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Future Fuels Package and Freight Productivity Program
Department of Industry, Science, Energy and Resources
Submitted via webform: <https://consult.industry.gov.au/climate-change/future-fuels-strategy>

01 April 2021

To Whom It May Concern,

RE: ClimateWorks Australia submission to the *Future Fuels Strategy: Discussion Paper 'Powering Choice'*

ClimateWorks Australia welcomes the opportunity to respond to the Department of Industry, Science, Energy and Resources *Future Fuels Strategy: Discussion Paper 'Powering Choice'*. ClimateWorks Australia develops expert, independent solutions to assist the transition to net zero emissions for Australia, South-east Asia and the Pacific. A non-profit organisation, it was co-founded in 2009 by The Myer Foundation and Monash University and works within Monash Sustainable Development Institute.

We applaud the Discussion Paper for outlining sensible high-level principles in the transition to a cleaner transport system. The opportunity to support consumer choice for zero-emissions vehicles and develop the electric vehicle industry in Australia, will reduce emissions in the road transport sector. Electric vehicles powered by renewable energy can also reduce operating costs, air and noise pollution, while supporting the transition to an efficient, zero-emissions transport system.

Our submission proposes more specific actions to accelerate the investment in infrastructure and zero-emissions corporate and government vehicle fleets. ClimateWorks recommends the addition of subsidies, incentives and minimum emissions standards in the final *Future Fuels Strategy*. The current actions in the strategy are not sufficient to fully achieve the priority areas, support consumer choices and realise the health benefits. There is an important role the Commonwealth Government could, but is not yet, play in driving cost-effective emissions reductions in the road transport sector. The growth in zero-emissions vehicles in Australia and internationally has the opportunity to demonstrate technologies and support initial development of the future fuel technologies such as hydrogen, which can be scaled up to take advantage of growing export markets.

ClimateWorks Australia's recommendations for the *Future Fuels Strategy* are summarised below, and detailed in the subsequent sections of this submission:

| Recommendations: | Responsibility |
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| Recommendation 1: set targets for the transition to zero-emissions vehicles, including specific metrics for phasing out internal combustion engines and supporting the uptake of zero-emissions vehicles. | Commonwealth Government |
| Recommendation 2: co-invest with state and territory governments to scale up the amount of public investment and leverage greater private investment in charging and refuelling infrastructure delivered through the Future Fuels Fund. | Commonwealth Government in partnership with states and territories |
| Recommendation 3: co-invest with state and territory governments, to accelerate uptake of fleet vehicles matched with private investment, for example through administering a grants scheme using a goal-oriented competitive tender process. | Commonwealth Government in partnership with states and territories |
| Recommendation 4: enable consumer choice with a national information sharing program to build fleet managers' and potential customers' knowledge and work with company decision makers to demonstrate leadership and build confidence and accelerate commercial fleet transition. | Commonwealth Government |
| Recommendation 5: co-invest with state and territory governments, to maximise the impact of the Freight Energy Productivity Program, ensuring the grants scheme uses a goal-oriented competitive tender process to reduce emissions and maximise cost savings for business. | Commonwealth Government in partnership with states and territories |
| Recommendation 6: establish short-term subsidies, and financial incentives through tax rebates or reductions, for vehicle purchases until the electric vehicles market in Australia is established. | Commonwealth Government |
| Recommendation 7: link the <i>Future Fuels Strategy</i> with <i>Australia's National Hydrogen Strategy</i>, <i>Technology Investment Roadmap</i> and <i>Modern Manufacturing Initiative</i>, to develop the renewable hydrogen industry for both domestic and export outcomes, and enable Australia to take a leading role in zero-emissions supply chains. | Commonwealth Government |
| Recommendation 8: commit to fund six to twelve hydrogen demonstration hubs across Australia. | Commonwealth Government in partnership with states and territories |
| Recommendation 9: fund studies and work with Australian ports and the shipping industry to enable ports to be zero-emissions ready with appropriate refuelling infrastructure. | Commonwealth Government |

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|---|--|
| Recommendation 10: develop national supply chain guidelines for electric vehicles and new technologies (e.g. battery components or renewable feedstocks for biofuels) and align to international initiatives, to remain competitive with global best practice. | Commonwealth Government |
| Recommendation 11: set local content requirements and use procurement strategies to stimulate local industry development. | Commonwealth Government in partnership with states and territories |
| Recommendation 12: partner with state and territory governments to establish Renewable Energy Industrial Precincts (REIP), where industries such as vehicles and vehicle components manufacturers, can be based to access cheaper renewable energy. | Commonwealth Government in partnership with states and territories |

On behalf of ClimateWorks, we thank you for the opportunity to provide input in response to the *Future Fuels Strategy: Discussion Paper 'Powering Choice'*. We would welcome an opportunity to brief your team on this submission. Please do not hesitate to contact us if you have any further questions.

