

[REDACTED]
29 March 2016

Vehicle Emissions Working Group
The Department of Infrastructure and Regional Development
GPO Box 594
CANBERRA ACT 2601

Dear Sir / Madam

Vehicle Emissions Discussion Paper

Attached is a response to some questions raised in the Australian Government's *Vehicle Emissions Discussion Paper - February 2016*.

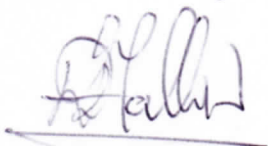
This input is provided from the viewpoint of an end-point vehicle user / consumer with a keen interest in seeing Australia reduce both its vehicle emissions specifically and greenhouse gas (GHG) emissions in general.

The Australian government gave a commitment, as part of the Paris Agreement on climate change, to reduce Australia's GHG emissions by 26-28% on 2005 levels by 2030. That is only 15 years away – and in real terms it is a relatively short timeframe, given the nature of the challenge to be achieved and improved on under the Paris Agreement Framework.

It is my view that over time Australia must transition much of its light transport fleet away from fossil-based fuels to electric vehicles or other low-emissions vehicles. This may take some time to complete, but we need to put arrangements in place that will encourage this transition as soon as practicable. Based on overseas experience, it seems to me that incentives will be required to foster the uptake of lower emissions vehicles including Hybrid Electric (HEVs), Plug-in Hybrid (PEHVs) and pure Electric Vehicles (EVs). At present the range of EVs in Australia is quite limited and needs to be expanded. While the range of many EVs is currently limited, EVs could well be suited to city driving where daily distances travelled are generally small. While Hybrid EVs have low emissions and can travel much longer distances, there is currently limited choice available in the Australian market. PEHVs while available overseas, are not generally available in Australia and it would be encouraging to see vehicle manufacturers / distributors address this issue. PEHV vehicles could operate largely as pure EVs around towns and cities and as an efficient, low-emissions 'Hybrid' for the longer trips which many Australians make. Australia may do well to look at some of the ideas being considered and implemented in Canada – a country not too dissimilar to Australia.

The attached submission is tendered for your consideration.

Yours sincerely



W. D. Fallow

Response to Australian Government Vehicle Emissions Discussion Paper

Develop Fuel Efficiency (CO₂) Standards

Q10. *Apart from standards, are there any complementary or alternative measures that could be adopted to encourage the purchase and supply of more fuel efficient vehicles?*

Response: Yes – we need to look to the future to encourage a move away from vehicles that are largely dependent on fossil fuels with higher GHG emissions. Overseas experience shows that it will be both useful and necessary to provide incentives for the successful uptake of low emissions / fuel efficient vehicles such as hybrid and electric vehicles. It will also be necessary to plan for recharging infrastructure for the transition towards electric vehicles (EVs) that will operate largely on renewable forms of energy.

Information and Education

Q17. *Have you found the information provided on the fuel consumption label and the Green Vehicle Guide website useful in considering the purchase of a new vehicle?*

Response: Yes. The fuel consumption label and Green Vehicle Guide website is useful when considering the purchase of a new vehicle. With a knowledge of the annual kilometres driven, the labels and guide can provide a reasonable estimate of the likely annual cost for fuel and the annual CO₂ emissions of vehicles under consideration.

Q18. *How could the information provided on the fuel consumption label and the Green Vehicle Guide be improved to encourage the purchase of more efficient vehicles?*

Response: The fuel consumption labels and Green Vehicle Guide at this stage generally seem adequate for consumers. However, to make the CO₂ emissions more meaningful, there could be a case for listing the likely annual tonnage of CO₂ emitted for typical annual distance travelled (this could be tonnes / 15,000km travelled). For example, while the emissions for a 2015 Toyota Corolla are listed as 156g / km this does not seem particularly high – 156g is not all that much. However, for a typical annual distance travelled of 15,000 km, this is equivalent to 2.34 tonnes of CO₂ per annum which seems much more significant. By contrast, a 2015 Mitsubishi Outlander Plug-in Electric Hybrid Vehicle (PHEV) emits 44g/km or 0.66 tonnes per annum.

Q20. *At what point in the decision making process is information on vehicle efficiency most effective in influencing purchasing decisions and what information mediums are most effective?*

Response: Information on vehicle efficiency is most effective when one first thinks about the purchase of a new vehicle and is making comparisons. Apart from having the standard fuel consumption / efficiency sticker on the vehicle, it could be worthwhile having this as a “stand-out” feature on printed or downloadable brochures.

Tax policy

Q24. *How could taxes and charges for motor vehicle purchase and/or use be reformed to encourage the purchase and supply of more efficient vehicles?*

Response: Australia is currently extremely unenlightened, and lags behind the rest of the world, as far as tax policy is concerned for encouraging the purchase of more fuel efficient vehicles - particularly electric vehicles, plug-in hybrids and hybrids. The major reason for this is the Federal government's refusal so far to consider any incentives to reduce the cost of purchase or ownership. The ACT currently provides some incentives (eg stamp duty reduction for EV purchases), but other States do not.

