries, Australian Automobile Association, NRMA and the Grattan Institute (DCCEE 2023b).

Markets covered by these standards have more access to efficient vehicle choices. This includes EVs and more efficient ICE vehicles, across all vehicle classes. Vehicle fuel efficiency standards set limits on a manufacturer's average emissions, which does not exclude any individual vehicles from the market. The Government will work in consultation with stakeholders to design a Fuel Efficiency Standard for passenger and light commercial vehicles that are broadly consistent with standards in place in major advanced markets and make a strong contribution to meeting our emissions reduction goals.

"A robust and ambitious fuel efficiency standard is a necessary prerequisite for the increased supply of electric vehicles to Australia, and in turn, to ensure Australia's transport sector does its fair share in reducing emissions in line with achieving an economy-wide 43% reduction by 2030."

– The Electric Vehicle Council of Australia

"A mandated CO2 standard is the obvious missing link that can help supply moving forward and further strengthen market signals."

– NRMA

"ETU agree that vehicle fuel efficiency standards are an effective mechanism to reduce passenger and light commercial fleet emissions, and that vehicle fuel efficiency standards would incentivise global manufacturers to send EVs and lower emission vehicles to Australia."

– Electrical Trades Union

"A robust fuel efficiency standard should be the cornerstone of any EV framework. If designed well, it will encourage EV uptake as well as uptake of lower emission ICE vehicles and provide for a lower Total Cost of Ownership for RACQ members and motorists."

– RACQ

"An ambitious fuel efficiency standard would encourage manufacturers to introduce more fuel-efficient vehicles into the Australian market, including a greater number of electric vehicle models. This policy is a necessary prerequisite for increasing the choice of fuel efficient and electric vehicle models for Australian businesses and households, in both our regions and cities."

– Janus Electric Ltd

As a part of the **Net Zero Government Initiative**, the Australian Government has committed to a net zero emissions Australian public service by 2030, excluding security agencies. This includes a commitment to ensuring Commonwealth fleet new passenger vehicle purchases and leases are 75% low emissions vehicles by 2025. The Australian Government has joined the international **Zero-Emission Government Fleet Declaration** which marks Australia's aspirations to procure 100% zero-emissions vehicle classes (light, medium and heavy-duty) for the Government fleet by 2035.

The Government will work with New Zealand and states and territories to **aggregate fleet vehicle** purchasing to meet government fleet targets which will encourage more EVs into Australia and over time, contribute to an expanding second-hand market. This may include opportunities beyond light vehicles, such as buses.

“An expanded Government EV fleets program – including major Government agencies – would give OEMs [original equipment manufacturers] greater confidence to more rapidly commit EVs to the Australian market as Government demand, demonstrated through tender and procurement programs, would create ‘bankable demand’. This would also help promote the more rapid development of a viable second hand market.” – Evie

States and territories are driving uptake of EVs through their own fleet purchases and supporting others to do so:

- The Northern Territory Government is transitioning fleet vehicles to electric where they meet operational requirements. Contribution rates for fleet EVs have been reduced to incentivise EV uptake.
- The New South Wales Government is providing \$105 million in fleet incentives to help local councils and businesses buy new EVs.
- The Queensland Government has committed to 100% of eligible government fleet passenger vehicles being zero emission vehicles by 2026 and 100% of new passenger vehicles sales being zero emissions by 2036.
- The Tasmanian Government has set a target to transition its fleet to 100% electric by 2030.
- The Victorian Government’s Zero Emissions Vehicle (ZEV) Roadmap includes a target for all public transport bus purchases to be ZEVs from 2025.
- The Western Australian Government has a minimum 25% electric vehicle target for its passenger fleet by 2025.



Critical minerals

Critical minerals are vital to international decarbonisation efforts to reach net zero emissions. They are the foundation for most, if not all, the technologies which underpin the renewable transition, including EVs and batteries.

The Australian Government is developing a new **Critical Minerals Strategy** which will consider how Australia can capture global clean energy opportunities by expanding the critical minerals sector into downstream processing.

This is supported by Australia's international partnerships, like the Critical Minerals Partnership signed with Japan in October 2022 (Austrade 2022). Such partnerships promote opportunities for information sharing and collaboration, including research, investment and commercial arrangements.

"Australia could capture more value from growing demand for minerals by moving up the value chain from mining to processing to metallurgy (turning ores into metals) to product manufacturing."

– Grattan Institute

Many of the raw materials and critical minerals used in EV battery production are already mined in Australia

Rare Earth Metals*
4th largest producer in the world

Lithium
World's largest producer

Nickel
Largest economic reserve in the world

Graphite
8th largest reserve

Bauxite
World's largest producer

Manganese
World's 3rd largest producer

Cobalt
World's 3rd largest producer

* Rare earths for EVs: (Praseodymium, Neodymium, Dysprosium, Terbium)

Batteries

Australia has a narrow window of opportunity to capitalise on global critical minerals demand and unlock our potential as a clean energy superpower. The **Australian Made Battery Plan** will help support globally competitive Australian battery industries and signal to international partners that Australia is open for investment and ready to play a role in diversifying concentrated global supply chains.

As part of the Australian Made Battery Plan election commitment, in partnership with the Queensland Government, the Australian Government will invest up to \$100 million in equity injection into an **Australian-Made Battery Precinct** in Queensland.

The expected increase in global demand for EVs over the next decade will place significant pressure on battery supply chains. The heavily concentrated nature of existing battery supply chains raises the risk of localised disruptions that destabilise prices of EV imports. Australia is working with partners internationally to help ensure that battery supply chains are expanding to meet our EV demand. For example, through the Inflation Reduction Act, the US is incentivising vehicle manufacturers to source battery inputs from free trade agreement (FTA) partners like Australia. This could present a significant opportunity for Australia, given the limited number of US FTA partners. We are also advocating for more geographically diverse, resilient and traceable battery supply chains that are subject to appropriate environment and social governance standards.

Manufacturing

International supply chain disruptions are putting pressure on EV manufacturers and ultimately limiting their ability to manufacture and distribute vehicles. Australia has the capability and capacity to develop manufacturing opportunities to support EV supply, including in component parts and batteries.

The Government has committed \$15 billion to establish the **National Reconstruction Fund (NRF)**. The NRF will provide finance for projects in priority areas that diversify and transform Australia's industry and economy. By establishing the NRF the Government is helping to secure Australia's future prosperity and drive sustainable economic growth. Transport is a priority area identified for targeted investment through the NRF, as are renewables and low emissions technologies that will support the transition to EVs.

Australia has established a series of bilateral clean energy partnerships, including with Korea, Japan and the United States, which aim to strengthen cooperation on clean energy technologies, supply chains and trade. For example, the Australia-Republic of Korea Low and Zero Emissions Technology Partnership provides a mechanism to implement practical joint initiatives with Korea on hydrogen fuel cell EVs.

The **NSW Government's Renewable Manufacturing Fund** aims to boost locally manufactured content for renewable energy and EVs, which could include assembly of component manufacturing for EVs.



