National Electric Vehicle Strategy

Consultation paper

September 2022

Copyright

Disclaimer

Contents

Ministers' foreword

The time has come for Australian households and businesses to reap the benefits of cheaper, low emissions transport that is fit for the 21st century. This consultation paper provides a chance for all Australians to have their say on a National Electric Vehicle Strategy to increase the supply and uptake of electric vehicles.

Excluding COVID-19's impact, transport is Australia's second largest source of national emissions. Most transport emissions are from road vehicles. Reducing these emissions will be critical to achieving Australia's emissions reduction target of 43% on 2005 levels by 2030 and reaching net zero emissions by 2050.

Today, Australians are being sold some of the highest emitting cars in the world. On average, new passenger vehicles in Australia have around 20% higher emissions than the United States, and around 40% higher emissions than in Europe. We need to catch up to the rest of the world when it comes to transport emissions.

In 2021, EVs were just under 2% of new light vehicle sales in Australia, compared with 9% globally In the United States and Canada, new EVs had a market share over 5%. In the past year in New Zealand, EVs have gone from 2.5% of new registrations to over 11%.

Current policy settings have failed to secure supply of affordable EVs for Australians.

State and territory governments around Australia have implemented policies to encourage EV take-up, but coordination and alignment at the national level has been lacking. The Albanese Government is delivering on its election commitment to develop Australia's first National Electric Vehicle Strategy to unlock the nation's EV potential and reduce transport emissions.

This paper advances our genuine consultation with the states and territories, industry, unions and consumers.

We are also seeking views on implementing vehicle fuel efficiency standards in Australia. Australia is in company with Russia as one of the only major economies without vehicle fuel efficiency standards in place or under development. These policies are helping other countries reduce transport emissions, save motorists money at the bowser, and enhance consumer choices. They also preserve access to the range of vehicles people need for work and leisure.

And while any standards must be designed specifically for Australia, standards that lack ambition will still leave Australians at the back of the global queue for cheaper, cleaner vehicles. We need to aim for as close to best practice as is achievable. The scale of our climate challenge and soaring global fuel prices make it vital we bring the world's best transport technology to Australians.

All Australians are encouraged to have their say on how we can transform Australia's transport sector through the development of the National Electric Vehicle Strategy

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

1 Introduction

1.1 Current state

Globally, transport makes up nearly a quarter of total emissions. Road transport contributes around 75% of that share. In Australia, transport makes up 19% of national emissions. Road transport is close to 85% of those emissions (see figure 1). Addressing road transport emissions, particularly through electrification, is critical to Australia reaching net zero emissions by 2050.

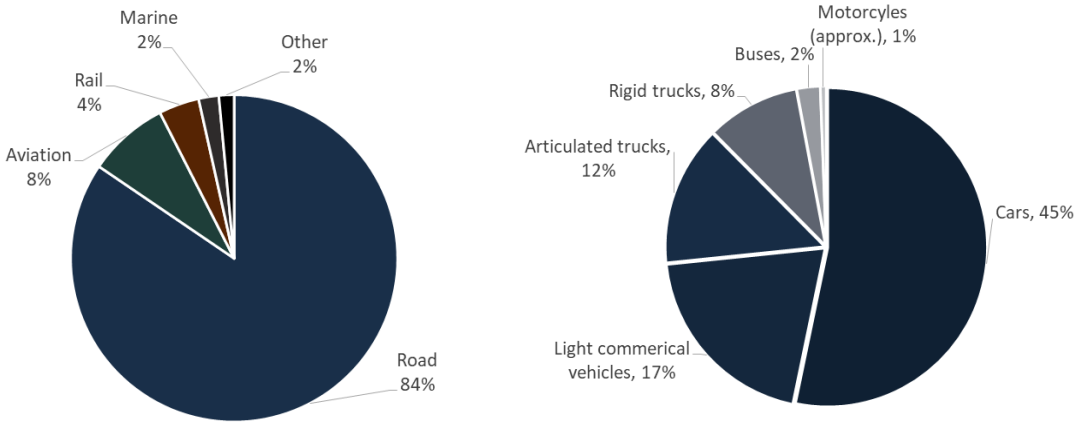

Figure 1 Australia's transport emissions and road transport emissions (2019)[1]

Australia is currently behind many other advanced and emerging economies in electric vehicle (EV) uptake (see figures 2 and 3).

