Climate Council of Australia

Submission to:	National Electric Vehicle Strategy Consultation
Addressed to:	Department of Industry, Science and Resources Australian Government
Submission from:	Climate Council of Australia Pty Ltd 8 Short Street, Surry Hills, NSW 2010 Tel: 02 9356 8528 Email: info@climatecouncil.org.au

October 2022

About the Climate Council

Climate Council is Australia's own independent, evidence-based organisation on climate science, impacts and solutions.

We connect decision-makers, the public and the media to catalyse action at scale, elevate climate stories in the news and shape the conversation on climate consequences and action, at home and abroad.

We advocate for climate policies and solutions that can rapidly drive down emissions, based on the most up-to-date climate science and information.

We do this in partnership with our incredible community: thousands of generous, passionate supporters and donors, who have backed us every step of the way since they crowd-funded our beginning as a non-profit organisation in 2013.

Summary of recommendations

Recommendation 1:

In light of the wide-ranging benefits that fuel efficiency standards can deliver - both in terms of the specific goals and objectives of the National Electric Vehicle Strategy and for the broader Australian community - Climate Council recommends the Australian Government move swiftly to introduce strong fuel efficiency standards in line with the policy principles outlined in this submission.

Recommendation 2:

The ongoing payment of fossil fuel subsidies is increasingly indefensible as technology advances and Australia moves to reduce emissions by at least 43% by 2030. Climate Council recommends the Australian Government commence the withdrawal of these subsidies, with the aim of having fully eliminated them within five years.

Recommendation 3:

Climate Council recommends the Australian Government develop a comprehensive Zero Emission Transport Strategy addressing the full suite of technology, policy and behaviour change considerations underpinning the full decarbonisation of transport in Australia. Delivering a National Electric Vehicle Strategy is a positive first step, but there are a wide range of issues impacting the decarbonisation of transport which cannot be achieved through vehicle electrification alone.

Introduction

Thank you for the opportunity to provide feedback on the development of the Australian Government's *National Electric Vehicle Strategy*.

Climate Council welcomes the Australian Government's focus on tackling transport emissions as part of a holistic approach to addressing harmful climate change. We congratulate the government for taking a range of initial steps through the updated 2022-23 Commonwealth Budget to incentivise uptake of electric vehicles, roll out more enabling infrastructure and pursue the development of alternative fuels for heavy vehicles.

We also recognise the Government has already taken an important step forward in committing to introduce stricter emissions standards, which limit noxious emissions from trucks and buses. Strong emissions standards for trucks and buses are crucial to reducing dangerous particulate air pollution, which is harmful to the health of Australians and destructive to our environment beyond the climate-warming impact of CO2 emissions. We welcome the Government's commitment to implement new standards from 2024 to address particulate emissions. We trust this will be just the start of a further series of important reforms to vehicle pollution regulation, which will bring Australia into line with the majority of advanced economies around the world.

Why tackling transport emissions matters

Addressing emissions from transport is essential for tackling the climate crisis. Transport accounts for 18% of Australia's greenhouse gas emissions, with road transport responsible for around 85% of total transport emissions (or about 16% of Australia's total emissions) in 2018.[1]

Personal transport is Australia's fastest growing source of emissions, and is second only to the energy sector as the largest source of total emissions. Cars and light commercial vehicles alone make up over 60% of Australia's transport pollution.[2]

Technology solutions available today mean electrifying Australia's light passenger vehicles and powering them with renewable energy is one of the first - and most achievable - steps towards decarbonising transport in Australia. Electrifying Australia's passenger fleets at the same time as we transition the grid to renewable energy will also accelerate overall decarbonisation so Australia can meet and then go further than its target to reduce national emissions by 43% below 2005 levels by 2030.

We welcome the Government's intended National Electric Vehicle Strategy as a key roadmap to guide this journey. It is important that this strategy sets out a clear direction for significant policy reform, technology acceleration and improvements to enabling

infrastructure, while also mapping out practical actions, which can get underway quickly to start driving down transport emissions.

We also note that a whole-of-sector approach will be required to fully decarbonise Australian transport beyond light passenger vehicles. Transport sub-sectors including aviation, shipping, freight and heavy vehicles also contribute significantly to national emissions and addressing these will also require focus. Investment and policy support to accelerate appropriate technology solutions for these sectors is essential, particularly where electrification may not be the optimal or appropriate solution.

Please read on for the Climate Council's submission to key areas of the National Electric Vehicle Strategy consultation.

Not all electric vehicles are created equal

The term 'electric vehicle' (EV) refers to a range of vehicle technologies that can be powered by different energy sources. As such, they offer varying levels of benefits when it comes to emissions reduction potential; consumers' hip pockets; health; and the environment.

Battery electric vehicles (BEVs): BEVs are run exclusively on electricity, drawing energy from their battery. As such, they can achieve zero tailpipe emissions and zero overall emissions from use when powered by renewable energy. BEVs can travel approximately 400 kilometres before requiring a recharge.[3] When it comes to emissions reduction potential, BEVs reduce CO2 emissions by between 57% and 67% (depending on energy source) compared with internal combustion engine vehicles (ICE).[4] BEVs are the only "true" electric vehicle and should be prioritised when it comes to policy support.