Circular economy

“Development of recycling, reuse and disposal standards for vehicles and their components (such as batteries) is important for resource efficiency and public confidence.” – Smart Energy Council

The Government is committed to supporting an EV circular economy, to help mitigate the environmental impacts of EV production and EV waste and reduce the strain on battery supply chains by repurposing and recycling batteries, where possible. The Government will undertake research to inform an **EV and other large format battery recycling, reuse and stewardship initiative**. This will consider end market demand for materials derived from these batteries, to reduce waste, grow jobs, and support emerging Australian industries.

We are preparing to manage new waste streams arising from the shift to EVs, in line with the Government’s commitment to accelerate the transition to a circular economy by 2030. The Government has funded the Federal Chamber of Automotive Industries and the Motor Trades Association of Australia to **design Australia’s first collective vehicle stewardship scheme**, to address end-of-life vehicle waste in Australia. This includes EVs and standard vehicles. Currently over 700,000 vehicles reach their end of life here annually, and hundreds of thousands of tonnes of valuable resources from these vehicles end up in landfill. Product stewardship for end-of-life vehicles in Australia will help us manage products across their lifecycle to protect the environment. It accepts that those involved in designing, manufacturing, selling and disposing of products have a role to play.



Over 700,000
vehicles reach their end
of life here annually
— currently, these are
largely ICE vehicles

“Governments must find a way to reuse batteries as demand for cobalt and lithium supplies (essential for these batteries) is expected to exceed supply by 2050.” – Insurance Australia Group



Infrastructure and systems

OBJECTIVE 2: ESTABLISH THE RESOURCES, SYSTEMS, AND INFRASTRUCTURE TO ENABLE RAPID EV UPTAKE

What we are doing

Making it easier for Australians to charge their cars is key to supporting the switch to EVs.

The Government is expanding the rollout of charging infrastructure through the **\$500 million Driving the Nation Fund** and the **National EV Charging Network** – a truly national network of EV charging infrastructure installed at 117 sites on major highways at an average interval of 150 km.

In addition, the Government is establishing **hydrogen highways** (hydrogen refuelling networks) for key freight routes recognising the opportunity to grow Australia’s hydrogen industry and the potential benefits for long-distance freight transport.

“The use of green hydrogen for long haul transport is one area where the Australian industry may be able to lead the world. The German Australian Hydrogen Alliance is an example of possible cooperation between Australian and European industry.” – Heavy Vehicle Industry Australia



Hydrogen and fuel cell electric vehicles

Hydrogen fuel cell electric vehicles (FCEVs) convert fuel into energy through an electrochemical reaction with hydrogen gas and oxygen. This process produces electricity, powering an electric motor to drive the car. Due to the early stage of the sector, hydrogen transport has required government support to de-risk investments and kick-start hydrogen transport uptake.

FCEVs are lighter than the batteries used in battery EVs and take less than five minutes to refuel. This could make them more suitable for long distance and commercial vehicle operations, such as fleet and heavy vehicle use. Heavy transport shows promise as an early use for hydrogen, particularly line-haul and back-to base bus and truck vehicles.

Work is underway by Australian governments to ensure regulations and standards exist and that they are fit for purpose for both the hydrogen refuelling infrastructure and the fuel cell vehicles. Additionally, across Australia, governments are developing programs to support trials and demonstrations that are supporting the rapid uptake and fleet commercialisation of FCEVs.

For example, the Australian Government has committed up to \$80 million to the development of hydrogen transport refuelling infrastructure through the Driving the Nation Fund hydrogen highways initiative.

In March 2022, the New South Wales, Victoria and Queensland governments announced a landmark tri-state collaboration on a renewable hydrogen refuelling network for heavy transport and logistics along Australia’s eastern seaboard. The first program being delivered under this agreement is the Hume Hydrogen Highway initiative by the New South Wales and Victorian Governments.

The Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC) have also supported ARK Energy Corporation to operate five purpose-built hydrogen fuel cell heavy trucks to transport zinc ore from Townsville Port in Queensland to the Sun Metals Refinery, where they will refuel with green hydrogen produced on site, before taking zinc ingots back to the port in a 30 km clean energy round trip.



To support ease of access to EV charging facilities across the nation, the Australian government will invest, develop and deploy a **national mapping tool for EV charging infrastructure**. While most Australian states and territories are implementing similar initiatives at a local level, a national map will facilitate infrastructure, energy and telecommunications planning around EV charging, cross border certainty for EV drivers, and inform future investment.

This tool will help ensure EV drivers can access reliable information on public charging infrastructure and easily plug and pay for their charging session, no matter what state or territory they are in.

The Government will work with states and territories to develop and deploy this wide-scale national mapping capability. It will identify priority locations for regional charging infrastructure to support optimal investment and provide certainty of EV charging for all users across Australia.

It is also becoming easier for Australians to charge their EVs, no matter what kind of home they live in. Updates to the **National Construction Code**, agreed by Commonwealth, State and Territory Building Ministers in October 2022, ensure that new buildings are designed, constructed and fitted out to enable the installation of renewable energy and EV charging.

Some Australians will choose to charge their EVs at home, however this can be challenging for those living in multi-residential buildings. The Government will undertake research to inform and **enable EV uptake for residents of existing multi-residential buildings** – helping to ensure all Australians can access the benefits of EVs, regardless of where they live.

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.

Implementing pathways for EV integration

Collaboration across Australian governments is already yielding results. In December 2022, Commonwealth, State and Territory Energy Ministers agreed to undertake further work in priority areas for reform to ensure **Australia's electricity system is ready for the rapid adoption of EVs** (DCCEEW 2022c):

- deliver nationally consistent and, where possible, internationally aligned standards and communications protocols for EV supply equipment (EVSE), cybersecurity, and smart functionality in Australia
- a common mechanism for EVSE data sharing
- nationally align Service and Installation Rules and
- streamline network connection processes for consumer energy resources, including EVSE.

EVSE includes EV chargers in homes, while smart functionality refers to devices that can communicate by sending and receiving data. Service and Installation rules apply to anyone wanting to connect EVSE to a network.

In this respect, Commonwealth, State and Territory Governments have agreed to work together to **align reporting and sharing of vehicle and infrastructure related data** across Australia and **collaborate on nationally consistent standards**.

Cooperating on implementation pathways that are nationally consistent, and where possible, internationally aligned, will ensure Australia's electricity grid remains secure, reliable, equitable and affordable for all Australians, not just for those who own an EV.

“A co-ordinated strategy is required which can incentivise private investment to stay ahead of growing demand for charging infrastructure, and ensure that no regions or consumer groups are disadvantaged by a lack of access to fast-charging points.” – Clean Energy Council

As we transition to EVs, it is essential to ensure accessibility for all EV drivers, including access to EV charging for people living with disability. Commonwealth, State and Territory Building Ministers have asked the Australian Building Codes Board to develop advice on making **EV charging easier and safer in the built environment**. This advice will include consideration of options to improve access for people who use accessible parking spaces.

