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Vehicle Emissions Working Group
The Department of Infrastructure and Regional Development
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Dear Working Group,

The Climate Institute submission on vehicle emissions

The Climate Institute welcomes the opportunity to contribute to the consultation on vehicle emissions.

Established in late 2005, The Climate Institute is an Australian-based, non-partisan, independent research organisation focused wholly on finding solutions to climate change. Our 2050 vision is for a resilient Australia prospering in a zero-carbon global economy, participating fully and fairly in international climate change solutions.

This submission focuses on the following issues

- The importance of reducing greenhouse gas emissions from transport
- The role of fuel efficiency or CO2 emission standards in reducing greenhouse gas emissions from vehicles
- The role of electric vehicles in reducing vehicle emissions and in increasing electricity consumption, and need to manage the integration of EVs with the electricity system.

Please note that this submission uses “emissions” to refer to greenhouse gas emissions rather than emissions of other air pollutants. Other air pollutants are not discussed.

Key points of this submission are:

1. Achieving the objectives of the Paris climate agreement (limiting average global temperatures to 1.5-2°C above pre-industrial levels) requires global CO2 from all energy sources to decline to net zero levels by mid-century. Developed countries such as Australia have agreed to take the lead in these efforts and will need to achieve this outcome before the global average. Policy to reduce vehicle emissions should be consistent with this.

2. Fuel efficiency or CO2 standards are an important tool to reduce vehicle emissions. As a starting point, The Climate Institute recommends Australian standards for vehicles be equivalent to United States CO2 limits by 2020.

3. Enabling vehicle emission standards to be responsive to market developments prevents regulatory lock-in of emissions that could otherwise be avoided. We recommend a regulatory framework similar to that of Japan’s Top Runner program, where the leading vehicle (in each class) sets the standard for future vehicles to meet.

4. Different parameters for Australian vehicles may be justified by analysis of the specific domestic context, as long as this analysis appropriately accounts for the costs associated with emissions - and the value of emissions reduction. This may be done by using estimates of the social cost of carbon ($61-183 per tonne by 2030), or of the potential future cost of purchasing carbon units domestically or internationally in a world moving to meet the Paris Agreement temperature goals ($60-$110 per

tonne by 2030). Using current carbon market prices is an inappropriate proxy for future carbon prices and/or the value of avoided climate change impacts.

5. Electric vehicles (EVs) are another important means of decarbonising the transport sector. EVs also offer both a growth opportunity and a new source of energy storage to the electricity system. Optimising the benefits of EV uptake requires a strategy that encourages EV use and supporting infrastructure to be consistent with decarbonisation of both transport and electricity. Integrating EVs into the electricity system should be done in ways that reduce rather than increase costs to the grid. The need for a long-term strategic approach to EV integration should be recognised in electricity policy development as well as transport policy.

1. Policy to reduce vehicle emissions should be consistent with the emission reductions required under the Paris Agreement.

The Paris Agreement strengthened the commitment, already agreed by over 190 countries, to limit global warming to less than 2°C above pre-industrial temperature levels. Countries agreed to seek to limit warming to "well below" this level and also committed in to pursue a temperature limit of 1.5°C.[1] These commitments impose a physical cap on the total amount of greenhouse gases that can be released this century. This is known as a carbon budget.

The carbon budget arises from the fact that the global climate system is not affected by emissions in any given year, but by the total amount of greenhouse gases in the atmosphere. Scientists have calculated that, to limit warming to 2°C with a reasonable level of probability, the world can emit no more than 590-1240 billion tonnes of carbon dioxide from 2015.

As the table below shows, to have a 75 per cent chance of avoiding 2°C warming and an even chance of avoiding 1.5°C warming, global emissions of carbon dioxide from energy use must decline to net zero by mid-century. Developed countries such as Australia have agreed to take the lead in these efforts and will need to achieve this outcome before the global average.