Plug-in hybrid vehicles (PHEVs): PHEVs can be powered by both conventional fuel (typically petrol) and an electric battery, and can travel only ~50km on their battery alone.[5] There is also evidence of problematic behaviour, including a lack of charging and overreliance on fuel when used as part of corporate fleets.[6] [7] PHEVs should not receive priority policy support. PHEVs reduce CO2 emissions by between 10% and 52% (depending on energy source) compared with ICEs.[8]

Hybrid electric vehicles (HEVs): HEVs combine an internal combustion engine with an electric motor and battery to reduce fuel consumption. Drivers can only refuel them with traditional fuels. HEVs charge their battery through regenerative braking, and use their electricity to power the car when the ICE would be less efficient - accelerating from a stationary position for example. The ICE unit then takes over when it is more efficient to do so, including when travelling at highway speeds.[9] As they will only ever be primarily powered by fossil fuels, HEVs should not receive priority policy support.

Hydrogen fuel cell vehicles (FCEVs): More research is required into the use of hydrogen for decarbonising heavier vehicle segments in the future including freight and shipping, but FCEVs are not commercially viable for lighter passenger vehicles today. Given the energy-intensive process of running a FCEV and the high cost of this technology, the economics and environmental impacts for passenger FCEVs are not competitive compared to BEVs.[10]

Climate Council recommends that priority policy support be directed to vehicle technologies that achieve the greatest reduction in CO2 emissions and savings for Australian drivers when in use. In practice, this means prioritising BEVs over PHEVs and other 'partial' electric vehicles when designing incentives and other policy settings outlined in this submission, such as fuel efficiency standards. Throughout this

submission the term 'EV' is used to refer to the broad category of vehicles, which are powered to some extent by electric battery power, but we note that in all instances our preference is to incentivise and prioritise the uptake of vehicles which do not use any fossil fuels over other hybrid vehicle types.

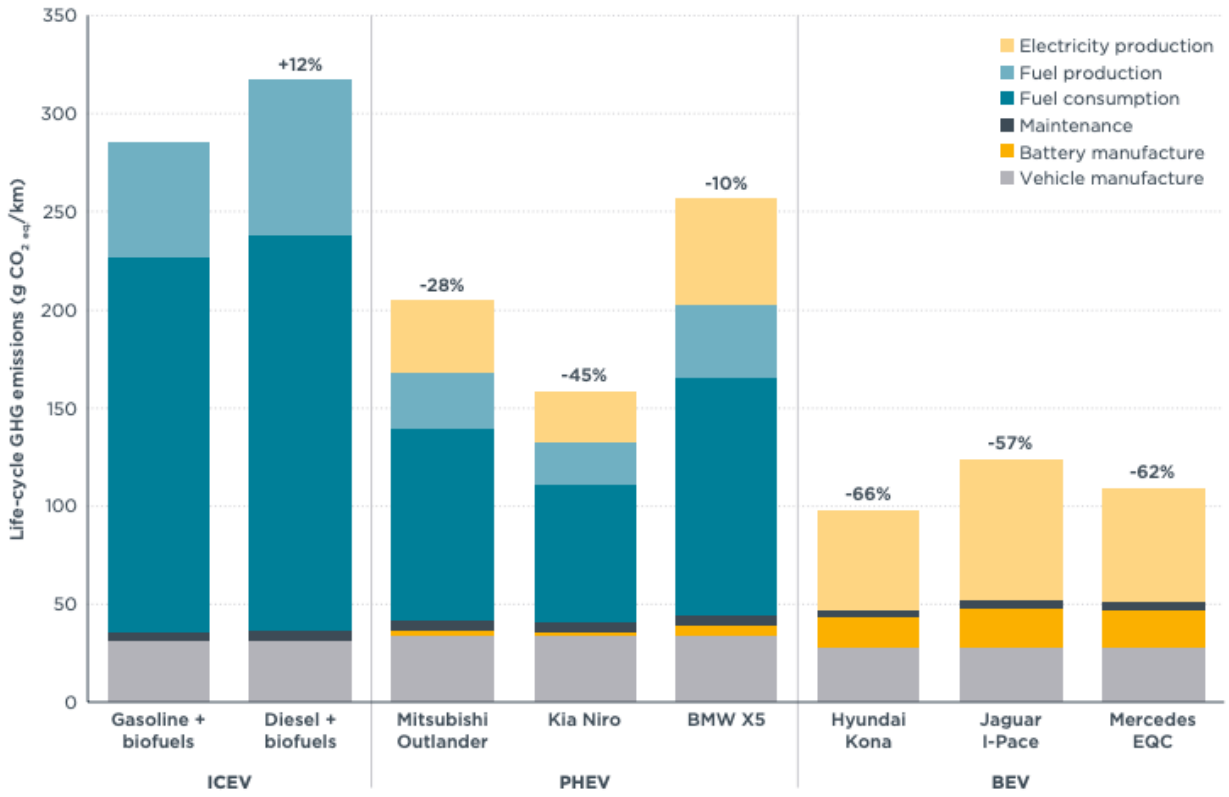

Figure: A comparison of lifecycle greenhouse gas emission benefits and incentives of plug-in hybrid and battery vehicles in Germany.[11]

Goals and objectives for a National Electric Vehicle Strategy

Climate Council strongly supports the proposed goals and objectives outlined for the National Electric Vehicle Strategy in the Consultation Paper (p. 4). Encouraging the uptake of more EVs is essential to drive down emissions from transport and free Australian households from rising and volatile prices at the petrol pump. However, at the moment most EVs are too expensive for the average Australian family to afford, and purchasing one involves long lead times from overseas manufacturers.[12]

In pursuing opportunities to address the availability and affordability of EVs in Australia, Climate Council believes strong fuel efficiency standards are the key national policy lever, which will drive the greatest impact. We note that the Australian Government has commenced implementation of a range of other actions aimed at achieving these objectives, and further such actions are canvassed in the discussion paper. These are

positive developments but are unlikely to achieve their desired outcomes unless and until Australia also implements strong fuel efficiency standards. Our inputs to this consultation process are therefore primarily focused on discussion of what effective fuel efficiency standards would look like and the key considerations for their design and implementation.