States and territories are supporting the installation of charging infrastructure across urban and regional areas:

- The Australian Capital Territory Government is expanding the ACT public charging network to at least 180 chargers by 2025 and providing grants to install EV charging in multi-unit buildings.
- The Northern Territory Government is supporting residential, business, destination and fast charging facilities through grant schemes and strategic planning. Charging infrastructure is being installed in government owned and leased buildings to cater for the transition of NT fleet vehicles to electric.
- The New South Wales Government has developed a master plan map to help to plan future NSW public EV fast charging stations and support industry and planners in finding ideal locations for public fast charging stations.
- Queensland’s Electric Super Highway fast charging network will provide a comprehensive network into regional and rural Queensland across more than 54 locations.
- The South Australian Government is providing a grant to the Royal Automobile Association

of South Australia, to build, own and operate a state-wide EV charging network.

- The Victorian Government is investing \$19 million to accelerate the roll-out of EV charging infrastructure across regional Victoria by 2024 and support the charging of fleets.
- The Victorian and New South Wales governments are investing \$10 million each in grant funding to co-deliver the Hume Hydrogen Highway initiative. This supports the design and delivery of the Hume Hydrogen Highway between Melbourne and Sydney – Australia’s busiest freight corridor. The initiative aims to support development of at least four hydrogen refuelling stations and approximately 25 hydrogen-powered long-haul heavy freight vehicles.

Collaboration between governments will focus on encouraging **national consistency around standards** which impact the effective uptake and use of EVs, like signage, charging infrastructure, and safety; aligning reporting and sharing of vehicle and infrastructure related data; and working together to support the roll-out of **EV charging infrastructure across regional Australia** to achieve a comprehensive national charging network.

“While global vehicle production of EVs continues to ramp up over time, a priority for the Australian market should be to explore how we can increasingly harmonise Australian Design Rules, Australian Standards and other regulatory requirements with global best practice to reduce vehicle costs in the long run, and increase the availability of affordable EVs.” – Mitsubishi Motors Australia

ARENA has awarded Team Global Express a grant of \$20 million to support a **\$44 million ‘Depot of the Future’ project** to make metropolitan deliveries using small electric trucks that will recharge when they return to base. In addition to 60 new trucks, the project includes back-to-base charging infrastructure and a 500 kW battery to power a third of the company’s Sydney-based express parcel fleet.

New energy jobs and skills

“Workforce planning must find an effective balance of attracting people to professions that will continue to be required for the foreseeable future while also training technicians, repairers, and others on electric vehicle requirements and increasing technology being applied to new vehicles.” – Motor Trades Association of Australia

The transition to EVs presents a significant opportunity to develop new jobs and skills in Australia.

The **New Energy Apprenticeships** program will create 10,000 new energy apprentices and the **New Energy Skills** program will help Australia’s workforce to transition to a new economy by developing resources to support the uptake of existing training packages and provide mentoring support to apprentices in clean energy related jobs.

The recently established **Jobs and Skills Councils** (JSCs) will support the transition to EVs by providing industry with a stronger, more strategic voice in ensuring Australia’s VET sector delivers stronger outcomes through workforce planning and vocational training. JSCs will work closely with Jobs and Skills Australia to create an understanding of the new energy skills landscape and how skill gaps can be addressed, including through prioritising training products, promoting career pathways and supporting quality training delivery.

These programs will be informed by Jobs and Skills Australia’s **Clean Energy Capacity Study** and complement the Government’s **Clean Energy Workforce Strategy**.

The Australian Energy Employment Report is Australia's first national energy workforce survey. It will improve government and industry understanding of jobs in the energy sector and support the people in those jobs and their skills.

“The Strategy should prioritise the establishment of common training standards for the EV workforce and ensure they do not conflict with Australian electrical laws.” – Electrical Trades Union

With the rapid shift to EVs, Australia’s emergency service workers and other first responders have called for focused training to ensure their safety when responding to EV-related incidents or fires involving lithium-ion batteries. While evidence suggests EVs are less likely to catch fire than ICE vehicles, this does not mean we can ignore the potential for EV battery electric shocks or fire related incidents (EV FireSafe 2022). The Government will support emergency service workers and first responders by funding the development of **world-leading guidance, EV road rescue demonstrations, and fire safety training** to address safety and risk knowledge gaps around EVs, chargers and battery technology.

“There are currently no national standards addressing fire safety requirements in the built environment (including in multi-storey car parks) in view of both the increasing number of EVs and EV charging infrastructure... Clear national guidance on evidence-based best practice for fire safety measurements addressing increasing number of EVs and chargers should be developed.” – JET Charge



10,000 new energy apprentices
Through the New Energy Apprenticeship program

Demand

OBJECTIVE 3: ENCOURAGE INCREASE IN EV DEMAND

The EV Council's October 2022 State of EVs Report shows rapidly growing interest from consumers wanting to make the switch to an EV, with some models selling out within minutes of becoming available for purchase (EVC 2022b).

Making EVs more affordable and reducing the costs to Australians of running their EVs is crucial to increasing demand for EVs in Australia. However, there are several factors tempering demand – including cost, perceived limited travelling distance of EVs, lack of charging infrastructure, and lengthy charging time.

“There is strong consumer interest in the electric vehicle market. CHOICE found that 69% of respondents would consider purchasing an electric vehicle for the next car they buy or lease.” – CHOICE

What we are doing

The Australian Government has cut taxes on electric cars through the **Electric Car Discount**. This removes the 5 per cent import tariff on eligible electric cars and where the car is used to provide a fringe benefit, including through salary sacrifice or novated lease arrangements, provides exemption from fringe benefits tax (FBT). The Electric Car Discount only applies to EVs priced below the Luxury Car Tax threshold for fuel efficient vehicles. For an electric car valued at about \$50,000, the FBT exemption saves an employer up to \$9,000 a year or an individual using a salary sacrifice up to \$4,700 a year.

Further information on the Electric Car Discount is available at the Australian Taxation Office website: www.ato.gov.au/Business/Fringe-benefits-tax/Types-of-fringe-benefits/FBT-on-cars,-other-vehicles,-parking-and-tolls/Electric-cars-exemption/.





The CEFC is investing up to \$20.5 million in **green car loans**. This scheme is open to those purchasing new EVs, providing interest rate discounts in the order of one per cent to eligible borrowers for a range of EVs under \$90,000 (CEFC 2022).

States and territories are leading the way with measures to encourage demand for EVs:

- The Australian Capital Territory Government offers incentives for people and businesses buying a ZEV, including stamp duty exemptions for new and used ZEVs, two years free registration, and zero interest loans for up to \$15,000 for ZEVs and charging infrastructure.
- The Northern Territory Government is reducing registration costs for EVs and removing stamp duty on the first \$50,000 of the purchase price, equating to a subsidy of \$1500 until June 2027.
- The New South Wales Government is permitting battery and fuel cell EVs to drive in T2 and T3 transit lanes (i.e. lanes otherwise reserved for vehicles carrying passengers) until 31 October 2023, and is offering \$3,000 rebates on new EVs purchases.
- The Queensland Government is implementing a \$45 million program for rebates for eligible new battery electric vehicles purchased on or after 16 March 2022 and has lower annual registration and vehicle registration duty costs for EVs.
- The South Australian Government is offering \$3,000 subsidies for the first 7,000 eligible new battery electric and hydrogen fuel cell vehicles registered in South Australia from 28 October 2021.
- The Tasmanian Government is waiving stamp duty on the purchase of new and second hand EVs for 2 years and is supporting hire car and tour companies to transition their fleets to EVs by waiving registration fees.
- The Victorian Government is providing \$46 million for a ZEV subsidy scheme to provide individual subsidies at the point of purchase of more than 20,000 ZEVs.
- The Western Australian Government is allocating \$36.5 million to provide rebates on up to 10,000 EVs, up to a value of \$70,000, sold in the state from 10 May 2022.