Some overseas governments provide incentives to encourage the uptake of electric, plug-in hybrids and electric vehicles. See list below, as an example:

Government incentive programs for electric vehicles (by country, not including concessions on registration, tolls and parking):

Ireland	\$ 7,042
Netherlands	\$ 4,225
Norway	\$ 1,620
Belgium	\$ 6,394
Portugal	\$ 7,042
Spain	\$ 8,451
Sweden	\$ 3,521
Italy	\$ 7,042
France	\$ 7,042
Austria	\$ 7,042
USA up to	\$10,000 (depending on state incentives)
Australia	\$ 0

Source: Mitsubishi Australia¹

Norway is a model for the uptake of electric cars. At the end of 2015, electric vehicles made up 22.4% of the Norwegian auto market share. The secret for the uptake seems to be in setting high vehicle taxes and offering generous exemptions such as 'stripping 25% sales tax and registration that averages more than \$12,000 depending on a vehicles weight and fossil fuel emissions'.² If the Australian government is really serious about reducing vehicle emissions – which it will have to be over the medium at least – then it may be worthwhile finding out more about the success of the uptake of electric vehicles in Norway.

To encourage the transition to more fuel efficient vehicles, the government could provide tax incentives along the lines adopted by other countries. In many respects, Canada is a similar country to Australia. A news article³ indicates that one Canadian province, British Columbia, may follow Norway's model to accelerate the transition to EVs. In British Columbia (BC), the \$10.6 million Clean Energy Vehicle Program includes \$5000 rebates to buy or lease electric vehicles. So far 2,200 vehicles have been purchased in BC through the scheme and the province now has over 3,100 battery electric and plug-in hybrid electric vehicles registered. In addition, the province has over 1,000 public charging outlets, with more to come^{*4}. Australia could, and should, adopt similar policies.

*** NOTE:** In considering charging outlets / infrastructure, consideration should be given to standardising charging plugs so that any electric vehicle on the market can use the charging infrastructure (i.e. Such infrastructure should not be specific to a particular brand of vehicle (eg Tesla, Nissan, etc).

1 <http://www.motoring.com.au/mitsubishi-slams-electric-car-tax-proposal-25239/>

2 http://www.huffingtonpost.com.au/entry/norway-electric-cars_us_5620eeafe4b069b4e1fba5d5?section=australia

3 <http://www.theglobeandmail.com/news/british-columbia/bc-could-follow-norways-electric-car-model-on-road-to-going-green/article26968781/>

4 <http://www.cbc.ca/news/canada/british-columbia/bc-electric-car-incentives-1.3414713>

Q 25. *To ensure incentives do not have any unintended consequences on air quality, should incentives include noxious emissions requirements as well as CO₂ requirements, or do current noxious emissions standards sufficiently mitigate this risk?*

Response: As noxious emissions have been problematic in cities overseas, it would make sense to ensure that incentives should also include noxious emissions. An advantage of electric vehicles is that they do not emit any noxious emissions (when charged from a renewable energy source).

Alternative Fuels and Electric Vehicles

Q 26. *What measures could be adopted to improve consumer awareness of the benefits of alternative fuelled and electric vehicles, particularly where they complement environmental benefits?*

Response:

The major motor vehicle companies and vehicle dealers need to be proactive in understanding and conveying to the public how Hybrids (HEVs), Plug-in Hybrids (PHEVs) and Electric Vehicles (EVs) operate and promote the use of these vehicles to potential and interested consumers.

My experience in soliciting information on Plug-in Hybrids shows a general lack of interest in promoting these vehicles. Furthermore, there seems to be a lack of understanding in how these vehicles work. While such vehicles are available in Japan, the United States and Canada – and could well be suited for use in Australia - I was advised that the reason that these vehicle are not currently available in Australia is that there is no charging infrastructure for such vehicles along the Hume Highway. This shows a lack of understanding, because (a) such a vehicle can operate as a pure electric vehicle around town and (b) can operate as a fuel efficient vehicle (3.4-3.9 l / 100km) operating on standard petrol when the battery is in a state of low charge. While the battery capacity of such vehicles could be improved to extend range in EV mode, a case could be made that Plug-in hybrids could be useful in Australia operating largely as an EV around town and in Hybrid mode on longer highway trips. As most city trips involve low distances, EVs and PHEVs can be charged at home overnight (ideally from solar renewable energy). Plug-in Hybrid vehicles such as the Mitsubishi Outlander PHEV have a quoted fuel efficiency of < 1.9 l / 100km.

A major issue in “selling” electric vehicles may not be the 'Head Office' desire to introduce such vehicles, but the dealerships themselves where there may be more interest in selling standard internal combustion (ICE) vehicles. Some people have commented to me that the local dealerships do not seem to consider electric vehicles to be 'real vehicles' and they have also commented on poor support and information available from dealerships. The reason for the apparent lack of interest from dealerships may have something to do with the fact that the on-going maintenance requirements for electric vehicles is likely to be significantly lower (~50% of that for an ICE vehicle) due to the simplicity of design centred around an electric motor and the fact that EVs typically have only about a dozen moving parts between the motor and the wheels. This means that dealerships may have less interest in selling vehicles that may not require as much maintenance as standard ICE vehicles which incorporate more moving parts, require more maintenance and would therefore bring in more revenue for the dealership.