Electric vehicles are defined in this paper as battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs) and hydrogen fuel cell electric vehicles (FCEVs).

EVs are being deployed globally, with rapid innovation. The transition will make a significant contribution to achieving the global climate goal of keeping warming well below 2 degrees, and preferably to 1.5 degrees. EVs also offer lower running costs for consumers compared to internal combustion engine (ICE) vehicles.

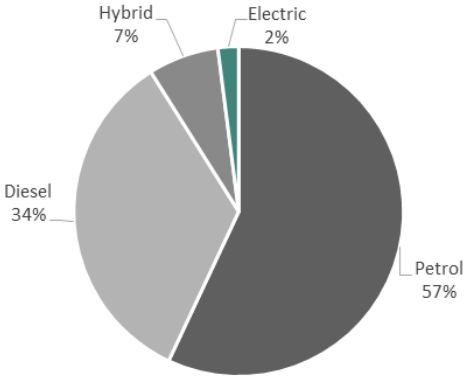

Figure 2 Australia's new light vehicle sales, 2021

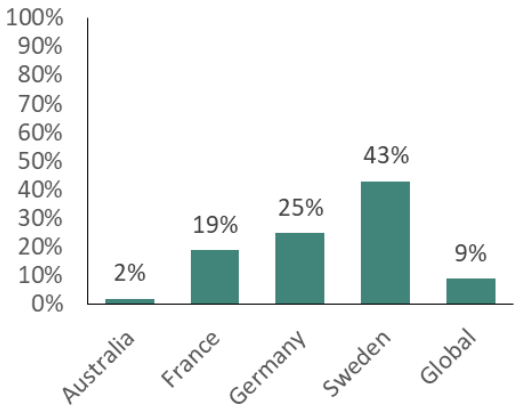

Figure 3 Comparison of new EV sales, 2021

[1] DISER (2021) Australia's Emissions Projections 2021. Note: 2019 was chosen as the best year to represent normal transport emissions activity before the impact of COVID-19.

1.2 The opportunity

The world is moving rapidly to electrify road transport.

EVs are being deployed globally, and innovation is continuing at pace. This transition will make a significant contribution to achieving the global climate goal of keeping warming well below 2 degrees, and preferably to 1.5 degrees. Collective effort by government and industry is needed to develop the right national policy settings and investments.

This transition presents enormous opportunities for Australia. Australia has the mineral resources, capital and skills potential to assist this work. We can value add and participate in:

- manufacturing batteries and other aspects of vehicle manufacturing
- manufacturing mechanical and electronic componentry and control systems
- developing intelligent electricity grid integration systems and markets
- leveraging other economic opportunities including:
    - increased growth and investment
    - upskilling the workforce
    - creating more jobs
    - increasing export revenue
    - increasing fuel security.

Australia will also gain social, health and environmental benefits. These include industry growth, less air quality related health costs, less noise and reduced emissions.

For households, accelerating EV uptake offers lower operating costs and reduced exposure to fuel prices. It also means better safety features and increased choice of vehicles. Innovations should enable more EV models to provide battery storage for the home and the electricity grid.

For our health and environment, greater adoption of EVs can reduce air pollution. Air pollution due to vehicle emissions may cause more deaths than the national road toll. It is also linked to health conditions including respiratory disease, cancer and dementia.[2]

1.3 Our plan

Our *Powering Australia* plan sets out how we will meet our climate targets. It includes our commitment to develop Australia's first national electric vehicle strategy.

The National Electric Vehicle Strategy will:

- Build on the strong platform that governments and industry have already started
- Deliver a nationally consistent, comprehensive and overarching framework
- Enhance existing actions to ensure greater alignment to the Strategy
- Raise the pace and scale of change
- Address national gaps so all Australians can access the benefits of EVs
- Be dynamic and adapt over time to reflect the rapidly evolving nature of the sector
- Make sure we are on track to meet our emissions and transport electrification goals and proposed objectives.