The value of strong fuel efficiency standards

Fuel efficiency standards aim to limit the greenhouse gas (CO_2) emissions produced on average across a given vehicle fleet.. They do this by setting a maximum allowable average level of CO_2 emissions across a manufacturer's overall new vehicle offerings for a given compliance period, with financial penalties applying where this average is exceeded.

In short, fuel efficiency standards incentivise vehicle makers to supply low and zero emissions vehicles by penalising them financially if they fail to do so. The agreed allowable CO_2 limit (fuel efficiency standard) can be progressively reduced over time, requiring vehicle manufacturers to produce increasingly efficient vehicles and/or grow the share of zero emission vehicles they produce. In international markets where fuel efficiency standards have already been implemented, this has had the effect of dramatically increasing the supply of EVs while driving down their price.[13] Conversely, Australia's lack of fuel efficiency standards means there is no incentive for manufacturers to offer cheap, clean EVs to our market when there are far greater financial benefits - via avoided penalties - for them doing so in a wide range of other markets.

Australia's lack of fuel efficiency standards has left us well behind our global peers when it comes to EV uptake and options as outlined in Table 1 below.

Table 1:

Jurisdiction	Percentage of new car sales	Number of EV models available
UK	19%[14]	80[15]
EU	17%[16]	184[17]
California	13%[18]	65[19]
China	13%[20]	300[21]
Global	8.6%[22]	450[23]
Australia	3%[24]	45[25]

Principles for the design of fuel efficiency standards

In designing fit-for-purpose fuel efficiency standards for the Australian market, there are a range of policy principles, which should underpin these. Climate Council would be happy to participate in further consultation with the Department on how such principles would be translated into the granular detail needed for the delivery of legislation and regulation.

Key principles:

- *Australian fuel efficiency standards must be <u>at least</u> equivalent to those in other major global markets.*

  Weaker standards will not achieve the desired objective of increasing supply of affordable and accessible EVs to meet demand across all segments. This is because Australia would remain at the back of the queue when manufacturers are making business decisions about where to direct their available supply of EVs.

- *Australian fuel efficiency standards must set a transition path to see 100% of new vehicles sold be zero emissions as soon as possible.*

  To rapidly drive down national emissions, it is an urgent priority to transition our vehicle fleet to clean alternatives. A new vehicle sold today will generally remain in service for 10 to 15 years - and possibly even longer. Setting a transition path that is overly gradual will mean higher emitting ICE vehicles continue to be sold for longer, reducing our capacity to make significant reductions in transport emissions over the coming decade.

- *The policy architecture for Australian fuel efficiency standards should allow for minimal use of crediting and other loopholes which diminish scheme transparency and effectiveness.*

Schemes in place around the world allow for varying levels of crediting and bonus arrangements in relation to how different vehicle types are counted. For example, the provision of a single fully electric BEV may accrue multiple 'credits' for the purpose of assessing a manufacturer's overall fleet emissions intensity. While recognising that crediting arrangements can play a role in incentivising manufacturers to bring particular vehicle types to a market - for example, BEVs over PHEVs - all credits have the potential to dampen the price signals upon which fuel efficiency standards rest. Further, extensive use of crediting can diminish transparency and effectiveness of the scheme by generating a gap between stated targets and the actual effort of manufacturers to reduce vehicle emissions. This is because manufacturers can achieve average emission targets 'on paper' through the use of credits which allow for double or triple counting of the same zero emission vehicle, while having much higher real-world emissions across their vehicle fleet. Where any form of crediting is used, this must be entirely transparent, with the expected impact on overall emissions relative to the standard modelled and disclosed as part of scheme design. Australia is in a fortunate position to be able to assess the empirical impact of crediting and associated mechanisms on the supply of EVs in different international markets to date. We would encourage the Department to look closely at this evidence in determining what - if any - crediting arrangements should be included in the design of Australian fuel efficiency standards, with a view to minimising potential loopholes.

- *Australian fuel efficiency standards should take into account the dynamics of our local vehicle market, while avoiding incentivising the ongoing purchase of large, high emitting vehicles.*

  Climate Council acknowledges that dynamics and consumer preferences within the Australian vehicle market are significantly different from those in some other markets. A clear example of this is the current Australian preference for SUVs and utes, which together made up approximately 75% percent of new vehicles sold in 2021.[26] This compares with just 43% per cent of new vehicles sold in the European Union in 2020.[27] Some of this preference is due to Australia's geography and the needs of particular workers - such as those in the agriculture and construction sectors. However, it should also be acknowledged that some is due to individual consumer preference and policy settings, which may indirectly incentivise the purchase of these vehicles, such as fringe benefits tax settings. Further, the USA vehicle market has similar dynamics to Australia's in that SUVs and utility vehicles represent the majority share of new vehicles sold.[28] This has not prevented the USA putting strong national fuel efficiency standards in place, which have recently been further tightened by the Biden Administration.[29]

  In designing fuel efficiency standards tailored to Australia, it is important to acknowledge and respond to the specific dynamics of our vehicle market without putting in place settings that inadvertently promote or extend the uptake of

heavier, higher emitting vehicles. How this can best be achieved will require further consultation between the Department and relevant sector stakeholders (see further discussion on a mechanism for this dialogue below).