Table 1. When global emissions must reach net zero levels under Paris Agreement temperature objectives[2]

Temperature goal	**Net zero deadline**	
	CO_2 emissions from energy	**All greenhouse gas emissions**
1.5°C (>50% probability, >75% of avoiding 2°C)	**2045-2055**	**2060-2080**
<2°C (>66% probability)	**2060-2075**	**2080-2100**

As the discussion paper notes, transport emissions are already a significant contributor to Australia's national emissions and are projected to increase over time. However, policies can significantly reduce the emission intensity of vehicle use and ultimately enable vehicle emissions to approach near zero or net zero levels. Fuel efficiency or emission standards can reduce emissions significantly in the medium term, but further policies are needed to enable widespread electrification of vehicles and the use of other potentially zero-carbon fuels. Unless policies are developed in consideration of the national long-term emission task, there is a risk that they deliver less emissions reductions than would be economically prudent over the long term, and create a larger and more difficult emission reduction task for the future.

[1] UNFCCC, 2015. 'Adoption of the Paris Agreement'. FCCC/CP/2015/L.9/Rev.1. https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

[2] Joeri Rogelj, Michiel Schaeffer and Bill Hare, 2015. 'Timetables for Zero Emissions and 2050 Emissions Reductions: State of the Science for the ADP Agreement', policy brief, Climate Analytics. http://climateanalytics.org/files/ca_briefing_timetables_for_zero_emissions_and_2050_emissions_reductions.pdf

2. **Australian vehicle emission standards should be equivalent to US standards by 2020.**

Given the similarities in vehicle usage between the United States and Australia, and the influence of US standards on vehicle manufacturers, matching the US standards should be a fairly straightforward way of setting a strong downward trajectory for Australian vehicle emissions while minimising regulatory costs and ensuring wide consumer choice. As a starting point, The Climate Institute supports Australian standards equivalent to US standards. We note that this is consistent with the strong standard recommended by the Climate Change Authority of 105 g CO2/km by 2025 for all light vehicles. The CCA found this standard would reduce costs to car owners by $7,000 per vehicle by 2025 and reduce Australia's emissions by 59 Mt CO2-e by 2030, at a net saving to Australia of about $580 per tonne of emissions reductions.[3]

3. **A regulatory framework responsive to market developments avoids unnecessary emissions. An agile framework for continuously improving standards avoids unnecessary emissions.**

Enabling vehicle emission standards to be responsive to market developments prevents regulatory lock-in of emissions that could otherwise be avoided. Japan's Top Runner program, under which standards are set and reviewed based on the most energy efficient product in the market at the time, offers an example. In the Japanese Top Runner program, which covers a range of products including vehicles, producers must ensure the weighted average efficiency of the products they sell in a target year achieves the standard. This means that not every single product must meet the standard, but the average of all products must do so. This drives a trend toward greater overall efficiency while allowing diversity within product categories and flexibility in meeting the standard. Such a policy a framework also rewards innovators and creates market incentives for the early adoption of new more efficient technology.

4. **Regulatory analysis of the costs and benefits of standards must account for the costs of carbon emissions**

It may be appropriate for Australian vehicle standards to differ from those of the United States due to specific domestic factors. However, any cost-benefit analysis of the impact of emission standards is incomplete without accounting for the costs of carbon emissions. Excluding these costs creates a biased outcome. There are several ways that the costs of emissions can be included within cost-benefit calculations:

- *Using estimates of the social cost of carbon*. Estimates of the economic damage caused by an additional tonne of greenhouse gas emissions have been developed by the United States for use in regulatory analysis.[4] Long-term costs of climate change are discounted to represent what society should be willing to pay in the present and near future. The US estimates are based on different discount rates and different probability distributions. The 3 per cent average pathway is considered the "central estimate", while the 3 per cent 95th percentile pathway reflects a 1-in-20 risk of significantly greater climate sensitivity. It is recognised that the method used is at best incomplete (multiple aspects of climate change impacts are excluded), and so these numbers should be considered lower bound estimates of the actual costs.[5] The table below shows US estimates converted to Australian dollars.

