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Submission to Senate Select Committee on Electric Vehicles: supplementary submission on EV industry policy enablers

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1 Enablers of Electric Vehicle Policy

There are significant economic benefits to be derived from the development of an Electric Vehicle (EV) industry in Australia. A study[1] of the EV industry has identified EVs and EV use as a significant contributor to economic development at national and global levels. The development of an EV industry is estimated to create a net increase in jobs, even as the growth of an EV industry creates job losses in fossil fuel-related industries. Australia is well placed to play a key role in EV supply chains given the nations electronics, advanced manufacturing, design and renewable energy technology capabilities. More broadly the growth of the EV industry and widespread use of EVs can play a major role in helping Australia reduce pollution and greenhouse gas emissions while driving improvements in quality of life.

Governments can play a major role in accelerating the uptake and diffusion of EV technology through community awareness raising, strategy development, policies and enabling programs, regulation and legislation. Government can also use its procurement powers to foster innovation in the Australian EV industry, using its purchasing power to drive innovation and change. In this supplementary submission we canvas a range of instruments available to government to accelerate the uptake and diffusion of EVs in Australia and foster the growth of a domestic EV manufacturing and services industry. What is clear at the outset is that Australia needs an EV/AV Industry Roadmap to act as a catalyst for the sector. There is no shortage of potential ingredients.

1.1 State of EV policy in Australia

At present, there is no overarching EV policy in Australia at the federal level. A lack of economy-wide EV policy has focused impetus on a range of state initiatives throughout the country. APEC singles out the South Australian government's initiative to increase the registration of EVs in the state and procure EVs for its fleet; and the Adelaide City Council's partnership with the state government is recognised for its efforts to establish a network of public EV charging infrastructure.[2] However, a federal framework is essential to building an industrial capability and a sustainable market for EV uptake amongst consumers. Achieving this reality in Australia requires overcoming a range of barriers. These barriers include the lack of vehicle choice in Australian markets, alongside the relatively high price of EVs in Australia. In comparison, the initiatives available in overseas nations involve a range of financial and non-financial consumer incentives that lead to a boost in both supply and demand of EVs.[3]

The available evidence from various research reports, market analysis and policy analysis of overseas and state-based initiatives in Australia suggests that the most effective way to lower barriers to EV adoption is with policy support. The expert, industry adviser organisation ClimateWorks has argued that in all leading EV nations, a supportive policy environment has been the key driver of a range of regulatory, financial and non-financial policies and incentives for industrial development and enabler of market growth relating to EVs. It contends that achieving a tangible impact on EV uptake, governments in Australia will have to use financial incentives to address barriers including cost and the availability of models in the market. Further to this,

[1] IEDC 2013. Creating the Clean Energy Economy - Analysis of the Electric Vehicle Industry. Washington DC, USA: International Economic Development Council.
[2] APEC 2017. The Impact of Government Policy on Promoting New Energy Vehicles (NEVs) - The Evidence in APEC Economies. Singapore: Asia-Pacific Economic Cooperation.
[3] CLIMATEWORKS 2016. The Path Forward for Electric Vehicles in Australia - Stakeholder Recommendations. Melbourne, Australia.

complementary policies to support infrastructure demands and consumer awareness initiatives will be a requirement over the next decade.[4]

A review[5] of economic modelling and other studies finds extensive evidence of positive outcomes from the uptake of EVs by consumers:

- Reduction of petroleum consumption and lower fuel costs, putting money back into drivers' pockets and household budgets. These savings also increase spending on goods and services in local economies that create new jobs and boost GDP.
- With increased spending on EVs, economic activity is generated in job production through incremental increases in vehicle costs and increased demand in the industries producing EVs, EV components and charging infrastructure.
- A reduction in electricity rates to all utility customers with the large-scale use of EVs.
- Mitigation of negative economic shocks, i.e. oil price shocks, additional revenue to EV owners through feedback of electricity into grid, stabilisation of energy grids, pollution reduction and the integration of alternative and distributed energy sources into the mainstream energy grid.

These reviews also found that policies that incentivise use of EVs increase economic activity and employment, even when the government investments essential to the establishment of policy and regulation for consumption and industrial development are taken into account.

A range of policies have been considered in the literature as enablers to the growth of the EV industry. This literature spans top Australian literature as well as numerous international sources.