Kind regards,

Anna Malos
Australian Country Lead

Rachel Lynskey
Project Officer, Cities team

The *Future Fuels Strategy* can support a zero-emissions transport sector in Australia, and set Australia up to benefit from a zero-emissions world

The *Future Fuels Strategy* is an important moment for Australia to address emissions, provide policy stability and market confidence for the uptake of zero-emissions technologies. In line with the 'Powering choice' discussion paper, our submission focuses primarily on battery electric vehicles. Hydrogen and other alternative fuels will also play a role in decarbonising transport, particularly in shipping, aviation and heavy road vehicles, and the economic development opportunities of hydrogen are discussed at the end of this submission. More work needs to be done to accelerate the development of these technologies, and ClimateWorks Australia looks forward to contributing further to the development of these areas of the *Future Fuels Strategy*.

Transport is the fastest growing and third largest source of emissions in Australia (Department of Agriculture, Water and Environment, 2019). Australia's road vehicle fleet is one of the most energy- and emissions-intensive in the world (National Transport Commissions, 2019). It is vital Australia takes the opportunity now to move our vehicle fleet to electric vehicles, to reduce household transport costs, public health costs, and emissions.

Electric vehicles are recognised internationally as a mature technology for the passenger and light vehicles market (International Energy Agency, 2019), ready to be deployed on a large scale in Australia if provided with the right supporting environment. The purchase cost of electric passenger cars is expected to become cost competitive or even cheaper than conventional vehicles by the mid-2020s (BloombergNEF, 2020). Combined with a renewable-powered electricity grid, electric vehicles can play a pivotal role in bringing passenger transport emissions to zero, alongside providing health benefits and addressing fuel security in Australia.

Electric vehicles reduce public health costs by producing less air and noise pollution than petrol and diesel vehicles. Electric vehicles also provide household cost savings, with lower total cost of ownership due to savings in fuel and maintenance (ClimateWorks, 2019). Recent Australian oil refinery closure announcements present a risk to our long term energy security (Macdonald-Smith and Durkin, 2021). The Australian government can play a proactive role in mitigating this risk by the increasing efficiency of vehicles, accelerating the transition to electric vehicles, and reducing our oil dependency.

To reduce emissions in the road transport sector Australia can adopt well-established solutions, such as zero-emission electric vehicles, to achieve significant emissions reductions decade and set Australia up to reach a zero-emissions transport sector by 2050 (ClimateWorks, 2020a). Moving to electric vehicles would reduce transport emissions 16-40 per cent, even with an electricity mix for Australia of 80 per cent fossil fuels and 20 per cent renewables (Smit, 2020). Further analysis shows with a 90 per cent renewable energy powered grid, an electrified vehicle fleet would reduce transport emissions 70-80 per cent. With most states and territories setting targets to reach zero emissions, the Australia electricity grid is in the process of transitioning to renewable energy, enabling the transport sector to further reduce emissions. By 2030 government projections estimate that the grid will reach 50 per cent renewables share (Department of Industry, Science, Energy and Resources, 2020a).

ClimateWorks analysis models future scenarios for Australia to transition to net zero emissions in line with the Paris Agreement on climate¹. Achieving a modelled scenario to keep warming below 1.5 C, includes immediately accelerating the roll out of mature zero-emissions technologies, such as electric vehicles. For example, ClimateWorks' *Decarbonisation Futures (2020a)* scenarios for Australia suggest electric vehicles would comprise 50 per cent of new light vehicle sales by 2030 in a scenario aligned with 2 degrees of warming. This proportion increases to 76 per cent under a 1.5 degrees scenario. Austroads - representing Australian and New Zealand transport agencies at all levels of government - found accelerated retirement of internal combustion engine (ICE) vehicles is needed to decarbonise the transport sector (Austroads, 2020). Their scenario analysis found sales of ICE passenger vehicles must end by 2024 to ensure all vehicles on the road in 2050 are zero-emissions². Both of these are a more rapid roll out than the Department of Industry, Science, Energy and Resources' Emissions Projections (2020a), which anticipates 26 per cent of new car sales will be battery electric or plug-in hybrid in 2030. Australian Energy Market Operator (2020) is planning for the impact electric vehicle uptake could have on Australia's grid, with scenarios ranging from 160,000 to 2.25 million electric vehicles on the road by 2030.

ClimateWorks (2020a) analysis also explores the role of electrification and zero-emissions fuels for heavy vehicles. In the 1.5 degrees scenario, 29 per cent of truck vehicles sales between 2025 and 2030 are electric. By 2030, use of biofuels and hydrogen have increased 338 per cent compared to 2020. This analysis focused on technological innovations and regulatory policy mechanisms. Future scenario modelling is needed to explore the emissions-reduction potential of other policy mechanisms, the impact of strategic planning, infrastructure and service provision decisions.