[2] Health Effects Institute (2017) State of Global Air 2017 Note: PM+ Ozone mortality: Australia - 3430 deaths (2015 global burden of disease x $A5.2M the 2010 value of statistical life); Bureau of Infrastructure, Transport and Regional Economics (2017) Australian Road Deaths Database; Frontiers in Public Health Journal (2020) Environmental and Health Impacts of Air Pollution: A Review; and The Lancet (2022) The effect of China's Clean Air Act on cognitive function in older adults: a population-based, quasi-experimental study.

The Strategy will also include our commitment to consider:

- Further possible measures to increase EV sales and infrastructure
- Policy settings to encourage Australian manufacturing of EVs, chargers and components
- Ways to address the implications of future declining fuel excise revenue.

The Strategy will also include measures to speed transition across all road transport segments. This includes measures relating to micro-mobility, motorbikes, light and heavy vehicles.

Proposed Framework for the National Electric Vehicle Strategy

Goals				
Make EVs more affordable	Expand EV uptake and choice	Reduce emissions	Save Australians money on fuel	Increase local manufacturing
Objectives				
Encourage rapid increase of demand for EVs		Increase supply of affordable and accessible EVs to meet demand across all segments		Establish the systems and infrastructure to enable rapid uptake of EVs
Examples of existing and potential actions by governments, industry and investors to meet the objectives				
Access to financing and concessions such as stamp duty and registration incentives, and tax measures		Measures to increase the supply of more EV options in all road transport segments, for example vehicle fuel efficiency standards, retrofitting		Strategic design and national alignment of reliable EV battery charging and hydrogen refuelling networks
Non-financial incentives such as transit lane access and free car parking and charging		Increase EV uptake in government and commercial fleets to help deliver more affordable second hand EVs to the market		Ensuring households, buildings, carparks and the national electricity grid and market are ready for higher penetration of EV charging, including bidirectional charging
Reliable information for consumers to make informed purchasing decisions		Attracting international investments and trade to scale-up Australian mineral extraction and onshore refining, manufacturing of EV components and assembly		Investment in, and expansion of skilled and diverse workforce as we transition to EVs
Supporting the transition with better fuel quality and more fuel efficient and low emission vehicles, infrastructure and skills until EVs are available for all Australians		Encouragement of, and investment in technology and systems innovation to support production and supply		Align treatment of EVs in national and state government systems – road revenue, taxes, and re-use, recycling, disposal, security and safety standards, design standards and approvals

Figure 4 Framework overview

1.4 Have your say

This consultation paper seeks views to help shape a truly national Strategy. We need the right framework and measures in place to help Australia be a globally competitive market for EVs. The Strategy will help us access the best transport technologies to meet our emission reduction targets. The Strategy aims to provide social, economic, business, health and environmental benefits. This will make sure we capture opportunities and have an orderly transition to electrification.

How to make a submission

We invite your views on the goals, objectives and actions for Australia's National Electric Vehicle Strategy.

You can make submissions via our Consultation Hub by clicking the *Make a Submission* button. Submissions will be published online after the consultation closes. You can request that your submission be kept confidential and not published.

We will also be running online consultation sessions. Visit our consultation hub to register your interest.

This consultation will close on 31 October 2022.

2 Strategy framework

2.1 Goals

Australia has committed to meeting the Paris goal of keeping warming well below 2 degrees, and preferably 1.5 degrees. This commitment spans across the federal, state and territory governments. The Australian Government has legislated a national emissions reduction target of 43% by 2030 and net zero by 2050. [3] The Australian Government signed the 2021 Glasgow Breakthrough on Road Transport where zero emission vehicles are the new normal and accessible, affordable, and sustainable in all regions by 2030.[4] Some Australian state and territory governments signed the COP26 declaration on accelerating the transition to 100% zero emission cars and vans by 2040 and by no later than 2035 in leading markets.[5]

Our goals are clear:

1. Make EVs more affordable
2. Expand EV uptake and choice
3. Reduce emissions
4. Save Australians money on fuel
5. Increase local manufacturing.

The Strategy is an opportunity to build on the actions that are well underway across Australia. We can align our goals nationally and consistently with our international commitments. We can help people and industry to transition. We can ensure motorists and businesses have access to the best modern transport technology.

The Strategy will help Australia become a globally competitive market for EVs. It will guide governments, industry and investors to design and deliver measures to electrify the road transport sector. The Strategy will contribute to meeting our emission reduction targets and will provide social, economic, health and environmental benefits.