“Provision of financial incentives will be key to increasing the affordability and accessibility of EVs.” – PricewaterhouseCoopers

Heeding calls from stakeholders, the Commonwealth, states and territories will work together to develop nationally consistent principles to guide further incentives to support sustained demand across the nation over time.

We are working to improve our ability to measure vehicle emissions. The Government’s **\$14 million partnership with the Australian Automobile Association** will help us conduct on-road emissions and fuel consumption testing of light vehicles sold in Australia.

The **Government’s Green Vehicle Guide** provides data and tools to help everyone understand the environmental impacts of different vehicle types, including electric and hybrid vehicles (Green Vehicle Guide n.d.). Updated regularly, the guide is designed to assist Australian consumers who want to choose a less emissions intensive vehicle, and to save on vehicle running costs. The Green Vehicle Guide is available at: www.greenvehicleguide.gov.au/.

Supporting the EV transition

Overall, Australia is ranked sixth in the world in EY's latest Renewable Energy Country Attractiveness Index for renewable energy investment and deployment opportunities. There is significant potential for both renewable energy investment and broader green economy investment in Australia, driven by growth in government funding, abundant natural resources, and Australia's ability to develop solutions for global supply chains, especially in critical and battery minerals (Austrade 2022).

In addition to the range of EV-focused initiatives already in place across Australia, the Government is supporting investment and innovation along the EV supply chain. The backbone of the transition is the decarbonisation of the electricity grid, which will charge most of the EVs Australians drive. The \$20 billion **Rewiring the Nation** commitment will modernise Australia's electricity grids at the lowest cost, ensuring the full renewable energy capacity is integrated into our grids.

We are working to provide long-term policy certainty to help industries make the investments needed to decarbonise. The **Safeguard Mechanism** requires Australia's largest industrial greenhouse gas emitters, including our biggest freight providers and airlines, to keep their net emissions below an emissions limit called a 'baseline'. New reforms will lead to progressively lower baselines to help us achieve our 2030 emissions reduction target and get on track to net zero.

Australia's regional areas play a key role in our net zero transformation. Many of Australia's largest emitters are located in regional areas, as are renewable energy and industrial opportunities. Regional areas also face unique barriers to EV uptake due to large distances and limited access to necessary infrastructure. The \$1.9 billion **Powering the Regions Fund** will support the decarbonisation of existing industries, grow new clean energy industries in regional areas and support workforce development.

The Government recognises the crucial role of First Nations people in tackling climate change and the benefits that can be realised by incorporating traditional knowledge and practices into climate action. A **First Nations Clean Energy Strategy** will enable First Nations communities to influence and access the benefits of Australia's renewable energy transformation. This will be developed in consultation with First Nations people, and the states and territories.

Fuel excise

Fuel excise is a tax levied on petrol and diesel bought at the bowser. The 2022-23 October Budget forecasts fuel excise to continue to grow year-on-year over the forward estimates, with CPI indexation, population and economic growth contributing factors. The impact of EV uptake on fuel excise has been factored into these estimates, but given current low uptake rates, the impact is minimal.

Fuel excise as a share of GDP fell in the 2021-22 financial year due to the temporary halving in the fuel excise rate but overall remains reasonably consistent over time at around 1 per cent of GDP.

Over the longer term, increasing EV uptake is expected to slow the growth in fuel excise receipts and result in a decline in the future, at the point where EVs make up a sufficient share of all vehicles.

Consultation submissions pointed to uncertainty around the application of road user charging on EVs. Timeframes for any future decline in fuel excise are highly uncertain and are not just dependent on EV uptake rate, but also on the retirement rate of the existing fleet, distance driven/fuel consumption of different vehicles, and fuel consumption by heavy and off-road vehicles. The Australian Government will continue to update and enhance modelling of the long-term impact of increased EV uptake on fuel excise in the context of regular Budget updates and the upcoming Intergenerational Report.

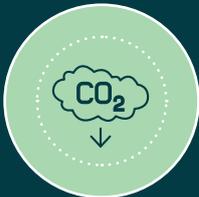
Note: Estimates of fuel excise are not reduced by fuel tax credits.

Our outcomes



Expand EV availability and choice

- EV sales as a percentage of total sales
- Number of EV models or variants available



Reduce road transport emissions

- Fleet average emissions (g/km) for new light vehicles



Make it easy to charge an EV across Australia

- Number of fast DC charging stations and chargers
- Number of public on street and other destination chargers



Increase local manufacturing and recycling

- EV recycling and collection rates
- Automotive industry jobs and value add
- Further indicators will likely emerge following establishment of the National Reconstruction Fund



Make EVs more affordable

- Number of models or variants priced below \$60,000



Reduce the cost to Australians of running their vehicles

- Average fuel consumption for new light vehicles

Measuring success

In a rapidly evolving landscape, progress against the Strategy’s six outcomes will be regularly reviewed to measure success and inform future government actions.

Success will be measured through a range of indicators, including greater availability of affordable EVs in Australia, convenient and easy access to charging infrastructure, and reduced greenhouse gas emissions.

“To track goals, objectives and progress against targets, Australia will need robust and transparent data.” – Climateworks Centre

We will consider additional indicators as additional data becomes available.

Reviews

Recognising the importance of Commonwealth, state and territory collaboration, the Strategy will be overseen by a cross-jurisdictional working group to ensure national collaboration continues. The group will work in partnership with the Electric Vehicle Grid Integration Working Group and other working groups supporting the Energy and Climate Change Ministerial Committee, Infrastructure and Transport Ministers, and Building Ministers.

Progress against outcomes will be reported via annual updates, including in existing Commonwealth reports and statements, such as Australia’s annual emissions projections and the Minister for Climate Change and Energy’s annual statement to Parliament.

A comprehensive and in-depth review of the Strategy will be undertaken in 2026.

“The Strategy should have a clear and ambitious vision for the future state, which will help guide decision making and action. To drive action towards achieving the Strategy’s goals and objectives and enable more meaningful monitoring and evaluation, ambitious targets should be set, and Key Performance Indicators (KPIs) established for responsible agencies.” – Royal Automobile Club of Western Australia



Appendix A.