Dual trajectory policy design

Recognising the different stages of technology development across vehicle classes, international jurisdictions such as the European Union, New Zealand and the USA have placed passenger vehicles and light SUVs (MA category) and heavy SUVs and light commercial vehicles (MC+NA category) on different regulated trajectories through the design of their respective fuel efficiency standards.

In Australia in 2019, the average emissions intensity for passenger cars and light SUVs was 146.5 g/km. In contrast, the average emissions intensity of heavy SUVs and light commercial vehicles was 212.5 g/km.[30] Technology for the manufacturing of electric utes is currently ramping up rapidly, but at present there are more electric passenger vehicle models currently under production.

In this context, there may be benefits in considering a dual trajectory policy design. For example, it may be possible to set a very ambitious transition pathway for lighter vehicles and SUVs - given the extensive existing availability of these EVs - and a more gradual pathway specifically for light commercial vehicles - accommodating the further development of electric ute technology. Such a policy design may well have greater overall benefits for emissions reduction and vehicle availability than one which keeps all vehicle classes together but sets very weak targets across the board.

However, there is some evidence of shortfalls with this approach. In the US, for example, while targets across each segment have consistently been satisfied, the effectiveness of the standards have been undermined as customers have opted for larger vehicles, including SUVs and light trucks.[31] Because of this shift in sales between vehicle classes, the US saw a rise in average vehicle emissions from new car sales in 2019 compared to 2018 – despite most car makers meeting their targets within the vehicle classes.[32] Some EU jurisdictions have had the same experience, albeit to a lesser degree.[33] This is why Climate Council recommends that SUVs be included on the more rapid transition path in a dual trajectory design if one were ultimately to be pursued, to avoid incentivising consumers to choose heavier and higher emitting vehicles.

It should also be noted that the introduction of any fuel efficiency standards will impact individual vehicle models differently depending on their starting

emissions intensity. For example, there are significant differences in the amount of pollution produced by utes available in the Australian market today. The best-in-class ute currently available is the Nissan D23 NP300 Navara 4x2 Twin Turbo, at 166g CO2 / km.[34] In contrast, the most polluting utes are the Toyota Hilux 4WD and 2WD at 203g CO2 /km and the Volkswagen MY21 Transporter Cab at 202g CO2 /km; 20 per cent more than their best-in-class peers.[35] Utes and other light commercial vehicles which are already relatively more fuel efficient would be less impacted by the introduction of fuel efficiency standards than their higher emitting counterparts. This means that consumers would still have a range of choices even within ICE vehicles following the introduction of such standards. To the extent that fuel efficiency standards drove consumer preferences towards the best-in-class light commercial vehicles for emissions, this would be a positive public policy outcome.

- *The policy architecture for Australian fuel efficiency standards should be flexible to evolving technology.*

  Vehicle technologies are changing rapidly and Australia is not the only market that is seeking to drive significant new uptake of EVs. It is therefore important that any policy settings put in place now have the capacity to be reviewed and updated at regular intervals to assess their effectiveness and appropriateness to the prevailing technology and market context. Climate Council recommends a legislated review after the first five years and regular intervals after this time be included in the legislation for Australian fuel efficiency standards. This review would provide a clearly-signposted opportunity to assess the transition pathway as initially set out at scheme commencement, and identify whether there are opportunities to accelerate this in light of improvements to vehicle technology or regulatory developments in other markets. In the event that a dual trajectory policy design was pursued, this review would also be an opportunity to assess and update the respective pathways for different vehicle types if there was evidence it was possible and beneficial to do so.

- *Australian fuel efficiency standards should be designed collaboratively with involvement from diverse stakeholders*.

  Climate Council recognises the design of fuel efficiency standards for Australia is of strong interest to vehicle manufacturers and their peak representative bodies. However, it must also be acknowledged that this policy process is of high interest to a range of other stakeholders as well given its potential implications for consumers and Australia's action on climate change. We recommend that any detailed discussion regarding specific policy settings be undertaken via a focused, consultative process, which includes representatives from a diversity of perspectives. For example, a Working Group could be established with representatives from the vehicle industry, climate and environment civil society

organisations and those representing consumer voices such as the national and state motoring bodies. This group could work collaboratively with the Department to develop the next level of detail in policy design for government's consideration. This process would ensure that stakeholders with a commercial interest in these reforms are appropriately consulted, while ensuring other important perspectives are also given appropriate weight.