2.2 Objectives

The objectives of the Strategy will be designed to achieve our goals. The proposed objectives are to:

- Encourage rapid increase in demand for EVs
- Increase supply of affordable and accessible EVs to meet demand across all segments
- Establish the systems and infrastructure to enable the rapid uptake of EVs.

In achieving the objectives of the Strategy, we will address barriers to EV uptake such as:

- Limited availability of affordable EV models across all vehicle types
- Range anxiety due to gaps in EV charging networks and hydrogen refuelling infrastructure
- Information for consumers.

[3] Climate Change (Consequential Amendments) Bill 2022
[4] UK COP (2021) COP26 World Leaders Summit- Statement On The Breakthrough Agenda
[5] UN Climate Change Conference UK 2021 (COP26) (2021) COP26 declaration on accelerating the transition to 100% zero emission cars and vans (New South Wales, South Australia, Victoria and the Australian Capital Territory)

1. Do you agree with the objectives and do you think they will achieve our proposed goals? Are there other objectives we should consider?

2.3 Actions

2.3.1 Existing actions and commitments in Australia

In the Powering Australia plan, the Australian Government committed to a series of measures to help increase EV uptake. The $500 million Driving the Nation Fund will establish a national EV charging network and a hydrogen refuelling network on major highways. We committed to an EV target of 75% of new leases and purchases in the Commonwealth fleet by 2025. These form the foundation the Strategy seeks to build on.

The Powering Australia plan also includes making electric cars cheaper with the Electric Car Discount by exempting eligible electric cars from fringe benefits tax and import tariffs. Complementary commitments include:

- Rewiring the Nation
- A Net Zero Australian Public Service by 2030
- New Energy Apprenticeships.

We are already making investments to boost Australia's role in EV supply chains. All governments are supporting the potential for hydrogen in transport.

State and territory governments have released EV strategies. These stimulate demand, increase supply of EVs and increase charging and refuelling infrastructure. Some states have announced EV targets. For example, New South Wales has a stretch target of 10,000 hydrogen vehicles by 2030.

The Australian Government is working with the Western Australian Government to deliver 130 new electric buses manufactured in Perth. The NSW Government has committed to transition its 8,000 buses to battery electric, which are being locally built in western Sydney.

State and territory governments are also investing in charging and refuelling infrastructure.

Some jurisdictions have announced timeframes for the phase in of EVs. This includes the Australian Capital Territory and South Australian governments. They have indicated all new passenger vehicles sold in their areas are to be fully electric by 2035. [6]

The Australian Government is developing a National Battery Strategy and a National Reconstruction Fund. These will drive investment across a range of activities, including clean energy component manufacturing. They will also value add in the resources sector (see more detail in section 3) and build on the policies and investments in critical minerals that are supporting EV uptake. We aim to incentivise greater supply of minerals, on-shore processing and value-adding. We also will link Australian projects to emerging markets in countries like USA, Japan, Korea, India and Germany.

The Clean Energy Finance Corporation (CEFC) and the Australian Renewable Energy Agency (ARENA) are working across the economy. They are speeding up investment in measures to reduce transport-related emissions. The CEFC is financing fleet and residential EVs, and associated charging infrastructure. ARENA will continue to co-invest with the private sector in EV charging and refuelling

[6] South Australian Government (2021) South Australia's Electric Vehicle Action Plan, ACT Government (2022) ACT's Zero Emissions Vehicles Strategy 2022-30

infrastructure. This work is done through the Driving the Nation Fund and other projects such as vehicle to grid and smart charging trials.

This work provides a foundation for all governments to build a national framework. It allows us to take more ambitious action with our partners at the scale and pace required to meet our goals and objectives.

2.3.2 Global action

Countries around the world are also implementing effective policy measures to support EVs. Many countries have adopted various forms of vehicle fuel efficiency standards (see section 3.2 below). Like Australia, many countries are investing in EV charging and hydrogen refuelling infrastructure. They are also offering subsidies, tax incentives and a range of financing for EVs. Many countries are setting ambitious targets for EV uptake or introducing specific measures to electrify heavy vehicles, such as setting emissions targets.