Glossary

Term	Definition
Battery electric vehicle (BEV)	An electric vehicle that exclusively uses chemical energy stored in rechargeable battery packs to power at least one electric motor with no secondary source of propulsion.
Charging / recharging	The process of restoring electrical energy in a battery or a battery-operated vehicle by connecting it to a power supply.
Critical minerals	A metallic or non-metallic element that is essential for the functioning of modern technologies, economies or national security, and with a risk that its supply chains could be disrupted.
Decarbonise	To stop or reduce carbon gases, especially carbon dioxide, being released into the atmosphere as the result of a process, like the burning of fossil fuels.
Drivetrain	The group of components that deliver power to the drive wheels.
Downstream processing	Refers to manufacturing processes that occur later on in a production sequence or production line.
Electric vehicles (EVs)	Defined in this Strategy as plug-in vehicles powered at least partly by electricity.
Fuel efficiency standard	A fuel efficiency standard sets an average efficiency target, typically measured in grams of CO ₂ per kilometre, for vehicles sold by each manufacturer.
Fringe Benefits Tax (FBT)	A fringe benefit is a payment made to an employee which is not their salary or wages. These benefits are subject to fringe benefits tax which is separate to income tax and calculated on the taxable value of the fringe benefit.
Fast charging DC	The second fastest electric vehicle charging technology with an electrical output ranging from 50 kW to 120 kW. This can add between 230 - 500 km driving range to an electric vehicle per hour.
Heavy road vehicles	Vehicles that have a gross vehicle mass (GVM) or aggregate trailer mass (ATM) of more than 4.5 tonnes. The GVM of a vehicle is the maximum it can weigh when fully loaded, as specified by the manufacturer.
Hydrogen fuel cell electric vehicle (FCEV)	An electric vehicle that uses electricity from a fuel cell powered by compressed hydrogen, rather than electricity from batteries.
Internal combustion engine (ICE) vehicle	A conventional vehicle is a vehicle with only an internal combustion engine system – that is, a conventional vehicle powered by fossil fuel.
Micromobility	Forms of transport using small, lightweight vehicles operating at speeds typically below 25 km per hour and driven by their users personally such as electric bicycles (ebikes), segways, scooters, skateboards, electric water bikes and hover boards.
Net zero emissions	An overall balance between greenhouse gas emissions and removals.
Plug-in hybrid electric vehicle (PHEV)	A hybrid electric vehicle whose battery can be recharged by plugging it into an external source of electric power, as well as by its on-board engine and generator.
Range	The total distance an electric vehicle can travel on one full charge before the battery needs to be recharged.
Refuelling	The process of refilling hydrogen fuel cell vehicles with hydrogen, or combustion engine vehicles with petrol or diesel fuel.
Regenerative braking	An energy recovery mechanism that slows down a moving vehicle or object by converting its kinetic energy into a form that can be used immediately or stored.
Renewable Energy	Energy sources that naturally replenish.
Tailpipe emissions	The product of fuel combustion (e.g. gasoline, diesel) and include a number of pollutants like carbon dioxide, carbon monoxide, and nitrogen oxides.
Ultra-fast or ultra-rapid DC charging	The fastest EV charging technology, with an average electrical output ranging from 120kW up to 350 kW. This can add between 500 km up to 1000 km in driving range for an electric vehicle per hour.
Zero-emission vehicle (ZEV)	A vehicle that emits no pollutants from its operation. Electric-only vehicles (both BEVs and FCEVs) are zero-emissions vehicles.

Appendix B.

Detailed State and Territory actions

Australian Capital Territory

The Australian Capital Territory launched its Zero Emissions Vehicles Strategy 2022-30 in July 2022, setting out the actions necessary to meet ambitious emissions reduction targets.

The ACT Government's ZEV Strategy sets a new and ambitious ZEV sales target of 80-90% of new light vehicles by 2030. It also outlines the intention to commence the phase-out of light internal combustion engine vehicles by 2035.

Under the ZEV Strategy, the ACT Government is:

- Expanding the ACT public charging network to at least 180 chargers by 2025.
- Prohibiting new internal combustion engine vehicles onboarding into taxi and ride-share fleets by 2030.
- Providing financial incentives for installation of EV charging infrastructure for apartment buildings.
- Continuing financial incentives including stamp duty waivers, free registration and zero interest loans.
- Introducing incentives to encourage the uptake of electric bikes, motorbikes and trikes.
- Changing the Territory Plan to make new multi-unit developments EV ready.
- Streamlining EV charging application processes for public land.
- Continuing to ensure that 100% of all newly leased ACT Government vehicles are ZEVs where fit for purpose.

Priorities

The ACT ZEV Strategy has been developed based on six priority areas of action:

- Setting a clear direction.
- Making zero emissions vehicles more affordable.
- Expanding the electric vehicle charging network.
- Supporting and informing uptake.
- ACT Government leadership.
- Updating policies to support the transition.

Aiming to achieve 80-90% of new light vehicle sales in the ACT being zero emissions vehicles in 2030

The ACT has set a new and ambitious ZEV sales target, supported by a policy intention to phase-out light internal combustion engine vehicles from 2035. These commitments place the ACT alongside other global jurisdictions taking strong action on climate change, including the European Union, Canada, UK and some US states.

Expanding the electric vehicle public charging network

The ACT has committed to ensuring there are at least 180 public chargers by 2025 and are rolling out the first round of chargers through 2022-23. This will substantially increase access to public charging for ACT residents and visitors, leading to reduced levels of range anxiety.

Making zero emissions vehicles more affordable

The ACT Government has committed to offering generous incentives for people and businesses thinking about buying a ZEV, including:

- Stamp duty exemptions for new and used ZEVs.
- Two years free registration and investigating the potential for future reforms.
- Zero interest loans for up to \$15,000 for ZEVs and charging infrastructure.
- Grants for installation of EV charging in multi-unit buildings.

New South Wales

New South Wales launched its \$633 million Electric Vehicle Strategy in June 2021 to support and accelerate the uptake of light electric vehicles. The state is also taking action on electric heavy vehicles and supporting local manufacturing for EVs.

The EV Strategy aims to increase sales of EVs to more than 50% of new car sales by 2030-31 and prepare the NSW road network for a low-emissions future. Key actions include:

- Rebates and incentives to make it easier for fleets and individuals to buy and drive EVs.
- Investing \$209 million to build a comprehensive EV charging network.
- Transitioning the procurement of NSW Government passenger fleet vehicles to EVs by 2030.

The NSW Government is facilitating the uptake of EVs and hydrogen-powered heavy vehicles (in line with the NSW Hydrogen Strategy), including:

- Zero emission bus fleet for the whole state by 2047.
- \$3 billion for manufacturing 1,200 zero emission buses and new charging infrastructure for Greater Sydney.
- \$25 million to support regional trials including battery and hydrogen fuel cell electric buses.
- Stretch targets of 10,000 hydrogen vehicles, 100 hydrogen refuelling stations and 20% of the NSW Government heavy vehicle fleet to be hydrogen fuel cell electric by 2030.

The NSW Government's \$250 million Renewable Manufacturing Fund provides support to manufacturing industries to develop renewable energy and low carbon products, which could include EV components.

Priorities

- Overcoming the biggest barriers to EV uptake.
- Maximising the economic and public health opportunities that arise from increasing the number of EVs on NSW roads.
- Adopting a fair and sustainable revenue model to build and operate the road network into the future.