Growing numbers of countries and cities are setting targets to phase out fossil-fuel powered cars, including scheduled bans on new fossil-fuelled car sales in the UK, France, China, and India. Countries introducing incentives for electric vehicle sales include Japan, South Korea, Ireland and Denmark (Centre for Climate Protection, 2018). Norway's electric vehicle incentives have had broad support across governments since the 1990s and electric vehicles have reached a 50 per cent market share of new vehicles in 2018. Incentives include tax reductions or subsidies on vehicles, road taxes and tolls, and parking; financial compensation for scrapping fossil-fuelled vehicles; and infrastructure for charging, parking and priority road access (Norsk elbilforening, 2020).

Manufacturers' business models are changing in response, although Australian consumers are not currently able to access these new and growing markets due to our lack of targets and standards. General Motors, the largest vehicle manufacturer in the US is planning to be carbon neutral by 2040 in its global products and operations, and aspires to end the sales of fossil fuelled light-duty vehicles by 2035 (General Motors, 2021). Daimler is electrifying the entire MercedesBenz portfolio, providing options of at least one electric alternative in every model of car and van, taking the total to 50 models overall by 2039 (Daimler, 2021).

¹ The Paris Agreement commits the global community to pursuing efforts to keep global temperature rise to 1.5 degrees Celsius above pre-industrial levels (UNFCCC, 2015).

² AustRoads also found fossil-fuel powered vehicles sales need to end by 2017 for buses, 2011 for light commercial vehicles and 2000 for heavy vehicles.

Australia risks being limited to dirtier, older and more expensive vehicle models. ClimateWorks recommends the Commonwealth Government, through the *Future Fuels Strategy*, sets targets for the transition to zero-emissions vehicles to ensure Australian consumers can access the best vehicle choices, and assist with reducing transport emissions. This includes specific metrics to set the pathway for phasing out ICE vehicles and supporting the uptake of zero-emissions vehicles would support government agencies, for example, in determining infrastructure and technology investment requirements for achieving these metrics.

Recommendation 1: set targets for the transition to zero-emissions vehicles, including specific metrics for phasing out internal combustion engines and supporting the uptake of zero-emissions vehicles.

The Discussion Paper offers a solid foundation for the *Future Fuels Strategy*

The high-level vision and priorities set out in the Discussion Paper aligns with ClimateWorks (2020b) research on international best practice in accelerating take-up of zero-emissions vehicles. Greater policy direction from Government can create market confidence and help address the biggest barriers affecting uptake of electric vehicles in Australia. In 2018, ClimateWorks and Electric Vehicle Council found that these were: purchase cost (see Recommendation 6), range anxiety and lack of charging infrastructure (see Recommendation 2). Increased effort in consumer education (Priority area 3) can reduce range anxiety and address outdated perceptions of restricted driving range and an inability to conveniently charge cars. Highly visible installation of charging infrastructure is needed.

Increased uptake of electric vehicles will see greater integration of Australia's electricity and transport networks. Government and energy market stakeholders do not yet fully understand the specific impacts on the grid from transitioning to electric vehicles. For this reason the Government should continue support of the ARENA, AEMO and the Electric Vehicle Council 'Distributed Energy Integration Program' (DEIP) Electric Vehicle Grid Integration Working Group (Action 4.2). Research and industry collaboration on this topic is growing. The RACE for 2030 CRC (Monash, 2021) is reviewing current research on the impacts and opportunities of widespread uptake of electric vehicles on the Australian electricity grid, to identify critical questions and answers for government and regulatory bodies to facilitate a smooth transition.

Electric vehicles can be integrated into the grid as a battery source and be a net positive for Australia's electricity networks. While electric vehicles will increase overall electricity demand, they can also absorb surplus generation from solar PV during the day and return it to the grid at a later time. This allows for greater renewable penetration and improves grid stability and resilience. The average electric vehicle can store approximately 60 kilowatt hours (kWh) of energy, enough to provide back-up power to an average household for two days (World Resource Institute, 2019). Vehicle-to-grid integration capability needs further focus to understand the impact on overall battery life, new infrastructure requirements, metering systems and policies to manage demand.

With the increased demand for electricity that electric vehicles will bring, there are concerns about the current grid needing additional transmission and distribution capacity. However, dynamic pricing and smart remote charging can allow consumers to turn charging off and on in response to prices,

flattening demand in the process. Trials in the UK have found demand management is technically feasible, motorists can be incentivised to avoid charging in the evening peak periods, and that easy access to smart charging (with an app) improves use by motorists (Electric Nation, 2019). University of Melbourne modelling showed that the Australian grid can support up to 80 per cent of electric vehicle uptake with targeted smart demand management, compared to only 10 per cent if unmanaged (Brazil, 2019).