All major vehicle manufacturers in Europe have pledged to electrify most of their new vehicle between 2030 and 2035. Volkswagen and Stellantis group[7] comprise 30% of Europe's automotive market by volume. They have pledged to sell 70% and 100% EVs, respectively, by 2030. Audi has pledged to launch only fully electric vehicles from 2026. Audi will halt manufacturing internal combustion engines (ICE) vehicles by 2033.

In the US, Ford and General Motors are aiming to exclusively sell zero emissions vehicles by 2035.[8] Norway, United Kingdom, California and the European Union are phasing out the sale of new petrol and diesel vehicles. They are planning to do this from 2025, 2030 and 2035 respectively.[9]

2. What are the implications if other countries accelerate EV uptake faster than Australia?

2.4 Ongoing periodic review

The Strategy will need to be dynamic and adaptive. Ongoing reviews to measure and inform adjustments are needed to meet our goals. This will allow us to maintain momentum and relevance. Technology and market development are rapidly evolving in the energy sector. This includes vehicle to grid technology that will enable energy storage and peak demand management later this decade.

We will also use the reviews to provide governance and coordination across jurisdictions. It will be important to develop indicators to assess our progress against our goals. This is particularly important to meet net zero emissions by 2050.

3. What are suitable indicators to measure if we are on track to achieve our goals and objectives?

[7] The Stellantis group includes Jeep, Chrysler, Fiat, Peugeot, Citroen and Opel, among others.
[8] International Energy Agency (2022) Global EV Outlook 2022
[9] International Energy Agency (2021) Global EV Outlook 2021

3 What more can we do to meet our goals and objectives?

The Strategy will include and build on the measures already underway. This will help to transition at the scale and in the time required to meet our goals and objectives proposed in Figure 4.

We invite views on actions across all segments of the road transport sector to achieve the objectives. This includes light and heavy vehicles, micro-mobility and motorbikes.

3.1 Encourage rapid increase of demand for EVs

One of the first actions of the Australian Government was to introduce legislation for the Electric Car Discount. This is to exempt eligible EVs from fringe benefits tax and import tariff arrangements to make them more affordable. State and territory governments are also amending registration and stamp duty for EVs. This will lower their upfront cost and encourage uptake.

To increase accessibility, we committed to a target of 75% of new purchased and leased vehicles in the Commonwealth fleet to be EVs by 2025. State and territory governments are planning to bring more EVs into their fleets. With thousands of electric vehicles in the Commonwealth fleet, this will mean more EVs will be available in the second-hand market and increase the accessibility of EVs to more Australians.

In 2019 the Senate Select Committee on Electric Vehicles reported on options to encourage EV uptake. The report noted tax reforms and investment in charging infrastructure could help support demand. [10]

There are unique challenges for EV uptake in rural and regional Australia. This is due to larger distances and limited access to EV charging and hydrogen refuelling infrastructure. However, rural and regional Australians could benefit from greater access to EVs given the longer travel distances and higher fuel costs. Investments in EV charging and hydrogen refuelling infrastructure networks are essential. This will mean rural and regional Australians can share in benefits as technology and vehicle model options increase (see section 3.3). Infrastructure will also support industries in those areas, such as agriculture and mining.

Improved fuel quality standards will give manufacturers certainty that their cleanest and most efficient engines can run on Australian fuels and help consumers reduce their emissions as we transition. Introducing the latest and best practice Euro 6d noxious emissions standards for light vehicles would also help us reach our goals. Combining fuel quality, light vehicle noxious emissions standards and vehicle fuel efficiency standards (see section 3.2) would help Australia have a cleaner fleet by the 2030s. Light vehicles would also be safer and more fuel efficient.

4. Are there other measures by governments and industry that could increase affordability and accessibility of EVs to help drive demand?
5. Over what timeframe should we be incentivising low emission vehicles as we transition to zero emission vehicles?
6. What information could help increase demand and is Government or industry best placed to inform Australians about EVs?

[10] Commonwealth of Australia (2019) Select Committee on Electric Vehicles

3.2 Increase supply of affordable and accessible EVs to meet demand across all segments

Demand side measures are improving confidence to make the choice to switch to EVs. Electric vehicle sales in Australia tripled from 6,900 in 2020 to 20,665 in 2021.[11] Yet the limited supply of affordable EVs remains a barrier to higher uptake.