Key actions

- **Stamp duty has been removed for EVs under \$78,000**, to be extended to all EVs and plug-in hybrids from the earlier of 1 July 2027 or when EVs make up at least 30% of new car sales when a road user charge will come into effect.
- **\$3,000 rebates** for the first 25,000 new EVs sold under \$68,750 from 1 September 2021.
- **\$105 million in fleet incentives to help local councils and businesses buy new electric vehicles** to increase the range of EVs available and help build the second-hand EV market.
- **All-electric Government passenger fleet procurement by 2030** (50% by 2026), incentivising importers to increase the range of EV models available.
- **\$209 million to support EV charging infrastructure across NSW** including public fast chargers, chargers at regional tourist destinations and in commuter carparks, kerbside charge points and electrical upgrades in residential strata buildings.
- **Making it easier to drive EVs** by permitting EVs to drive in T2 and T3 transit lanes until 31 October 2023.

Support for hydrogen heavy vehicles

As part of the NSW Hydrogen Strategy, the NSW Government has established a \$150 million Hydrogen Hub initiative to stimulate the NSW hydrogen in areas including bus and freight transport.

A \$20m Hume Hydrogen Highway joint initiative with Victoria to establish at least four hydrogen refuelling stations between Sydney and Melbourne and support at least 25 hydrogen-powered trucks. Funding to be awarded first half 2023, with the corridor to be operational by 2025.

Northern Territory

Northern Territory launched its Electric Vehicle Strategy in July 2021. The Strategy aligns with the NT energy target of 50% renewable by 2030 and Climate Change Response Plan Net Zero by 2050.

The NT Government's EV Strategy seeks to support the uptake of EV's in Government and private fleets whilst recognising that the Northern Territory's small dispersed population and long distances present unique challenges.

Through a process of consultation with the community, industry and business, the NT Government has identified four priority areas for action

- **Action 1:** Vehicle costs and availability
- **Action 2:** Vehicle charging
- **Action 3:** Knowledge, Skills and innovation
- **Action 4:** Consumer information

Through the EV Strategy, the NT Government is:

- Making EVs more affordable by providing registration and stamp duty concessions on eligible EVs.
- Assisting EV owners with grants to install chargers in homes and businesses.
- Transitioning the government fleet where vehicles are fit for purpose.
- Supporting the development of a fast charging infrastructure network on major highways.

Priorities

The NT EV Strategy is based on the following principles.

- reducing barriers to electric vehicle uptake.
- responding to the transition to renewable energy.
- achieve net zero emissions by 2050.

The NT Government is removing stamp duty on electric vehicles.

Stamp duty is being removed for EVs (includes plug-in hybrids) up to a purchase price of \$50,000, from 1 July 2022. The incentive will be in place for 5 years to 1 July 2027. Vehicles in excess of \$50,000 will benefit from a stamp duty reduction of \$1500.

The NT Government is reducing registration costs for EVs, representing a savings in 2022 of \$91.

The incentive introduced in July 2022, will be in place for five years and available for new and second hand BEVs and PHEVs.

The NT Government has undertaken a review of Fleet to support the transition of 'fit for purpose' vehicles to EVs.

Transitioning Fleet will reduce NTG emissions and support the development of a second hand EV market in the Territory. It will also build wider community acceptance and familiarity.

The NT Government is supporting residential, business, destination and fast charging through grant schemes and strategic planning.

Range anxiety was identified in consultation as a significant barrier to EV adoption. The Territory Government understands that a range of charging options are needed including home charging, public charging and fast charging and is working to facilitate the development of the network.

Queensland

The Queensland Zero Emission Vehicle Strategy (ZEV Strategy) 2022-2032 is accelerating Queensland toward a cleaner greener transport future while ensuring QLD energy network supports the transition to achieve net zero emissions by 2050.

The ZEV Strategy aims to reduce emissions across all modes and sectors.

Actions

Queensland's Zero Emission Vehicle Strategy Action Plan (2022-2024) supports the ZEV Strategy which sets out initiatives that will progress over two years to increase zero emissions vehicle uptake.

This includes actions that enable the development of alternative fuels and new and emerging clean technologies.

- **50%** of new passenger vehicle sales to be zero emissions by **2030** and **100%** by **2036**.
- **100%** of eligible Queensland Government Fleet passenger vehicles to be zero emission by **2026**.
- Every new TransLink funded bus added to the fleet to be a zero-emission bus from **2025** in south east Queensland and from **2025-2030** across regional Queensland.
- Net zero emissions by **2050**.

Actions will create jobs for Queenslanders through local manufacturing opportunities and emerging ZEV industries.

Principles

- Encouraging cleaner, greener transport modes
- Building ZEV manufacturing and supply chain capability
- Facilitating support ZEV infrastructure
- Driving towards renewables and smart charging
- Partnerships, innovation, and advocacy

Key achievements

Key actions from the ZEV Strategy include:

- continued reduced **annual registration and vehicle registration duty costs** for EVs
- a **\$45 million** program for rebates for eligible new battery electric vehicles purchased on or after 16 March 2022
- a **\$10 million** Electric Vehicle Charging Infrastructure Co-Fund Scheme which will extend into at least **\$20 million** of further public charging infrastructure across Queensland (when including local council and industry contributions)
- adding a further **24** sites to the **Queensland Electric Super Highway** fast charging network, which will provide a comprehensive network into regional and rural Queensland across more than **54 locations** once complete
- investment of **\$12 million** to deliver charging infrastructure and trials to support efficient integration of electric vehicles into the grid and **\$30 million** to make government buildings ZEV ready.

Principles

- Remove barriers to enable Queensland to access and benefit from ZEVs over the next 10 years.
- Support uptake and development of ZEV technologies in Queensland to build industry and supply capability
- Strategically integrate ZEV technology into the energy system and built environment in a way that benefits all Queenslanders
- Support the renewable energy and hydrogen industry to power Queensland's zero emission energy needs.
- Create a sustainable, accessible, and affordable ZEV economy

South Australia

South Australia is focussed on driving the transformation to Electric Vehicles (EVs), to realise its ambition for at least 50% reduction in greenhouse gas emission by 2030 and net zero emissions by 2050.

The state is aiming to be a national leader in EV uptake and smart charging by 2025, facilitating this by:

- offering EV purchase and a registration fee exemption
- providing a \$12.4 million grant to the RAA to construct the state's first EV charging network throughout South Australia
- grant funding of \$3.2 million for nine EV Smart Charging Trials
- delivering the EV Fleet Pledge program.

South Australia has identified four areas for action required to realize its objective:

- Action Theme 1: Statewide public charging network
- Action Theme 2: Leading by example
- Action Theme 3: Catalyse fleet and private uptake
- Action Theme 4: Framework to speed up transition

Priorities

- As a signatory to the COP-26 Declaration on Accelerating the Transition to 100% Zero Emissions Cars and Vans agreement, South Australia committed to work towards all sales of new cars and vans being zero emission globally by 2040, and by no later than 2035 in leading markets.
- By 2030, we will transform the government fleet and aspire for all private taxi and rideshare vehicles to be electric, and for fully electric commercial fleets to be a normal part of doing business.
- As South Australia drives the transformation to EVs, around 170,000 EVs will be on South Australian roads by 2030 and 1 million EVs integrated into the electricity system over the next 20 years.

The Government is offering an EV purchase subsidy package

\$3,000 subsidies available for the first 7,000 eligible new battery electric and hydrogen fuel cell vehicles registered in South Australia from 28 October 2021. A three-year registration exemption is also available as part of the subsidy package.