Getting the design of fuel efficiency standards right will be challenging. However, doing so will deliver significant benefits for Australia and our environment. Below is a brief summary of the key benefits that would be expected to accrue across a range of domains from the implementation of strong fuel efficiency standards:

Household budgets:

- Our ongoing dependance on volatile foreign oil means Australians are now paying a record $100 a week for fuel[36]
- If fuel efficiency standards had been introduced in 2016, $5.9 billion in fuel costs for Australian households would have been saved.[37]
- With fuel efficiency standards, drivers who buy a zero or low-emissions car would save *at least* $900 over the first five years, due to reduced running costs.[38]

Air quality

- Air pollution from cars, trucks and fossil-fuel powered buses is responsible for an estimated 1,700 deaths every year in Australia – larger than the national road toll.[39] Modelling indicates that an increase in travel mode share to 20% for buses and a transition to EVs by 2035 would prevent 2,624 deaths between 2021 and 2050.[40]

Emissions reductions

- Personal transport is Australia's fastest growing source of emissions,[41] and the second highest source of emissions behind only the energy sector. Australia's current transport system, built extensively around cars, is a major contributor to harmful climate change.
- If fuel efficiency standards had been introduced in 2016, 9 million tonnes of CO2 would have been prevented – equivalent to approximately one year's worth of emissions from domestic aviation.[42]

Recommendation:

In light of the wide-ranging benefits that fuel efficiency standards can deliver - both in terms of the specific goals and objectives of the National Electric Vehicle Strategy and for the broader Australian community - Climate Council recommends the Australian Government move swiftly to introduce strong fuel efficiency standards in line with the policy principles outlined here.

Phasing out fuel tax credits

The consultation paper sought input on other proposals that could help drive demand for EVs and provide a revenue source to help fund road infrastructure. In this context, Climate Council urges the Australian Government to commence the phase out of public subsidies for the ongoing use of fossil fuels - particularly fuel tax credits.

Fuel tax credits provide businesses with a credit for the excise component of the price of fuel used in:

- machinery
- plant
- equipment
- heavy vehicles
- light vehicles travelling off public roads or on private roads.[43]

These credits are estimated to cost the Commonwealth Budget over $7 billion in 2022-23 alone[44], with the largest beneficiaries being Australia's mining industry - including fossil fuel companies.[45]

In a context where Australia needs to be decarbonising vehicles and machinery as quickly as possible, the ongoing payment of fuel tax credits risks blunting the financial incentive, which would otherwise apply for businesses to switch to zero emission options. It may also disincentivise their rapid implementation at scale because zero emission plant, equipment and vehicles must compete with the artificially-reduced operating cost of petrol and diesel equivalents when businesses are assessing their costs.

While not a direct subsidy *to* the fossil fuel industry, the payment of fuel tax credits entrenches Australia's reliance on expensive, volatile fuel sources and dampens market signals for the rapid uptake of zero emission alternatives across Australia's 2.5 million businesses. When combined with other, more direct fossil fuel subsidies, there are billions of dollars a year available in Commonwealth funding, which could be repurposed to support uptake of EVs and other decarbonisation initiatives in the transport sector.

For example, Climate Council analysis indicates that the $11.6 billion spent on fossil fuel subsidies in 2021-22 would have been sufficient to deliver 72,500 public EV charging stations around Australia.[46] This would mean one charger for every 12 kilometres of road across the country, completely eliminating concerns about charger availability and associated range anxiety. Alternatively, $11.6 billion would be sufficient to fully fund around 15,500 electric buses, which could replace all of the diesel buses used in public transport in Sydney, Melbourne and Brisbane, with more to spare.

Recommendation:

The ongoing payment of fossil fuel subsidies is increasingly indefensible as technology advances and Australia moves to reduce emissions by at least 43% by 2030. Climate Council recommends the Australian Government commence the withdrawal of these subsidies, with the aim of having fully eliminated them by the end of this decade.

Sector-wide decarbonisation and mode-shift

The Australian Government has an important leadership role to play in setting out a pathway to the full decarbonisation of the transport sector. Beyond the electrification of light vehicles there are a wide range of issues, which need to be considered both to drive mode shift away from private vehicles altogether and address emissions from other areas of transport such as aviation, shipping and logistics.

That is why the Climate Council recommends the Australian Government develop a comprehensive Zero Emission Transport Strategy - whether alongside the proposed National Electric Vehicle Strategy, or with vehicle electrification as one component within a broader whole-of-transport-sector plan.

Key issues that a Zero Emission Transport Strategy should address include:

- Strategies and investment plans to genuinely transform how Australians move around, including significantly increasing uptake of public transport, walking and bike riding;
- Strategies and investment plans to decarbonise public transport fleets, including supporting the rapid roll out of zero emissions buses;
- Transition pathways and technology options for segments of the transport sector where electrification may not be the optimum or most cost efficient solution, including:
    - Aviation (passenger and freight)
    - Shipping
    - Heavy vehicles and logistics
    - Heavy rail.

  In segments where technologies are less advanced, Australian Government leadership through both investment in research and development and policies to incentivise demonstration and deployment would be highly beneficial. In this critical decade for climate action, Australia cannot afford the same delayed roll out

of clean technologies for the broader transport sector as has been seen to date in relation to passenger vehicles.

As a priority, supporting mode shift by investing in better public transport and infrastructure for walking and cycling will deliver a wide range of benefits and positive climate impacts which can be achieved almost immediately with solutions available today:

Reduced cost of living

- Cars are the most expensive mode of travel, costing society 86c for every passenger kilometre, compared with rail (the cheapest) at 47c and buses at 57c. Note: this is even lower in the case of zero-emission buses.[47] Commuting to work by public transport can save someone $8,000 a year, or $12,000 for someone who walks.[48]

Improved accessibility

- Improving footpaths, bike lanes and public transport can make it easier for Australia's most vulnerable and marginalised groups to get around. These upgrades can dramatically impact older people, those living with a disability, low income households and migrant communities.

More choice

- Quality urban design and investment that prioritises walking, riding and public transport will empower individuals to have more autonomy over how they get around.