Infrastructure investment

Australia's public and private sectors are making unprecedented investments in transport infrastructure. Given the long lived nature of these assets, and their influence on travel behaviour, it is vital the pipeline of transport infrastructure enables emissions reductions. ISCA, ClimateWorks and ASBEC's *Issues Paper: Reshaping Infrastructure for a net zero emissions future* (2020) found infrastructure influences 70 per cent of Australia's emissions³. Decisions made about infrastructure today will shape Australia's future, including its emissions trajectory, for decades to come. Long-term infrastructure strategies have a key role to play in:

- prioritising infrastructure investments that will put Australia on a pathway to net zero emissions
- capturing the growth opportunities for Australia's economy in a world transitioning to net zero emissions
- ensuring assets aren't built that are at risk of becoming 'stranded' due to significant losses of value in a zero-emissions world.

The disruption and economic impact of COVID-19 has increased focus on infrastructure, and provides an opportunity to ensure investments are aligned to a green recovery. ClimateWorks's *Recover and Reduce* (2020c) identifies government investment opportunities, including infrastructure, that will meet key COVID-19 economic recovery objectives of job creation and productivity growth, while also making material progress towards net zero emissions.

One area is investments in electric vehicle charging infrastructure, estimated to have a job multiplier of 12.5 jobs per \$1m spent (AlphaBeta, 2020). *Recover and Reduce* found that to align with 2 degrees of warming, 93,000 public chargers and three million home chargers are required in Australia by 2030, requiring \$3.2 billion in public and private capital investment. Australia currently has 2,307 public charging stations (Electric Vehicle Council, 2020). The Future Fuels Fund has committed \$71.9 million, which must be scaled up substantially to meet the scale of the task required (see Recommendation 2). By comparison, Canada is investing CAD\$280 million in a 5-year Zero Emission Vehicle Infrastructure Program (Government of Canada, 2021), and the UK Government has announced £1.3 billion for public and home charging infrastructure (Department for Transport, 2020a).

The discussion paper identifies there are public charging blackspots in Australia. There is currently no clarity about who is responsible for funding, building and operating charging infrastructure in Australia (ClimateWorks, 2019) leading to a gap in infrastructure provision. Gaps can be identified, prioritised and addressed across the country through government leadership in coordinating electric

³ From energy, transport, water, waste and telecommunications infrastructure.

vehicle charging infrastructure. When financially unviable for commercial operators to provide infrastructure, we recommend the government leads the investment to fill these gaps.

ClimateWorks supports coordinating private and public investment to enable the efficient rollout of charging and refuelling infrastructure (Priority area 1). One barrier to installing new charging or refuelling infrastructure is businesses having insufficient incentive to invest where it is not yet commercially viable for them to do so. To sufficiently incentivise the private sector, the Australian Government should co-invest with state and territory governments to scale up the amount of public investment in charging and refuelling infrastructure delivered through the Future Fuels Fund. Such co-investment with state and territory governments would result in multiplying the already committed \$71.9 million and being able to leverage greater private investment in the required infrastructure.

This Co-investment Partnership financing model could be designed to scale up supply chain responses in charging and refuelling infrastructure markets across the Australian economy in all states and territories. It could be implemented through DISER administering a grants scheme using a goal-oriented competitive tender process. State and territory governments could provide matched funding to increase the funding pool. The competitive tender goal would call for a certain quantity of charging and refuelling infrastructure to be built within each jurisdiction. Infrastructure companies would be invited to bid into the process and indicate what they need from government to build multiple charging and refuelling stations at scale. Successful applicants would also be eligible to apply for federally funded low-interest finance from the Clean Energy Finance Corporation. This Co-investment Partnership financing model can also accelerate the uptake of fleet projects for pl and hydrogen electric vehicles, on which the government is already working with states and territories (Action 1.5). It can build on lessons learned from New Zealand's *Low Emissions Vehicles Contestable Fund*, where \$29.3 million of government funding has been matched with \$65 million from partners across 180 electric vehicle and charging infrastructure projects (Gen Less, 2021).

Recommendation 2: co-invest with state and territory governments to scale up the amount of public investment and leverage greater private investment in charging and refuelling infrastructure delivered through the Future Fuels Fund.

Recommendation 3: co-invest with state and territory governments, to accelerate uptake of fleet vehicles matched with private investment, for example through administering a grants scheme using a goal-oriented competitive tender process.

Discussion Paper Question 1.5. What information do businesses need to ensure an integrated charging network can be delivered across Australia?

Electric fleets require appropriate charging infrastructure to keep them running. The majority of the cost involved in installing charging infrastructure is in preparing the site and installing the electrical capacity required. Coordinating infrastructure can reduce costs by carefully selecting the site to reduce the cost of electrical and construction works. Regulation and incentives that support installation of greater electrical capacity (wiring) in new builds can also reduce the cost for future electric vehicle charging infrastructure by avoiding the need for retrofits.