The Government is providing a grant to the RAA, to build, own and operate a statewide EV charging network.

The EV charging network will provide over 530 EV chargers, across 52 locations and 140 sites by early 2024. The network will overcome driving range anxiety, supporting EV uptake and helping South Australia to realise its greenhouse gas emissions reduction ambitions.

The Government is undertaking Smart Charging Trials to understand and provide solutions to EV charging

The trials will generate and share knowledge about charging patterns and preferences, and the financial benefits of smart charging and electric vehicle ownership

The Government is continuing the EV Fleet Pledge to support fleet managers in their EV transition

The EV Fleet Pledge will build a network of like-minded businesses who would like to see EVs become the common choice for fleet managers, metropolitan taxi and hire cars by 2030, to lower motoring costs and reduce pollution.

Tasmania

The Tasmanian Government has implemented a range of measures to support the transition to electric vehicles.

The Tasmanian Government's Climate Action 21: Tasmania's Climate Action Plan 2017-2021 included a range of measures to support the transition to electric vehicles, by focusing on addressing the barriers to electric vehicle uptake. Climate Action 21 also supported alternative forms of transport and optimising the use of vehicles to reduce costs and emissions.

The Climate Change (State Action) Act 2008 was amended in November 2022. The Act now includes a requirement for the Government to develop emissions reduction and resilience plans (ERRPs) for key sectors. The ERRPs will be developed in consultation with business and industry.

The Government has committed to developing the Transport sector ERRP by November 2023.

Key Measures

Key measures implemented by the Tasmanian Government to date include:

- Establishing the cross-sectoral Electric Vehicle Working Group to develop a coordinated approach to the EV uptake.
- Implemented the Smarter Fleets program for government agencies, local government and heavy vehicle fleets to improve efficiency and plan for EV uptake.
- Implemented two rounds of the ChargeSmart Grant Program to support the installation of fast, destination and workplace charging infrastructure around the State.
- Supported community 'try and drive' days.

The Tasmanian Government is providing a waiver on duty on the purchase of new and second hand EVs

From 1 July 2021, duty is waived on the purchase of new or secondhand battery electric vehicles for a period of two years.

The Tasmanian Government is supporting hire car and tour companies to transition fleets

From 1 July 2021, registration is waived on new electric vehicles purchased by hire car companies or tour companies for a period of two years.

The Tasmanian Government is supporting Metro Tasmania is trial zero emissions buses

Funding has been provided to support trials of battery electric and hydrogen fuel cell buses in both the North and South of the State.

The Tasmanian Government has set a target to transition its fleet to 100 per cent electric by 2030

Transition the government vehicle fleet may result in a higher number of vehicles becoming available on the second hand market for Tasmanians to purchase.

Victoria

In 2021, the Victorian Government released an important initial package of policies and investments through the Transport Sector Pledge in Victoria's Climate Change Strategy and the Zero Emissions Vehicle (ZEV) Roadmap, to begin transitioning the transport sector and promote ZEV uptake.

The ZEV Roadmap outlines Victoria's commitment to sending a clear signal to the market about Victoria's commitment to decarbonisation, encourage overseas manufacturers to supply more ZEV models to Australia, and thereby improve consumer choice and affordability.

The Roadmap incorporates the following targets:

- 50 per cent of light vehicle sales to be ZEVs by 2030.
- All public transport bus purchases to be ZEVs from 2025.
- Electric vehicle charging stations to be installed across regional Victoria by 2024.
- 400 vehicles in VicFleet to be replaced with ZEVs by 2023.

Since the launch of this initial package of measures in May 2021, Victoria has also:

- Signed the November 2021 COP26 declaration on accelerating the transition to 100 per cent zero emission cars and vans by 2035;
- Committed \$10 million to co-deliver the Hume Hydrogen Highway initiative in partnership with New South Wales and the Commonwealth Government; and
- Advocated for changes to the National Construction Code 2022 to better support EV charging installation in new buildings.

Priorities

The Victorian ZEV Roadmap has been developed to identify and outline the actions the Victorian Government is taking to support the transition to net-zero emissions in road transport by 2050, with the following priorities:

- To promote confidence in the ability of ZEVs to meet the travel needs of all Victorians
- To address infrastructure barriers to the uptake of ZEVs and promote uptake
- To help reduce public transport CO₂ emissions and spur the development of associated supply-chains
- To reduce government and commercial fleet emissions and help support the development of a second-hand market of affordable ZEVs

The \$100 million zero emissions vehicle support package is Australia's first comprehensive strategy to fast-track the transition to zero emissions vehicles. It delivers:

- \$46 million for Australia's first ZEV purchase subsidy scheme, providing individual subsidies at the point of purchase of more than 20,000 ZEVs;
- \$19 million to accelerate the roll-out of electric vehicle (EV) charging infrastructure across regional Victoria by 2024 and support the charging of EV fleets;
- \$20 million for a ZEV public transport bus trial and a target for all public transport bus purchases to be ZEVs from 2025;
- \$10 million to begin the transition of the Victorian Government's own vehicle fleet to ZEVs, with an initial commitment to introduce 400 ZEVs into the fleet by June 2023; and
- \$5 million for a Commercial Sector ZEV Innovation Fund.

Western Australia

Western Australia launched its Electric Vehicle Strategy in November 2020, which is part of the WA Climate Policy.

The WA Government has allocated almost \$80 million to accelerate the use of zero emission vehicles. The EV Strategy plays a key role in supporting the State's commitment to transition the WA Economy to net zero emissions by 2050.

Key areas of action include:

- electric vehicle uptake
- charging and refuelling infrastructure
- standards, guidelines and planning approval requirements
- industry development.

The Strategy is supported by the 2021 EV Action Plan, which provides an integrated set of actions designed to deliver a future where EVs contribute to a safe, reliable and efficient electricity system while accelerating our transition to a low-carbon future.

In May 2022 the WA Government announced an additional \$60 million Clean Car Fund including:

- rebates on the purchase of electric and hydrogen vehicles
- Grants for local governments, not for profits and small to medium businesses to install charging infrastructure

Priorities

The WA EV Strategy has been developed based on the following four priorities.

- **Increase EV uptake:** stimulating the electric vehicle market through fleet uptake, increasing awareness and promoting the importance of emission standards
- **Infrastructure growth:** investing in, and facilitating, the provision of electric vehicle charging and refuelling infrastructure
- **Developing standards, guidelines and planning approvals:** developing and updating guidelines, standards and requirements for planning approvals to assist the safe and efficient adoption of electric vehicles and associated infrastructure
- **Industry development:** developing areas of industry relevant to our state such as the Future Battery Industry Strategy

The WA Government is building an electric vehicle fast charging network -The WA EV Network

We are investing \$22.9 million to install almost 100 charging stations at 49 locations across the state. Installation of the charging stations commenced in November 2022 with the network fully operational in 2024.

The WA Government is offering \$3,500 rebates on new electric and hydrogen vehicle purchases

The WA Government has allocated \$36.5 million to provide rebates on the purchase of up to 10,000 EVs, up to a value of \$70,000, sold in Western Australia from 10 May 2022.