Improved quality of life

- Opening the streets for people and children to walk, ride, play and explore helps build safer, more connected, happier and healthier communities, and has been key to cutting car congestion at school gates and other busy hubs.[49]

Reduced car traffic

- Creating a safe network of bike lanes, separated from roads, helps people gravitate towards bike-riding and reduces car traffic, achieving 'traffic evaporation.'[50] Further, research shows that public transport is the most intelligent way to reduce car traffic.[51]

New, high quality jobs

- Investment in sustainable transport is a major job creator, with an estimated 12-15 jobs created per $1 million invested in foot paths, bike lanes and EV charging infrastructure.[52] Clean transport jobs create 1.2 more jobs than roads for every $1 million of investment.[53]

Recommendation:

Climate Council recommends the Australian Government develop a comprehensive Zero Emission Transport Strategy addressing the full suite of technology, policy and behaviour change considerations underpinning the full decarbonisation of transport in Australia. Delivering a National Electric Vehicle Strategy is a positive first step, but there are a wide range of issues impacting the decarbonisation of transport, which cannot be achieved through vehicle electrification alone.

Conclusion

With the transformation of Australia's energy system underway and accelerating rapidly, decarbonising transport is the next frontier in tackling harmful climate change. The National Electric Vehicle Strategy represents a strong opportunity to see Australia take significant and rapid steps forward in this sector after a decade of obstruction and delay.

Strong fuel efficiency standards are the key to achieving the goals and objectives outlined for this strategy. Without them it is unlikely that any other combination of government actions and incentives will achieve the desired outcomes of seeing EVs become more affordable and accessible to promote uptake and cut emissions from personal transport. The continued incentivisation of certain types of ICE vehicles through fuel tax credits and other tax benefits is now directly at odds with the objective of promoting increased uptake of electric vehicles and such subsidies should be phased out on that basis.

Decarbonising transport is a significantly bigger task than transitioning the current vehicle fleet to EVs. Mode shift to other forms of transport entirely for day-to-day journeys will play a significant role in reducing emissions while also delivering a wide range of other benefits - particularly in our cities. The active pursuit of mode shift should therefore be a key consideration for transport policy at all levels of government. Equally, fully decarbonising the transport sector will require new solutions across a range of sub-sectors, which currently have fewer available options to significantly reduce emissions. A coordinated and holistic focus on these broader challenges through the development of a Zero Emission Transport Strategy should be prioritised alongside work on vehicle electrification.

References:

1. Climate Change Authority, 2020. *Transport Factsheet.* [Online] Available at: https://www.climatechangeauthority.gov.au/sites/default/files/2021-03/2021Fact%20sheet%20-%20Transport.pdf [Accessed 2022].
2. Climate Council, 2018. *Waiting for the Greenlight - Transport Solutions to Climate Change.* [Online] Available at: https://www.climatecouncil.org.au/wp-content/uploads/2018/09/CC_MVSA0154-Report-Transport_V5-FA_Low-Res_Single-Pages.pdf [Accessed 2022].
3. Australian Government, 2022. *Electric vehicles - The Green Vehicle Guide.* [Online] Available at: https://www.greenvehicleguide.gov.au/pages/LowAndZeroEmissionVehicles/ElectricVehicleInformation [Accessed 2022]
4. International Council on Clean Transportation, 2022. *More bang for buck: A comparison of lifecycle greenhouse gas emission benefits and incentives of plug-in hybrid and battery vehicles in Germany.* [Online] Available at: https://theicct.org/publication/ghg-benefits-incentives-ev-mar22/ [Accessed 2022].
5. Australian Government, 2022. *Hybrid vehicles - The Green Vehicle Guide.* [Online] Available at: https://www.greenvehicleguide.gov.au/pages/LowAndZeroEmissionVehicles/HybridVehicleInformation [Accessed 2022]
6. The International Council on Clean Transportation, 2020. *Real-world usage of plug-in hybrid electric vehicles: Fuel consumption electric driving and CO2 emissions.* [Online] Available at: https://theicct.org/publication/real-world-usage-of-plug-in-hybrid-electric-vehicles-fuel-consumption-electric-driving-and-co2-emissions/ (Accessed 2022]
7. UC Davis, International EV Council, 2019. *Exploring the Role of Plug-In Hybrid Electric Vehicles in Electrifying Passenger Transportation.* [Online] Available at: https://ucdavis.app.box.com/v/plug-in-ev-guide
8. International Council on Clean Transportation, 2022. *More bang for buck: A comparison of lifecycle greenhouse gas emission benefits and incentives of plug-in hybrid and battery vehicles in Germany.* [Online] Available at: https://theicct.org/publication/ghg-benefits-incentives-ev-mar22/ [Accessed 2022].
9. International Council on Clean Transportation, 2022. *More bang for buck* [Online] Available at: https://theicct.org/publication/ghg-benefits-incentives-ev-mar22/ [Accessed 2022].
10. Ze Car, 2022. *Electric car waiting list in Australia (July 2022)* [Online]. Available at: https://zecar.com/resources/electric-car-waiting-list-in-australia [Accessed 2022].
11. Nasdaq, 2022. *Australia plans fuel efficiency standards to boost electric car supply.* [Online] Available at: https://www.nasdaq.com/articles/australia-plans-fuel-efficiency-standards-to-boost-electric-car-supply [Accessed 2022]
12. Electric Vehicle Council, 2022. *Latest State of EVs report shows huge boom in EV sales, but Australia still miles behind due to policy.* [Online] Available at: https://electricvehiclecouncil.com.au/reports/latest-state-of-evs-report-shows-huge-boom-in-ev-sales-but-australia-still-miles-behind-due-to-policy/ [Accessed 2022].