Fleets first approach

The Federal government can assist in reducing purchase cost of electric vehicles by encouraging fleet uptake. Encouraging fleet uptake is also expected to create scale to bring down upfront vehicle purchasing cost and encourage electric vehicle manufacturers to bring more models and vehicles to Australia. This would increase consumer choice as well as contribute to a successful second hand market that makes electric vehicles more accessible to more Australians (ClimateWorks, 2019). Vehicle manufacturers are increasingly vocal that Australia's current lack of standards is limiting them bringing vehicles and models to our market (O'Malley, 2021).

ClimateWorks supports electric vehicle fleet strategies (Priority area 2), as fleet procurement guidelines have a large influence on the future composition of Australia's total vehicle fleet. Business fleets made up 50 per cent of annual new vehicle sales in Australia in 2020, and serve as an important source to the second-hand market (National Transport Commission, 2020). Fleet targets also demonstrate national appetite for electric vehicles to manufacturers, and can provide a necessary boost for increased investment in charging infrastructure. Transitioning fleets to electric vehicles would normalise their use and provide the opportunity to educate employees and the broader community, overcoming misconceptions and demonstrating the significant benefits of electric vehicles.

Discussion Paper Question 2.3: In what ways (other than direct funding) could the Government assist businesses to increase uptake of new vehicle technologies in their fleets?

Discussion Paper Question 3.1: What is the most important information to provide to motorists and fleets about new vehicle technologies and future fuels?

Discussion Paper Question 3.2: What are the highest priority knowledge sharing areas to be targeted in future fleet trials?

Discussion Paper Question 3.3: What additional guidance do businesses need on technical or taxation matters in relation to new vehicle purchases?

Providing information about electric vehicles to decision makers and the general public will support faster uptake (Priority area 3). Education and consumer information will ensure the general public is comfortable choosing electric vehicles. Programs such as Charge Together Fleets provides peer-to-peer learning opportunities for fleet managers, as well as online tools such as a total cost of ownership calculator that compares electric vehicles to fossil-fuelled vehicles, to help fleet managers transition. Specific and targeted training is needed to support industries such as mechanics and dealerships, to ensure they help facilitate changing technology and can thrive in a net zero economy.

ClimateWorks Australia (2019), the Electric Vehicle Council and the Municipal Association of Victoria worked with Victorian local governments on recommendations to enable greater uptake of electric vehicles in local government fleets. Our research was targeted at how local government fleets in Victoria can increase electric vehicle uptake, but is even more relevant to the role the Commonwealth Government can play. We recommend:

- A national capacity building program to share information:
 - Australia's electric vehicle market is still in the relatively early stages of development and it can be difficult to access credible and impartial advice. This is particularly true for charging infrastructure, as many parties who can provide information also have an interest in selling their services or equipment. Impartial tools for calculating the

total cost of ownership of vehicles are important to build a business case for switching to an electric vehicle fleet.

- A key knowledge gap for sustainability and fleet teams was both the technical and management systems needed to service a transitioning fleet. Regarding technical specifics, questions included what chargers to install and where to install them, and in relation to management systems knowledge, about best practice contracting arrangements, processes and IT integrations. Our research found that providing case studies and examples from other jurisdictions who had already installed infrastructure was most helpful in addressing this knowledge gap.
- Build momentum at executive level through:
 - Holding events to enable peer-to-peer information sharing
 - Providing vehicles for senior executives to gain first-hand experiences driving electric vehicles
 - Setting clear motivation for leaders, such as company level emissions reduction targets
- Initiatives to reduce the capital cost such as:
 - Using the Co-investment Partnership financing model (proposed on p. 8), by co-investing with state and territory governments and leveraging private investment (see recommendation 2, 3 and 5).
 - Introducing new financial support mechanisms to reduce upfront capital costs with financial incentives and subsidies (see Recommendation 6).
 - Setting electric vehicle uptake targets to signal demand for manufacturers to bring more electric vehicle models and vehicles to Australia (see Recommendation 1).

Recommendation 4: enable consumer choice with a national information sharing program to build fleet managers' and potential customers' knowledge and work with company decision makers to demonstrate leadership and build confidence and accelerate commercial fleet transition.

Due to their relatively low operating costs, electric vehicles are currently financially feasible for government and business fleets based on total cost of ownership. ClimateWorks' analysis found that for most light vehicle types, including hatchbacks, sedans, wagons, sport utility vehicles, vans and minibuses, there is an electric vehicle model within or below local council total cost of ownership guidelines. ClimateWorks supports the use of the Future Fuels Fund to expand the CEFC co-financing programs to accelerate electric vehicle roll out in commercial fleets (see Recommendation 3).

ClimateWorks recommends the Freight Energy Productivity Program also uses co-financing models to build on the existing \$24.5 million commitment. The competitive grants program can set criteria for emissions reductions in trialling new technologies and vehicle modifications. The road freight transport sector has an estimated 42,000 operators who can directly benefit from cost savings from more efficient technology.