[3] Climate Change Authority, 2014. *Light Vehicles Emissions Standards for Australia*. Research report, CCA, Melbourne. http://www.climatechangeauthority.gov.au/files/files/Light%20Vehicle%20Report/Lightvehiclesreport.pdfhttp://www.climatechangeauthority.gov.au/files/files/Light%20Vehicle%20Report/Lightvehiclesreport.pdf

[4] Interagency Working Group on Social Cost of Carbon, United States Government, 2013. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis. http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impactanalysis.pdf

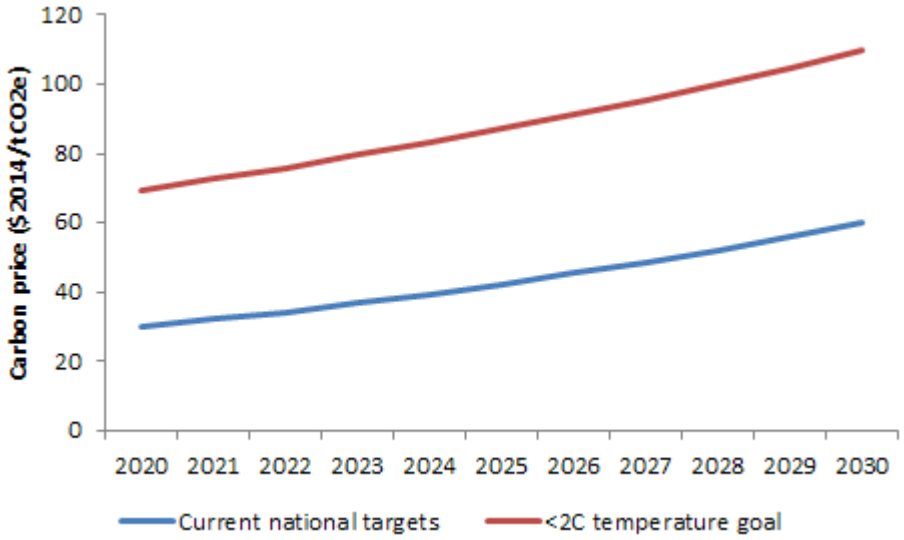
[5] The Climate Institute, 2014. *Counting All the Costs: Recognising the carbon subsidy to polluting energy.* The Climate Institute, Sydney. http://www.climateinstitute.org.au/verve/_resources/TCI_SocialCostOfCarbon_PolicyBrief_September2014.pdf

Table 3. US central and more risk-averse estimates of the social cost of carbon in A$2014

Year	Central estimate (3% discount rate average) $/tCO2e	More risk-averse estimate (3%, 95th percentile)
2020	51	148
2030	61	183
2040	73	221
2050	84	256

- *Using estimates of future carbon prices*. Despite the current low prices for carbon units produced through the Clean Development Mechanism, the outlook for carbon units is uncertain. As the Paris Agreement requires all countries to target emission reductions (compared with only a subset of countries under the Kyoto Protocol), there is a strong incentive for countries to provide preferred access to any carbon units that they produce to their own domestic industries. In a world limiting climate change to 1.5-2°C, all countries will need to achieve net zero emissions. In this environment, the international trade of units will be severely constrained and unit prices will rise. The figure below shows two indicative price paths for internationally traded units over the period from 2020 to 2030. One is the global price of carbon under a <2°C scenario and the other is the global price for a scenario consistent with the commitments that countries have currently made.[6] In both cases, indicative global prices are substantially higher than the current prices in major carbon markets.

Figure 1. Indicative price pathways of internationally traded carbon units



[6] The <2C price path is taken from the IPCC's median carbon price consistent with a >66% probability of avoiding 2C warming. The current targets price path is based on the median carbon price consistent with 3C warming, which is the temperature outcome of countries' current targets. See IPCC, 2014, *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva.

5. Strategic encouragement of EVs should maximise emissions and electricity sector benefits

EVs are an important means of decarbonising Australia's transport sector, as well as a growth opportunity and a new source of energy storage for Australia's electricity system. There is some potential for these effects to collide with national emission reduction and electricity price management goals. For example, if EVs use emission-intensive electricity their contribution to decarbonisation is less than if they use clean electricity. Similarly, if EVs increase peak demand, they could impose additional costs on the electricity system, but if they flatten peak demand they could help reduce costs for electricity users.

Optimising the benefits of EV uptake requires a strategy that encourages EV use and supporting infrastructure to be consistent with decarbonisation of both transport and electricity. Integrating EVs into the electricity system should be done in ways that reduce rather than increase costs to the grid and facilitate rather than hinder electricity decarbonisation. The need for a long-term strategic approach to EV integration should be recognised in electricity policy development as well as transport policy.

For any comments or further inquiries into the matters raised in this submission, please contact me [redacted]

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