13. Nasdaq, 2022. *Australia plans fuel efficiency standards to boost electric car supply.* [Online] Available at: https://www.nasdaq.com/articles/australia-plans-fuel-efficiency-standards-to-boost-electric-car-supply [Accessed 2022]
14. Electric Vehicle Council, 2022. *Latest State of EVs report shows huge boom in EV sales, but Australia still miles behind due to policy.* [Online] Available at: https://electricvehiclecouncil.com.au/reports/latest-state-of-evs-report-shows-huge-boom-in-ev-sales-but-australia-still-miles-behind-due-to-policy/ [Accessed 2022].
15. Next Green Car, 2022. *Available electric cars 2022* [Online] Available at: https://www.nextgreencar.com/electric-cars/available-models/ [Accessed 2022].
16. Cars Guide, 2022. *How many electric cars are there in Australia?* [Online] Available at: https://www.carsguide.com.au/ev/advice/how-many-electric-cars-are-there-in-australia-83262 [Accessed 2022].
17. International Energy Agency, 2021. *Trends in electric light-duty vehicles.* [Online] Available at: https://www.iea.org/reports/global-ev-outlook-2022/trends-in-electric-light-duty-vehicles [Accessed 2022].
18. Electric Vehicle Council, 2022. *Latest State of EVs report shows huge boom in EV sales, but Australia still miles behind due to policy.* [Online] Available at: https://electricvehiclecouncil.com.au/reports/latest-state-of-evs-report-shows-huge-boom-in-ev-sales-but-australia-still-miles-behind-due-to-policy/ [Accessed 2022].
19. International Energy Agency, 2021. *Trends in electric light-duty vehicles.* [Online] Available at: https://www.iea.org/reports/global-ev-outlook-2022/trends-in-electric-light-duty-vehicles [Accessed 2022].
20. Cars Guide, 2022. *How many electric cars are there in Australia?* [Online] Available at: https://www.carsguide.com.au/ev/advice/how-many-electric-cars-are-there-in-australia-83262 [Accessed 2022].
21. International Energy Agency, 2021. *Trends in electric light-duty vehicles.* [Online] Available at: https://www.iea.org/reports/global-ev-outlook-2022/trends-in-electric-light-duty-vehicles [Accessed 2022].
22. Electric Vehicle Council, 2022. *Latest State of EVs report shows huge boom in EV sales, but Australia still miles behind due to policy.* [Online] Available at: https://electricvehiclecouncil.com.au/reports/latest-state-of-evs-report-shows-huge-boom-in-ev-sales-but-australia-still-miles-behind-due-to-policy/ [Accessed 2022].
23. International Energy Agency, 2021. *Trends in electric light-duty vehicles.* [Online] Available at: https://www.iea.org/reports/global-ev-outlook-2022/trends-in-electric-light-duty-vehicles [Accessed 2022].
24. Electric Vehicle Council, 2022. *Latest State of EVs report shows huge boom in EV sales, but Australia still miles behind due to policy.* [Online] Available at: https://electricvehiclecouncil.com.au/reports/latest-state-of-evs-report-shows-huge-boom-in-ev-sales-but-australia-still-miles-behind-due-to-policy/ [Accessed 2022].
25. Electric Vehicle Council, 2022. *State of Electric Vehicles.* [Online] Available at: https://electricvehiclecouncil.com.au/wp-content/uploads/2022/10/State-of-EVs-October-2022.pdf [Accessed 2022].

26. Budget Direct, 2021. *Latest Australian Car Sales Statistics & Survey.* [Online] Available at: https://www.budgetdirect.com.au/car-insurance/research/australian-car-sales-statistics.html [Accessed 2022].
27. International Council on Clean Transportation, 2021. *European Market Vehicle Statistics.* https://theicct.org/wp-content/uploads/2021/12/ICCT-EU-Pocketbook-2021-Web-Dec21.pdf
28. Stasitica, 2022. *U.S. light vehicle market in June 2021 and 2022, by segment.* [Online] Available at: https://www.statista.com/statistics/276506/change-in-us-car-demand-by-vehicle-type/ [Accessed 2022]
29. NHTSA, 2022. *USDOT Announces New Vehicle Fuel Economy Standards for Model Year 2024-2026* [Online] Available at: https://www.nhtsa.gov/press-releases/usdot-announces-new-vehicle-fuel-economy-standards-model-year-2024-2026#:~:text=The%20new%20standards%20will%20increase,relative%20to%20model%20year%202021 [Accessed 2022].
30. National Transport Commission, 2021. *Carbon Dioxide Emissions Intensity for New Australian Light Vehicles 2021.* [Online] Available at: https://www.ntc.gov.au/sites/default/files/assets/files/Carbon%20Dioxide%20Emissions%20Intensity%20for%20New%20Australian%20Light%20Vehicles%202021.pdf [Accessed 2022].
31. Shepardson, D, 2021. *U.S. vehicle fleet fuel efficiency fell in 2019 to 24.9 mpg -- EPA*. [Online] Available at: https://www.reuters.com/article/us-usa-autos-emissions-idUSKBN29B1YQ [Accessed 2022]
32. International Energy Agency, 2019. *Growing preference for SUVs challenges emissions reductions in passenger car market*. [Online] Available at: https://www.iea.org/commentaries/growing-preference-for-suvs-challenges-emissions-reductions-in-passenger-car-market [Accessed 2022]
33. The International Council on Clean Transportation, 2018. *The role of standards in reducing CO2 emissions of passenger cars in the EU, pg. 4* [Online] Available at: https://theicct.org/sites/default/files/publications/Role_of_EU-CO2_Standard_20180212.pdf [Accessed 2022]
34. The Australian Government, 2022. *Green Vehicle Guide.* [Online] Available at: https://www.greenvehicleguide.gov.au/ [Accessed 2022]
35. The Australian Government, 2022. *Green Vehicle Guide.* [Online] Available at: https://www.greenvehicleguide.gov.au/ [Accessed 2022]
36. Drive, 2022. [Online] *Australian fuel costs rise to more than $100 per week for the first time on record* Available at: *https://www.drive.com.au/news/australia-fuel-cost-100-per-week-first-time-on-record/ [Accessed 2022].*
37. The Australian Institute, 2022. *Fuel Efficiency Discussion Paper.* [Online] Available at: https://australiainstitute.org.au/wp-content/uploads/2022/08/P1269-Fuel-Efficiency-Standards-WEB.pdf [Accessed 2022]
38. The Grattan Institute, 2022. *The Grattan Car Plan.* [Online] Available at: https://grattan.edu.au/wp-content/uploads/2021/10/Grattan-Car-Plan.pdf [Accessed 2022]
39. Schofield R. et al., 2017. *Submission on the "Better fuel for cleaner air" discussion paper. Clean Air and Urban Landscapes Hub.* [Online] Available at http://www.nespurban.edu.au/publications- resources/research-reports/CAULRR06_SubmissionFuelQualityStandardsAct2000_Mar2017.pdf [Accessed 2022].
40. Australian Conservation Foundation, 2021. *Local community benefits of Zero Emission Vehicles in Australia.* [Online] Available at: https://d3n8a8pro7vhmx.cloudfront.net/auscon/pages/19557/