Recommendation 5: co-invest with state and territory governments, to maximise the impact of the Freight Energy Productivity Program, ensuring the grants scheme uses a goal-oriented competitive tender process to reduce emissions and maximise cost savings for business.

Accelerating the impact of the *Future Fuels Strategy*

In addition to the previous comments, ClimateWorks suggests the addition of subsidies, incentives and minimum standards to stimulate development of the local electric vehicles market. Electric vehicles provide significant public good, through household cost savings, reducing passenger transport emissions, providing health benefits, and addressing increasing fuel insecurity in Australia. At this early stage of the industry, the market needs support so all Australian consumers can fully realise these benefits.

Using financial incentives remains important to bring forward the upfront price parity cost of electric vehicles in the near future, until expected price parity in the mid-2020's (BloombergNEF, 2020). This will also encourage vehicle manufacturers to bring more models to the market, increasing customer choice and supporting associated investment (e.g. charging infrastructure, skills and training for mechanics, etc). Due to unique features in the Australian market, it is important that effort is made to attract vehicles and models. Even as global electric vehicle costs fall, our vehicle market is smaller, remote from many production centres and requires right-hand drive vehicles, which could limit options without active intervention.

Government can enable consumer choice by providing a tax rebate or reduction for electric vehicles, through the Fringe Benefit Tax, import tariffs or a more ambitious difference in the luxury car tax threshold. Changes to the FBT could also be an opportunity for the government to support companies with fleets to encourage employees to go electric in the vehicles they access through novated leases.

ClimateWorks suggests these subsidies be designed to respond to the size of the market, with greater incentives while the market is small, and a planned wind-down once vehicle sales hit higher milestones. To ensure economic efficiency, it could be targeted towards particular product types or buyers, for example in line with the Future Fuels discussion paper priorities on fleets.

Financial incentives have been used in many other jurisdictions, including upfront purchase incentives (e.g., China, Japan, France, Germany, the United Kingdom), federal tax credits (e.g., the United States), tax and registration fee exemption or discounts (e.g., Netherlands, Norway, Sweden), subsidising charging infrastructure, reducing parking fees or enabling priority road lanes (International Council on Clean Transport, 2020).

In some jurisdictions, the market for electric vehicles has matured such that they are now beginning to gradually roll back support:

- The US State of Colorado adopted a gradual phasedown of its tax credit from \$5,000 in 2019 to half that amount by 2021–2023, and to \$2,000 from 2023–2026 (International Council on Clean Transport, 2019).
- The UK electric vehicles grant scheme has been in place since 2011 (Department for Transport, 2020b). It initially offered £5,000 for electric vehicles, and in 2020, dropped to £3,000/vehicle and excludes vehicles over £50,000. Other vehicle grant schemes support vans (up to £8,000), large vans and trucks (up to £20,000), taxis (up to £7,500) and

motorbikes (up to £1,500). The grant scheme has supported the purchase of 200,000 electric vehicles and the vehicles now make up six per cent of the new car market. £800m of grant scheme money has been spent.

- In China, there have been significant subsidies for the last decade that are now gradually being rolled back now that the industry is becoming more independent. The initial target to phase out completely was 2020, but the pandemic has slowed the change. The subsidies and favourable tax treatment have attracted automakers to the country, including a Tesla factory; General Motors investing \$20b in electric vehicles and releasing models to China ahead of the USA; VW began production of electric vehicles at two factories in China in 2020; Daimler (Mercedes Benz) is basing their Smart city-car brand venture in China with plans for produce a zero-emissions subcompact car there (Bloomberg News, 2020).

Australia can learn from previous technology uptake to ensure we plan appropriately for both the supportive measure to establish a market, and the timing and process to wind back support. Feed-in-tariffs and certificate schemes have supported Australian households to install solar PV and rapidly reduce costs. However, accelerated take-up of PV subsidies went beyond governments' budget and expectations. This led to rapid winding back of government support and a significant boom and bust cycle for the PV industry (Grattan Institute, 2015). To avoid consumer confusion or risk market confidence, the Commonwealth Government should set short-term subsidies for electric vehicles with plans to scale it according to the market size. To align with the *Future Fuels Strategy* discussion paper priorities, it could also target fleet uptake.

Recommendation 6: establish short-term subsidies, and financial incentives through tax rebates or reductions, for vehicle purchases until the electric vehicles market in Australia is established.

Discussion Paper Question 2.3. In what ways (other than direct funding) could the Government assist businesses to increase uptake of new vehicle technologies in their fleets?

To maintain competitiveness in comparison to the international vehicle market and ensure Australian buyers have access to the best vehicles, Australian regulations need to be aligned with international standards. Australia risks being limited to dirtier, older and more expensive vehicle models. Vehicle emissions standards enable transport users to benefit from innovations by leading manufacturers who are already delivering zero-emissions vehicles. By 2025, Volvo has committed to 50 per cent of new vehicle sales to be electric cars (Volvo, 2018). General Motors, Hyundai, Volkswagen and Volvo all have targets for over one million annual sales of electric vehicles by 2025 (Electric Vehicle Council, 2020).