In addition to current procurement and incentive policies, many stakeholders, including car manufacturers, are calling for supply measures. This includes the introduction of mandatory national vehicle fuel efficiency standards. This would incentivise overseas light vehicle manufacturers to send more EV models to Australia and place downward pressure on prices.

Over 80% of the global car market has vehicle fuel efficiency standards. [12] This includes the European Union, United States, United Kingdom, China, Japan, Brazil, India, Canada, South Korea, New Zealand, Mexico and Saudi Arabia. This is often measured in grams of CO2 per kilometre on average for new vehicles sold by each manufacturer.

The standards send signals to manufacturers to increase supply and sales of EVs and low emissions vehicles. The absence of these standards in Australia has been cited as a key reason why EV models are not supplied to the Australian market. This view is supported by global carmakers, motoring associations, and independent experts, including Volkswagen, Hyundai, Peugeot, Federal Chamber of Automotive Industries, Australian Automobile Association, NRMA and the Grattan Institute.

Markets covered by these standards have more access to efficient vehicle choices. This includes EVs, hybrids 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.

We are seeking views on how vehicle fuel efficiency standards could be implemented in Australia. If these standards are implemented, they will need to be designed specifically for Australia. However, evidence also suggests that standards that lack ambition will continue to leave Australia at the back of the queue for cheaper, cleaner new vehicles. Feedback is sought on options for a robust model. We will draw from the experience in other markets and consider Australia's unique circumstances.

Vehicle fuel efficiency standards need to be:

- **Effective** in reducing transport emissions
- **Equitable** so all Australians can access the vehicles they need for work and leisure
- **Transparent** and well explained to avoid unintended consequences
- **Credible** and **robust** by drawing on expert analysis and experience
- **Enable** vehicles with the best emissions and safety technology to be available to Australians.

Initially, we are seeking views on:

7. Are vehicle fuel efficiency standards an effective mechanism to reduce passenger and light commercial fleet emissions?
8. Would vehicle fuel efficiency standards incentivise global manufacturers to send EVs and lower emission vehicles to Australia?

[11] Electric Vehicle Council (2022) State of EVs
[12] ICCT (2020) Passenger Vehicle Fuel Economy

9. In addition to vehicle fuel efficiency standards for passenger and light commercial vehicles, would vehicle fuel efficiency standards be an appropriate mechanism to increase the supply of heavy vehicle classes to Australia?
10. What design features should the Government consider in more detail for vehicle fuel efficiency standards, including level of ambition, who they should apply to, commencement date, penalties and enforcement?

Following consideration of submissions in response to this paper, further consultation on detailed design features will be undertaken by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts.

Find out more about vehicle fuel efficiency standards.

Heavy vehicles currently account for 22% of road transport emissions[13], and are increasing. We need to identify ways to reduce emissions in this sub-sector. BEV technology is less advanced for heavy than light vehicles, and FCEVs are entering production at increasing scale. Opportunities vary across different segments of the heavy vehicle fleet. For medium rigid delivery trucks and buses that utilise 'back to base' style trips, BEVs could be suitable to adopt in the short term. For larger vehicles, new biodiesel and renewable diesel standards could support a transition fuel. This could be effective in cases where BEV and FCEV will likely take longer to commercialise.

The Californian Air Resources Board's Advanced Clean Trucks regulation requires manufacturers to sell a minimum proportion of zero-emission trucks from 2024 to 2035. There are different targets for different vehicle classes. These requirements are supported by targeted incentives for heavy vehicle buyers. Six other US states - New Jersey, Washington, Oregon, New York, Massachusetts, and Connecticut – have now followed California in approving the Advanced Clean Truck rule.[14]

11. What policies and/or industry actions could complement vehicle fuel efficiency standards to help increase supply of EVs to Australia and electrify the Australian fleet?
12. Do we need different measures to ensure all segments of the road transport sector are able to reduce emissions and, if so, what government and industry measures might well support the uptake of electric bikes, micro-mobility and motorbikes?

Under current regulations, new and second-hand EVs and hybrids can be independently imported, where the manufacturer is not selling that vehicle in Australia. Such vehicles may need to be modified to meet Australian standards, but can receive concessions against certain Australian Design Rules (ADRs). ADRs are widely regarded as being critical to ensure the safety and serviceability of vehicles supplied in large quantities to the Australian market. A reduction in regulation in this area has the potential to compromise vehicle quality standards across the fleet and road safety outcomes. Such vehicles are also not covered by the same warranty and recall provisions provided by the original manufacturers.