The WA Government is providing incentives to help local councils and businesses to invest in charging infrastructure

\$15 million will be provided to support local governments, not-for-profits and small and medium-sized businesses with grants to install charging infrastructure.

The WA Government has a minimum 25 per cent electric vehicle target for our passenger fleet by 2025

The target covers all new light and small passenger, and small and medium SUV government fleet vehicles by 2025/26. Funds are allocated to install charging infrastructure in existing government buildings and new public building capital works projects must be "EV ready".

References

- ACCC (Australian Competition & Consumer Commission) (2023) Lithium-ion batteries – issues paper, ACCC website, accessed 17 February 2023.
- AEMO (Australian Energy Market Operator) (2022) 2022 Integrated System Plan – June 2022, AEMO website, accessed 25 January 2023.
- Ampol (n.d.) Ampol partners with BYD to support the uptake of electric vehicles across Australia, Ampol website, accessed 23 February 2023.
- Austrade (Australian Trade and Investment Commission) (31 October 2022) Australian Budget commits A\$25bn to clean energy and renewables projects [investor updates], Austrade website, accessed 25 January 2023.
- Australian Conservation Foundation (2018) The dirty truth: Australia's most polluted postcodes, Analysis & Policy Observatory website, accessed 25 January 2023.
- BITRE (Bureau of Infrastructure, Transport and Regional Economics) (2016) Road trauma Australia: 2015 statistical summary, BITRE website, accessed 25 January 2023.
- (2022) Australian Road Deaths Database – ARDD, BITRE website, accessed 1 February 2023.
- Bleakley D (19 January 2023) Mad rush to purchase Ioniq 5s in biggest drop to date – most gone in 15 minutes, The Driven website, accessed 25 January 2023.
- Bp (16 November 2022) bp pulse electric vehicle charging goes live in Australia, bp website, accessed 18 February 2023.
- Brewer P (6 June 2022) Electric cars are in unprecedented demand in Australia, but the car makers can't deliver, The Canberra Times website, accessed 25 January 2023.
- CEFC (Clean Energy Finance Corporation) (2022) Taurus green loans for EVs are electrifying, CEFC website, accessed 27 January 2023.
- CPRC (Consumer Policy Research Centre) (2022) The barriers and potential enablers of electric vehicle uptake in Australia [working paper], CPRC website, accessed 25 January 2023.
- DCCEEW (Department of Climate Change, Energy, the Environment and Water) (n.d.a) Solar PV and batteries, DCCEEW website, accessed 25 January 2023.
- (2022a) Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2022 – incorporating preliminary emissions up to September 2022, DCCEEW website, accessed 24 January 2023.
- (2022b) Australia's emissions projections 2022: December 2022, DCCEEW website, accessed 25 January 2023.
- (2022c) Meetings and communiqués, DCCEEW website, accessed 25 January 2023.
- (2023a) Energy sector survey to map jobs of the future, DCCEEW website, accessed 16 February 2023.
- (2023b) National Electric Vehicle Strategy: consultation paper, DCCEEW website, accessed 24 January 2023.
- DITRDCA (Department of Infrastructure, Transport, Regional Development, Communications and the Arts) (2023) National safety standards for electric and hydrogen-fuelled vehicles, DITRDCA website, accessed 24 February 2023.
- EVC (Electric Vehicle Council) (n.d.) Myth busting, EVC website, accessed 25 January 2023.
- (2022a) Insights into electric vehicle ownership: a survey of Tesla Owners Club Australia members in partnership with the Electric Vehicle Council, EVC website, accessed 25 January 2023.
- (2022b) State of Electric Vehicles – October 2022, EVC website, accessed 24 January 2023.
- (2023) Australian Electric Vehicle Industry Recap 2022, EVC website, accessed 10 February 2023.
- EV FireSafe (2022) Passenger EV LIB fire incidents – global, as of 31st December 2022, EV FireSafe website, accessed 25 January 2023.
- Garcia E, Johnston J, McConnell R, Palinkas L and Eckel SP (2023) California's early transition to electric vehicles: observed health and air quality co-benefits, Science of the Total Environment (via ScienceDirect) website, accessed 16 February 2023. Geoscience Australia (n.d.) Australian mineral facts, Geoscience Australia website, accessed 25 January 2023.
- Green Vehicle Guide (n.d.) Green Vehicle Guide [homepage], Green Vehicle Guide website, accessed 1 February 2023.
- IEA (International Energy Agency) (n.d.) Transport: improving the sustainability of passenger and freight transport, IEA website, accessed 24 January 2023.
- (2022a) The Role of Critical Minerals in Clean Energy Transitions, IEA website, accessed 10 February 2023.
- (2022b) Global EV Outlook 2022, IEA website, accessed 24 January 2023.
- (2022c) Securing clean energy technology supply chains, IEA website, accessed 24 January 2023.
- (2022d) Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle, IEA website, accessed 1 February 2023.
- (2022e) Evolution of average range of electric vehicles by powertrain, 2010-2021, IEA website, accessed 14 February 2023.
- (2022f) Transport sector CO2 emissions by mode in the Sustainable Development Scenario, 2000-2030, IEA website, accessed 25 January 2023.

Health Effects Institute (2017) State of Global Air 2017 [special report], State of Global Air website, accessed 1 February 2023. Manisalidis I, Stavropoulou E, Stavropoulos A and Bezirtzoglou E (2020) Environmental and health impacts of air pollution: a review, Frontiers in Public Health website, accessed 1 February 2023.

Prime Minister, The Hon Anthony Albanese MP (1 May 2022) Driving the Nation [media release], Anthony Albanese website, accessed 25 January 2023.

Prime Minister of Australia (21 October 2022) Support for critical minerals breakthroughs [media release], Prime Minister of Australia website, accessed 25 January 2023.

Raftery T (2018) Seven reasons why the internal combustion engine is a dead man walking [updated], Forbes website, accessed 25 January 2023.

Ritchie H (2020) Cars, planes, trains: where do CO₂ emissions from transport come from?, Our World in Data website, accessed 25 January 2023.

Schofield R, Walter C, Silver J, Brear M, Rayner P and Bush M (2017), Submission of the 'Better fuel for cleaner air' discussion paper, The Clean Air and Urban Landscapes Hub website, accessed 25 January 2023.

Sydney Energy Forum (2022) The Sydney energy forum – why Australia: investing and partnering in clean energy, Australian Government website, accessed 10 February 2023.

US Department of Energy (n.d.) All-electric vehicles, US Department of Energy website, accessed 25 January 2023.

USGS (United States Geological Survey) (2022) Mineral Commodity Summaries, USGS website, accessed 25 January 2023.

Walter C and Say K (2023) Expert Position Statement: Health impacts associated with traffic emissions in Australia, University of Melbourne Melbourne Climate Futures website, accessed 24 February 2023.

Yao Y, Lv X, Qiu C, Li J, Wu X, Zhang H, Yue D, Liu K, Eshak ES, Lorenz T, Anstey KJ, Livingston G, Xue T, Zhang J, Wang H and Zeng Y (2022) The effect of China's Clean Air Act on cognitive function in older adults: a population-based, quasi-experimental study, The Lancet: Healthy Longevity website, accessed 1 February 2023.