Improving the fuel efficiency of Australia's light vehicle fleet can deliver substantial environmental and broader economic benefits. Australia would be advised to join other markets with standards in place such as the US, EU, Japan, Mexico and Saudi Arabia. The bipartisan Ministerial Forum on Vehicle Emissions (2017) found introducing a Fuel Efficiency Standard for Light Vehicles provided the opportunity to deliver over six per cent of Australia's 2030 emissions reduction target, whilst contributing a net benefit of \$13.9 billion to 2040. The analysis found the most stringent target explored would deliver an additional \$8.1 billion in net benefit to 2040. Implementation of this

existing work would help Australia achieve its emissions reduction objectives at least cost, reduce expenses for Australian households and businesses, and lessen the transport sector's health impacts.

Best practice light vehicle CO₂ emission standards create financial savings for vehicle owners, improved energy security, health and economic benefits and least cost emissions reductions for Australia (Climate Change Authority, 2014). ClimateWorks (2017) analysis showed it could deliver reductions of 4 Mt CO₂ e in 2020 and 8.7 Mt CO₂ e in 2024, equivalent to taking 2.2 million cars off the road in 2024. Based on the Ministerial Forum on Vehicle Emissions cost benefit analysis (2017), setting an ambitious but feasible target (105 gCO₂/km by 2025) provides 65 Mt CO₂ of abatement to 2030 and 231 Mt CO₂ to 2040, whilst delivering an additional \$13.9 billion in net benefit to 2040. The Commonwealth Government, through the *Future Fuels Strategy*, should include a commitment to build on existing work by the Ministerial Forum on Vehicle Emissions to implement best practice greenhouse gas emissions standards.

Recommendation 7: set best practice minimum vehicle emissions standards to maximise economic and environmental benefits.

Industry growth: potential of hydrogen and alternative zero-emissions fuels

As the world transitions to a net zero economy, Australia can only remain a major energy exporter if we develop zero-emissions future fuels technologies. This will require action and support by governments, including financial support in research development and commercialisation, potentially through ARENA and the CEFC, as well as appropriate infrastructure, regulation and licencing, and skills development. Australia needs to rapidly accelerate the zero-emissions fuels industry, in order to keep pace with global competitors, who are also developing hydrogen industries. Most large-scale hydrogen projects have been announced in Asia and Europe, while bigger projects are planned for the Middle East in order to develop export-oriented scale (Institute for Energy Economics and Financial Analysis, 2020).

Discussion Paper Question 5.1. What are Australia's market niches in future fuels to maximise high-value domestic and export outcomes?

Australia could produce energy- and capital-intensive low carbon industries and support domestic and export markets of renewable hydrogen (Priority area 5) by leveraging our comparative advantage in accessible renewable resources, established export and trading partnerships and a skilled workforce. The growth in zero-emissions vehicles in Australia and internationally has the opportunity to demonstrate technologies and support the initial development of the industry, which can then be scaled up to take advantage of growing export markets. Low carbon industry potential includes⁴:

- Renewable hydrogen: 2,800 jobs and \$1.7b in value by 2030
- Lithium value chain: capture 28,771 jobs and \$297b in value by 2025. This would require approximately \$34.1b in capital investment
- Green ammonia: 5,000-20,000 jobs by 2050

⁴ Adapted from ClimateWorks (2020c).

- Advanced biofuels: 22.9-27.8 Gegalitres production, 285,000-345,000 jobs, and \$18-24b of value created per annum by 2050. This would require over \$25-30 billion in capital investment for production facilities
- Green steel: largest clean manufacturing opportunity for Australia in a low-carbon world, with the potential to create 25,000 jobs – a figure equal to just under half of current employment in carbon-intensive industries such as mining and heavy manufacturing.

The development of a domestic hydrogen industry would also play a critical role in the growth of harder-to-abate Australian industrial sectors including heavy and long-distance transport. It will be critical for the Commonwealth Government to align *Future Fuels Strategy* with initiatives such as *Australia's National Hydrogen Strategy* (COAG Energy Council, 2019), *Technology Investment Roadmap* (Department of Industry, Science, Energy and Resources, 2020b) and *Modern Manufacturing Initiative* (Commonwealth Government, 2021), because hydrogen links the transport sector with many other sectors of Australia's economy.

Recommendation 7: link the *Future Fuels Strategy* with *Australia's National Hydrogen Strategy*, *Technology Investment Roadmap* and *Modern Manufacturing Initiative*, to develop the renewable hydrogen industry for both domestic and export outcomes and enable Australia to take a leading role in zero-emissions supply chains.