Some stakeholders have called for regulation to be relaxed to enable a wider range of second hand and new EVs to be imported. While this could increase the number and reduce the cost of second

[13] DISER (2021) Australia's Emissions Projections 2021. 2019 emissions in heavy vehicles subsector: Articulated trucks (12 Mt CO2-e), Rigid trucks (8 Mt CO2-e) and Buses (2 Mt CO2-e)
[14] US Senator A. Padilla (2022) Padilla, Barragán, Booker, McEachin, and Jayapal Urge EPA to Finalize Strongest Possible Clean Truck Rule

hand EVs available for purchase, it will need to be considered against the potential for increased safety, business and consumer protection risks.

13. How could we best increase the number of affordable second hand EVs?
14. Should the Government consider ways to increase the supply of second hand EVs independently imported to the Australian market? Could the safety and consumer risks of this approach be mitigated?

3.2.1 Strengthen Australia's competitiveness in the EV value chain

Governments and industry could unlock further growth and innovation in the full lifecycle of the EV value chain (see Figure 5). This can help to increase global EV supply and could be across a range of vehicle types, from micro-mobility through to light commercial and heavy vehicles. This growth and innovation could include:

- Expanding extraction, processing and refining of critical minerals for global demand
- Developing, designing and manufacturing EV components, control systems, batteries and possibly cars
- Expanding existing heavy vehicle and bus manufacturing capability
- Designing and manufacturing EV charging and hydrogen refuelling infrastructure and software development
- Increasing supply of zero emission vehicles through conversion and retrofitting
- Developing intelligent systems and grid integration (supported by modified market rules)
- Ensuring sustainable second life EV battery use, recycling and disposal.

Figure 5 Lifecycle of EV value chain

To make best use of the opportunities offered by the EV transition, we will need to build on our strengths. Australian businesses can occupy niche opportunities anywhere in the EV value chain. This could include the R&D stage, or in software development.

Australia has some of the world's largest recoverable resources of several critical minerals. We are already one of the leading producers of several minerals used to make EVs. Australia is the largest producer of lithium, 3rd largest producer of cobalt, 5th largest producer of nickel. We are also the 6th largest producer of rare earth minerals. [15] Yet most of the resources extracted in Australia are processed overseas. This is a lost opportunity to value-add and create jobs and investment in Australia. An estimated 35,000 jobs and $7 billion in value can be made from battery technology and industries across all sectors. [16]

The Australian Government is working to develop Australia's critical minerals sector and to build downstream mineral processing capabilities. The Australian Made Battery Plan includes developing Australia's first National Battery Strategy. We are working to create a Battery Manufacturing Precinct in Queensland. We also are establishing a Powering Australia Industry Growth Centre.

[15] Geoscience Australia (2021) World ranking for Australia's mineral resources (EDR) and production as at December 2020
[16] Future Batteries CRC (2021) Future Charge Report

The Australian Government will also expand our mining science technology capability. This is to ensure a greater share of Australia's raw materials are processed here through the $1 billion Value-Adding in Resources Fund. The Fund is part of the $15 billion National Reconstruction Fund and will build on policies and investments under our existing Critical Minerals Strategy. This includes existing support to help develop and connect with international supply chains. The Critical Minerals Strategy will also connect to world-leading scientific and technical expertise through the CSIRO, Geoscience Australia and ANSTO. Financing support is available through the Critical Minerals Facility, Clean Energy Finance Corporation and the Northern Australia Infrastructure Facility.

These measures will support EV uptake and development of onshore manufacturing capability. It will incentivise greater supply of minerals, on-shore processing and value-adding. It will link Australian projects to emerging markets. There are also other opportunities for Australia to become more embedded in global supply chains, to help boost global supply. For example, capturing more international investment and attracting on-shore manufacturing by global car or battery companies and OEMs.

In addition to industry growth, increased value added to Australian critical minerals can ease global battery supply chain constraints. This would boost the reliability of battery supply globally and ease constraints on the global supply of EVs.