1.2 Review of EV policy responses and outcomes

A report[6] commissioned by the CSIRO summarised international polices to determine the initiatives that other countries have employed to encourage the uptake of EVs by drivers as well as for the creation of an EV industry, or the growth of the EV industry where already established. The CSIRO canvassed several categories of policy, which are referred to below along with some of their implications:

1.2.1 Regulation

- Categories of regulation relate to several areas: technical and safety; emissions and fuel; EV acquisition; manufacturers; charging systems; EV specifics.
- Regulatory policy has often taken the form of mandates for zero emission vehicles (ZEVs), creating a benchmark standard in the case of California's ZEV mandate. The CSIRO report found that the outcomes of a mix of regulatory policies in California saw great investment in EV technology by several automotive OEMs, significant uptake of EVs on Californian roads, and the development of an innovative hybrid and fuel cell vehicle industries.

1.2.2 Pricing

- Pricing policies commonly consist of electricity tariffs for EV charging. Taxes are also used to equalise cost of EVs versus Internal Combustion Engine Vehicles (ICEVs), or taxes that account for the environmental footprint of ICEVs.

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[4] CLIMATEWORKS 2018. The state of electric vehicles in Australia - Second Report: Driving Momentum in Electric Mobility. Melbourne, Australia.

[5] WINEBRAKE, J. J., GREEN, E. H. & CARR, E. 2017. Plug-In Electric Vehicles: Economic Impacts and Employment Growth. *Preliminary Final Report.* New York, USA: Energy and Environmental Research Associates, LLC.

[6] DUNSTAN, C., USHER, J., ROSS, K., CHRISTIE, L. & PAEVERE, P. 2011. Supporting Electric Vehicle Adoption in Australia: Barriers and Policy Solutions. *Electric Driveway Project.* Sydney, Australia: University of Technology Sydney.

- Pricing policies have resulted in reducing the sale of fossil-fuelled alternatives when combined with EV purchasing incentives. Creating more stable demand and self-sustaining markets for EVs means governments may need to consider more restrictive policies to regulate and lower demand for conventional vehicles.

1.2.3 Incentives

- In many jurisdictions, incentives are offered to individuals and businesses to purchase and own an EV and EV infrastructure, to convert a conventional vehicle into an EV, to install infrastructure, to develop EVs and their components, and to manufacture EVs and EV batteries.
- Incentives have been provided at state level within nations like the USA. Some findings suggest that where a positive relationship exists between income and the adoption of hybrid vehicles, financial incentives to purchase alternatives such as these may benefit those more likely to purchase alternatives like EVs in the first place.
- In the US, state-level incentives are found to explain large state market shares of EVs, meaning policy has been important for industry and consumer growth.
- The price of petrol fuel is more strongly related to the adoption of hybrids than are government incentives to purchase hybrids. Tax incentives are often found to be more effective when delivered upfront rather than in the form of rebates.

1.2.4 Facilitation

- Policies are in place across numerous jurisdictions to facilitate partnerships – such as with manufacturers for testing and development that bring industry and stakeholders together; with funding for technology development and support for academic research; for hardware, including infrastructure building commissioned by government and investigations into state agency procurement; and in the form of resolutions – at state level for federal action, and state resolutions for the production of EVs by manufacturers in the vehicle production market.
- These sorts of facilitative measures have been met with mixed success. Often they appear to not be attached to any form of ongoing funding support or agreements with manufacturers to produce. The result is the fulfilment of agreements but to specification, rather than ongoing development of industry, which requires more long-term policy and planning commitment.

1.2.5 Information

- In many jurisdictions across the world, information is provided to governments, consumers, industry and the market in the form of an EV Association. There are also present a variety of information resources on government and association websites and communications, decision-making tools, training provision services, regulation, and a range of publicly available reports based on funded studies into a range of issues relating to EVs (i.e. public opinion, trial findings, environmental impacts, cost-benefit analyses).

1.2.6 Targets

- Targets for EV manufacture and sales, replacement/reduction in conventional vehicles or fossil fuels, and EV parking spaces or charging stations are common forms of target-based policy.
- Targets are signalling to the EV industry in countries in Asia, Europe and North America that government is supportive of EV uptake.

1.2.7 Coordination

- Coordination policies include standards, bodies and partnerships, roadmaps and joint policy evaluation, and guidelines, definitions and resolutions. These policies range from initiatives at international to local level.