attachments/original/1634867677/Zero_emissions_ vehicles_in_Australia.pdf?1634867677 [Accessed 2022].
41. Australian Government, 2022. *National Greenhouse Gas Inventory.* [Online] Available at: https://ageis. climatechange.gov.au/nggi.aspx [Accessed 2022].
42. Mulach, J. *Australian fuel costs rise to more than $100 per week for the first time on record* [Online] Available at: https://www.drive.com.au/news/australia-fuel-cost-100-per-week-first-time-on-record/ [Accessed 2022].
43. ATO, 2021. *Fuel tax credits – business.* [Online] Available at: https://www.ato.gov.au/Business/Fuel-schemes/Fuel-tax-credits---business/ [Accessed 2022].
44. Australian Government, 2022. *2022-23 Commonwealth Budget (May),* [Online] Available at: https://archive.budget.gov.au/2022-23/index.htm [Accessed 2022]
45. The Australian Institute, 2022. *Never Mind the Budget, Here's the Fuel Tax Credit Scheme.* [Online] Available at: https://australiainstitute.org.au/post/never-mine-the-budget-heres-the-fuel-tax-credit-scheme/ [Accessed 2022].
46. Climate Council, 2022. *Five Better Bets - What $11 billion of Australian's money wasted on fossil fuel subsidies could buy us.* [Online] Available at: https://www.climatecouncil.org.au/resources/five-better-bets-what-11-billion-of-australians-money-wasted-on-fossil-fuel-subsidies-could-buy-us/ [Accessed 2022].
47. The Climate Council, 2018. *Waiting for the Green Light: Transport Solutions to Climate Change.* [Online] Available at: https://www.climatecouncil.org.au/wp-content/uploads/2018/10/CC_MVSA0154-Report-Transport_V6-FA_Low-Res_Single-Pages.pdf [Accessed 2022].
48. Climate Council, 2022. *New Poll - Australians want transport options that are better for our hip pockets and the climate.* [Online] Available at: https://www.climatecouncil.org.au/resources/australians-want-transport-options-better-for-our-hip-pockets-and-climate/#:~:text=Australians%20who%20commute%20to%20work,savings%20are%20close%20to%20%2412%2C000. [Accessed 2022].
49. Bicycle Network, 2021. *Open Streets to cut school gate congestion* [Online] Available at: https://www.bicyclenetwork.com.au/newsroom/2021/03/11/open-streets-to-cut-school-gate-congestion/ [Accessed 2022].
50. Toussaint-Strauss, J et al. 2022. *Why new bike lanes don't cause traffic jams.* [Online] Available at: https://www.theguardian.com/lifeandstyle/video/2022/may/17/why-new-bike-lanes-dont-cause-traffic-jams-video [Accessed 2022].
51. Buchanan, M, 2019. *The benefits of public transport.* [Online] Available at: https://www.nature.com/articles/s41567-019-0656-8 [Accessed 2022].
52. Climateworks Centre, 2020. *Recover and reduce – Prudent investments to boost the economy and lower emissions* [Online] Available at: https://www.climateworkscentre.org/resource/prudent-investments-to-boost-the-economy-and-lower-emissions/ [Accessed 2022].
53. World Resource Institute, 2021. *The Green Job Advantage: How Climate Friendly Investments Are Better Job Creators* [Online] Available at: https://files.wri.org/d8/s3fs-public/2021-10/the-green-jobs-advantage-how-climate-friendly-investments-are-better-job-creators.pdf?VersionId=_4q3pkXM5qB8_DEy1MhhbF8AloDhqGUY [Accessed 2022].