SEA Electric partners with established commercial vehicle manufacturers to provide 100% electric power-systems for both new and aftermarket deployment. Applications include (but not limited to) delivery vans/trucks, refuse trucks, tipper trucks, tilt tray trucks, refrigerated trucks, elevated work platform trucks, utility vehicles (utes), school and shuttle buses. This Australian-founded company has a global presence, deploying its proprietary technology in seven countries which include USA, Canada, New Zealand, Thailand, Indonesia and South Africa, in addition to Australia.

Based in Victoria, Savic Motorcycles is developing the capacity to manufacture and assemble high performance electric motorcycles, adding to the growing EV market in Australia.

15. What actions can governments and industry take to strengthen our competitiveness and innovate across the full lifecycle of the EV value chain?
16. How can we expand our existing domestic heavy vehicle manufacturing and assembly capability?
17. Is it viable to extend Australian domestic manufacturing and assembly capability to other vehicle classes?

3.3 Establish the systems and infrastructure to enable rapid uptake of EVs

Accelerating uptake of EVs needs to be well planned at the national level to ensure the benefits and opportunities from the transition are fully realised. National planning, coordination, and effectively integrated infrastructure and systems are needed to accelerate uptake.

National leadership is essential. The roll out of reliable EV charging and refuelling infrastructure needs to be aligned and accessible for energy and parking needs. It will need to consider metropolitan, rural and remote motorists. The Driving the Nation Fund commits to establish a truly national EV charging network. Charging stations will be available at an average interval of 150km on major roads. Australian governments will need to coordinate public investment to make sure it does not duplicate or crowd out private or state and territory government efforts.

Planning is also required as future fuel excise revenue declines from reduced consumption of petrol and diesel. While this revenue is not currently earmarked for expenditure on roads, it is an important source of funding. In the long run, Australia will need a more sustainable and fair way to pay for roads.

We already have a system for setting nationally consistent charges to recover the cost of road use related to heavy vehicles. That system has been in place since 1996. It is subject to a cross-government reform proposal to improve the way that money is invested ('Heavy Vehicle Road Reform'). Part of that reform is investigating more direct user charging options for heavy vehicles, including electric heavy vehicles.

18. Are there other proposals that could help drive demand for EVs and provide a revenue source to help fund road infrastructure?

Examples of other areas that could benefit from national coordination include:

- continue working with states and territories for full implementation of the National Construction Code 2022 requirement that new apartment buildings are EV ready by 1 October 2023, as agreed at the 26 August 2022 meeting of Building Ministers
- developing further measures within the National Construction Code to support easy and safe charging of EVs (as requested at the 26 August 2022 meeting of Building Ministers)
- continue investigating potential market/tariff reforms to incentivise EV charging at various times of the day (e.g. middle of the day or off peak) and plan for future vehicle to grid opportunities (e.g. peak demand management)
- Increased workforce skills, training and education to aid the transition
- Development of appropriate security and safety standards
- Development of recycling, reuse and disposal standards for vehicles and their components (such as batteries).

19. What more needs to be done nationally to ensure we deliver a nationally comprehensive framework for EVs?
20. How can we best make sure all Australians get access to the opportunities and benefits from the transition?

4 Glossary and acronyms

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.

Electric vehicles (EVs): defined in this paper as plug-in vehicles powered at least partly by electricity. This includes battery electric vehicles, (BEVs), plug-in hybrid electric vehicles (PHEVs) and fuel cell electric vehicles (FCEVs) and includes passenger, light and heavy road vehicles.

Heavy vehicles: vehicles that has 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.

Micro-mobility: forms of transport using small, lightweight vehicles operating at speeds typically below 25 kilometres per hour and driven by users personally such as electric bicycles (ebikes), segways, scooters, skateboards, electric water bikes and hover boards

Original equipment manufacturers (OEMs): Original equipment manufacturers, such as automotive manufacturers.

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.

Refuelling: The process of refilling hydrogen fuel cell vehicles with hydrogen, or combustion engine vehicles with petrol or diesel fuel.

Vehicle Fuel Efficiency Standards: Vehicle Fuel Efficiency Standards set an average emissions target for vehicle manufacturers, or local distributors, measured in grams of CO_2 released per kilometre and averaged across the new vehicles they sell.