1.3 Review of international policy initiatives

There is considerable momentum globally to accelerate the uptake and diffusion of EV technologies and the EV industry. A recent report[7] has surveyed the emergence of phase out policies for internal combustion engine (ICE) vehicles globally. As of February 2018, fifteen countries around the world had taken policy action to phase out internal combustion engine (ICE) vehicles whilst increasing the numbers of EVs on roads. These nations include Austria, China, Denmark, France, Germany, India, Ireland, Japan, the Netherlands, Norway, Portugal, South Korea, Spain and the UK. These nations variously employ official targets for no new ICE vehicles to be sold (or in some cases produced) by date targets of 2020, 2025, 2030 or 2040. At the city level, numerous jurisdictions have enacted steps to immediately phase in registration and zoning policies that promote clean transportation. Automotive OEMs have begun to plan for changes to design and production processes. Nevertheless, the survey suggests that market drivers will still emanate from government policies to encourage and incentivise consumers of EVs.

APEC has reviewed[8] the government initiatives of its member nations:

- Canada has used a range of targets and coordination policies. It has incentivised EV OEMs with competitive funding grants and facilitated industry development through procurement arrangements.
- China has set targets for the number of EV vehicles on the road (5 million by 2020). Financial supports have been provided to OEMs, market promotion policies have been employed to help leverage demand, and infrastructure development has been funded. The development of information sources has also been encouraged through funding of industry-research projects and demonstration projects have been undertaken across major cities.
    - In 2013 academic commentary on China's EV policy recommended the government increase focus on opening the domestic EV market to international players to promote technological development, among other initiatives to promote procurement, build infrastructure and EV industry business models.[9] APEC's policy analysis notes that the recent refocusing of the government's policy in 2015-16 has seen it pursue greater investments in these areas, reflecting the Chinese government's recognition and acceptance of the need to more clearly set policy direction.
- Japan's strategy contains a policy mix of coordination, facilitation and incentives. Policy is comprehensive in its delivery of government-funded and coordinated R&D, technology demonstration programs and market support with a long-term timeframe and funding.
- South Korea has also exhibited a long-term industry R&D and incentive-driven strategy for EV industry development. Legislation has facilitated industry change and market growth.

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[7] BURCH, I. 2018. Survey of Global Activity to Phase Out Internal Combustion Engine Vehicles. Santa Rosa, USA: Center for Climate Protection.

[8] APEC 2017. The Impact of Government Policy on Promoting New Energy Vehicles (NEVs) - The Evidence in APEC Economies. Singapore: Asia-Pacific Economic Cooperation.

[9] TAO, W. 2013. Recharging China's Electric Vehicle Policy. *Policy Outlook.* Beijing, China: Carnegie-Tsinghua Center for Global Policy.

- New Zealand has an EV program that incentivises consumers through tax exemptions, pricing and procurement support, funding of public charging infrastructure, information campaigns, innovation support funding, access assistance and facilitation.
- Singapore has encouraged EV uptake through rebates, funded public charging infrastructure, developed strategic R&D initiatives, and helped to develop markets.
- The United States has incentivised EV use through procurement policies and tax credits. Manufacturers have also been provided with funding assistance to transform their production capabilities matched with EV production and use targets.

The APEC review has most importantly identified that across all of the APEC nations other than Australia, policy support has actively promoted EV industry development and consumer awareness and market participation. Purchasing and regulation initiatives were also key to guiding the growth of EV industry to sustainable levels. The review suggested that the more policies promoting EV uptake and industry within an economy, the more emphasis there is on the development of the EV industry and the easier the expansion of EV numbers is. Key reasons for the success of these policies is the long-term vision of policy, its broad (economy-wide) geographical coverage, and high density of policy.

The important role of EV promotion and EV industrial policy is noted elsewhere in the literature.[10] Promotion policies are significantly helpful in overcoming EV barriers of limited model offerings, cost, and convenience in China, Europe and the USA. Industry policy that sets clear goals of EV production volume targets and financial incentives is critical to gaining investment in EV markets and the development of a manufacturing base.

1.4 Possible Australian EV policy initiatives

In the broadest context, policymaking in support of the facilitation of EV markets and infrastructure, incentives for industry and consumers and appropriate market pricing are identified as all critical policy initiatives in Australia for enabling EV use and industrial development.[11] Technology policy is also considered essential to raise R&D contributions to EV development, and information in the provision of a central hub – such as the demonstrator hub proposed for Tonsley Precinct in Adelaide, South Australia – are also posited as projects of great potential in raising awareness, increase sales targets and help to grow the strategic importance of coordinating policy for EV manufacture and use.[12]

Other organisations have requested policy measures from the Australian federal government. Overall, these seek a range of initiatives that demonstrate lessons from international experience of what has worked in other jurisdictions internationally. Such studies have informed recent studies in the Australian context on a range of policy initiatives that could be used to overcome barriers to EV uptake in Australia, and enable development of the EV market and industry growth.