Australia's National Hydrogen Strategy recommends demonstration-scale hydrogen hubs as an early-stage approach to achieve the scale needed for a competitive industry. These hubs are aggregations of various hydrogen users to create, test and prove the market for hydrogen in industrial, transport and energy sectors. Hubs are vital at this early stage of industry development, as they “will make infrastructure more economic, allow for efficiencies from scale, foster innovation, facilitate the sharing of expertise and services and promote sector coupling” (COAG Energy Council, 2019, p. 31). ARENA's \$70 million Renewable Hydrogen Deployment Funding aims to support two or more large-scale hydrogen projects (Taylor, 2020). ClimateWorks advises that more than two hubs will be required in order to achieve the scale needed to develop a competitive industry. The Commonwealth Government should work with state and territory governments to fund six to twelve demonstration hubs for testing hydrogen potential. This will allow a greater range of stakeholders and industries to explore technologies and business models, build scalability, and ensure replicability across different jurisdictions. More than 30 locations have been identified as potential hydrogen export hubs, alongside assessment of supportive supply chain infrastructure, and criteria to determine the feasibility of hydrogen precincts, cities and regions in Australia (ARUP, 2019).

Recommendation 8: commit to fund six to twelve hydrogen demonstration hubs across Australia.

Freight shipping volumes account for 98 per cent of Australia's total international trade, and 74 per cent in terms of value (Department of Infrastructure and Regional Development, 2016). Demand is expected to continue growing for timely delivery of items such as high value manufacturing and mining products, and perishables such as food, urgent medical products and market flowers. Infrastructure that facilitates electrification and switching to zero-emissions fuels can also be built today. Shipping giant Maersk recently brought forward their target launch date for zero emissions

ships to 2023 (seven years ahead of the original commitment) due to ‘advances in technology and increasing customer demand’ (Maersk, 2021). Other developments in the shipping industry, with the first zero-emissions electric tanker under construction in Japan, demonstrate that zero-emissions ships will be operating this decade (Corvus, 2021). Refuelling infrastructure at ports is needed to enable and normalise the use of alternative fuels such as biofuels and hydrogen. The Commonwealth Government should use the *Future Fuels Strategy* to help prepare Australia for the alternative fuels to be adopted by the shipping industry.

Recommendation 9: fund studies and work with Australian ports and the shipping industry to enable ports to be zero-emissions ready with appropriate refuelling infrastructure.

As production of electric vehicles is scaled up, the sustainability of their supply chains is coming under increasing scrutiny. Consumers are seeking products that meet best practice sustainability and social outcomes. The World Economic Forum (2020) endorsed guiding principles for a sustainable global battery value chain by 2030, including the circular recovery of battery materials, and eliminating child and forced labour from supply chains. Australia has the opportunity to tap into global low carbon supply chain markets, but to remain competitive we will need to ensure our products meet consumer expectations. Emissions embodied in the production of electric vehicles batteries can be mitigated through increased reuse and recycling, as happens in Japan (Toyota, 2018).

Recommendation 10: develop national supply chain guidelines for electric vehicles and new technologies (e.g. battery components or renewable feedstocks for biofuels) and align to international initiatives, to remain competitive with global best practice.

Supporting Australian innovation and manufacturing

A local electric vehicle market also presents an opportunity to support a growing modern manufacturing sector and associated industries in Australia (Priority area 5). Jobs could be generated in construction, electrical trades, administrative roles and infrastructure manufacturing. Australia has access to recently retrenched skilled automotive industry workers; education providers that can retrain in specialised skills; and regions with established infrastructure, supply chains, and import and export networks.

PwC found that building infrastructure to support three million electric vehicles is estimated to generate a net increase of 13,400 jobs in 2030, compared to 2017 (PwC, 2018). In Adelaide, Precision Buses is designing and manufacturing electric buses to use on public transport systems in five Australian states, and supporting worker transitions from the now-closed Holden car factory. This was driven by South Australian government requirements for local material and suppliers (Australian Manufacturing, 2017). The NSW Government electric bus commitment is already sparking interest in establishing a local manufacturing base in regional NSW to meet demand (The Driven, 2020). The *Future Fuels Strategy* can accelerate this opportunity, by outlining local content requirements for fleet procurement strategies.

Recommendation 11: set local content requirements and use procurement strategies to stimulate local industry development.

ClimateWorks recommends the Australian Government partners with state and territory governments to establish Renewable Energy Industrial Precincts (REIP) to help Australian manufacturers build scale, competitiveness and resilience in products suited to a carbon constrained world. REIPs are regions wherein a cluster of manufacturers are closely located to each other and to high-quality renewable energy sources. This could be well suited to manufacturers of vehicles and their components. Businesses in these precincts will share access to critical infrastructure, lower energy bills and production costs. This will enable them to remain competitive in an increasingly carbon constrained world and potentially access a premium for low-carbon products.

Recommendation 12: partner with state and territory governments to establish Renewable Energy Industrial Precincts (REIP), where industries such as vehicles and vehicle components manufacturers, can be based to access cheaper renewable energy.

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