Chiefly, policy recommendations manufacturers should be incentivised to produce higher volumes of EVs through regulations that treat new technologies under CO^2 emissions standards, identifying their critical role in reducing emissions across entire industries. These should be complemented by measures to support the uptake of EVs, paired with measures to encourage supply of

[10] LUTSEY, N., GRANT, M., WAPPELHORST, S. & ZHOU, H. 2018. Power Play: How Governments Are Spurring the Electric Vehicle Industry. *White Paper.* Washington DC, USA: The International Council on Clean Transportation.

[11] NRMA 2017. The future is Electric. *Future mobility series.* Sydney, Australia: National Roads and Motorists Association.

[12]

supporting infrastructure, which together will help to nurture industry growth.[13] In a review of EV charging infrastructure and market modelling of EV sales and associated charging infrastructure requirements, Energeia identified[14] several key policy drivers, and ClimateWorks support these:

- Purchase incentives;
- Procurement targets;
- Import regulation;
- Fuel efficiency and consumption regulation; and
- Global ICE vehicle bans.

Furthermore, ClimateWorks noted the importance of awareness raising amongst the public, which includes demonstration and deployment activities around EVs and EV charging infrastructure.[15]

1.5 Further potential directions for policymaking

Some recent research into responses to climate change has focused on the role of EVs in the way that cities attempt to mitigate its effects on the urban environment. A study of provision of EV infrastructure in 30 UK cities as part of local authority policy initiatives showed troubling findings, in that these local strategies were failing to achieve the needed changes to promote rapid EV uptake, where there was no difference in the availability of public charging infrastructure between cities with committed climate change mitigation strategies and those without. Thus, infrastructure was having no impact on EV uptake and instead, a range of factors including local vehicle population or income were major factors. These researchers indicated that far more radical thinking and policymaking may be necessary – specifically, more 'hands on' policy intervention as has been the case in a number of continental European nations.[16]

Furthermore, even within the debate in Australia, the coordinating role of government has been highlighted as critical to the development of public infrastructure in the nation's development (i.e. telecom network). Peak bodies have called for the discussion over EV industry and market development in Australia to move beyond the debate over the merit of EVs and to take the debate to a higher place in identifying the opportunities for different forms of policy to be delivered.[17]

Recent research also points to the future of policymaking for EV uptake and industry development as best enabled by moving beyond subsidies and towards direct strategic industrial development by government. This is considered as essential to assisting widespread industry change at a critical time in policy attempts to battle climate change, and in helping to sustain the expected growth in EV grid-based service industries that will be intrinsic to the industry's future as well.[18]

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[13] CLIMATEWORKS 2018. The state of electric vehicles in Australia - Second Report: Driving Momentum in Electric Mobility. Melbourne, Australia.

[14] ENERGEIA 2018. Australian Electric Vehicle Market Study. Canberra, Australia: ARENA, Australian Government.

[15] CLIMATEWORKS 2018. The state of electric vehicles in Australia - Second Report: Driving Momentum in Electric Mobility. Melbourne, Australia.

[16] HEIDRICH, O., HILL, G. A., NEAIMEH, M., HUEBNER, Y., BLYTHE, P. T. & DAWSON, R. J. 2017. How do cities support electric vehicles and what difference does it make? *Technological Forecasting and Social Change,* 123**,** 17-23.

[17] ESAA 2013. Sparking an Electric Vehicle Debate in Australia. *Discussion Paper.* Melbourne, Australia: Energy Supply Association of Australia.

[18] KEMPTON, W., PEREZ, Y. & PETIT, M. 2014. Public Policy for Electric Vechiles and for Vechile to GridPower. *Revue d'économie industrielle,* 148**,** 263-290.

Looking forward, the development of an Australian EV industry would benefit from the adoption of a range of enabling initiatives including:

- The preparation of an 'Electric Vehicles/Autonomous Vehicles Industry Development Roadmap'. This would map an Australian EV/AV industry's capability and capacity for participation in global value chains; analysis would include the potential barriers and enablers of capacity building and capability generating.
- The establishment of a 'Next Generation Australian EV/AV Fund', for supporting innovation and export in the sector.
- The establishment of EV/AV standards at the national level.
- The establishment of a 'Future Fleet' procurement program within government.
- The establishment of a 'National Mobility Commission' to advise on strategies that can drive the uptake and diffusion of innovative EV/AV technologies, within the context of economic, environmental and social objectives and imperatives.