The above issues tend to highlight the fact that much better information, education and perhaps incentives are required within the motor vehicle industry to ensure:

- awareness on the requirement to mitigate the effects of climate change and the need for society to transition away from internal combustion engines to electric vehicles or other low emissions vehicle technologies;
- that dealerships are well informed regarding new technology vehicles and that dealerships can effectively promote and sell these vehicles.

Electric vehicles are really only efficient at reducing emissions if the power for the vehicle is sourced largely from renewable energy. In the medium to longer term, EVs combined with clean power is exactly what is required. It should be noted that it will take time to establish the required recharging infrastructure to enable widespread deployment of electric vehicles. Provision of the required infrastructure should commence quite soon to allow increased uptake of electric vehicles – we should not procrastinate until the country has near 100% renewable energy. [Furthermore, as some vehicles have a lifespan of 15-20 years, this could mean that light internal combustion engine vehicles may largely need to be phased out by ~ 2030-35 if there is a requirement to be largely carbon neutral around the middle of the century.] Some jurisdictions, such as the ACT and South Australia, where there is a relatively high availability of renewable electricity, could benefit immediately and provide lower vehicle emissions through the use of EVs or PHEVs. However, the uptake of EVs would provide advantages to other States and Territories through cleaner urban air quality, noise reduction and improvement of community health.

For reference, some statistics on the uptake of electric vehicles in different countries is at Attachment 1.

If the government is serious about reducing vehicle emissions in a fair share effort to address climate change under the Paris Agreement to limit the rise in global temperatures to well below 2° Celsius, both the government and vehicle distributors need to provide information and incentives to encourage the change to more low emissions vehicles such as Hybrids, Plug-in Hybrids and pure Electric Vehicles.

Darryl Fallow

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Some Statistics Regarding the Uptake of Electric Vehicles Around the World

Light-duty plug-in electric vehicle stock and PEV market share of total new car sales in the top ten PEV selling countries as of December 2015							
Country	PEV stock ⁽¹⁾			PEV market share			Comments
	2015 ^[5]	2014 ^[24]	2013 ^[11]	2015 ^[5]	2014 ^[24]	2013 ^[11]	
 United States	~410,000	291,332	172,000	0.66%	0.72%	0.62%	Sales since 2008. Only plug-in electric passenger cars.
 China	258,328	83,198 ^[7]	28,619	0.84% ^[41]	0.23%	0.08%	Sales since 2008. Only new energy passenger cars
 Japan ⁽²⁾	~130,000 ^{[5][7]}	108,248 ^[7]	74,124	n.a.	1.06%	0.85%	Sales since July 2009. Plug-in cars and all-electric utility vans.
 Netherlands	88,991	45,020 ^[42]	28,673	9.74%	3.87%	5.37%	Registrations since 2009. Plug-in cars and all-electric utility vans.
 Norway	84,401 ^{[43][44]}	43,442	20,486	22.39%	13.84%	5.60%	Registrations since 2003. Plug-in cars, all-electric vans, including used imports.
 France	74,294	43,605 ⁽³⁾	28,560 ⁽³⁾	1.2%	0.70%	0.65%	Registrations since 2010. Only all-electric cars and utility vans.
 United Kingdom	53,524	~24,500 ^[45]	9,982 ^{[45][46]}	1.1%	0.59% ^[46]	0.16% ^[46]	Registrations since 2006 Plug-in cars and all-electric utility vans.
 Germany	48,669 ^{[5][24]}	25,205 ^{[47][48]}	12,156 ^[48]	0.73% ^[49]	0.43%	0.25%	Registrations since 2006 Only plug-in electric passenger cars.
 Canada	17,058 ^[50]	10,658 ^[51]	5,596 ^[51]	0.35% ^[50]	0.27% ^[51]	0.18% ^[51]	Sales since 2011. Only plug-in electric passenger cars.
 Sweden	16,984 ^{[5][24]}	8,076 ^[52]	3,138 ^[52]	2.62% ^[53]	1.53% ^[54]	0.57%	Registrations since 2011 Plug-in cars and all-electric utility vans.
Global Total (since 2003)	1,235,000 ^[5]	712,000 ^[24]	405,000 ^[24]				
Light-duty plug-in electric vehicle stock and PEV market share of total new car sales in selected regional markets							
 Europe ⁽⁴⁾	419,192 ^{[8][9]}	233,022 ^[8]	n.a.	1.41% ^[55]	0.66% ^[56]	0.49% ^[57]	Registrations since 2010. Only plug-in electric passenger cars.
 California ^{[58][59]}	191,650	129,484	69,999	3.1%	3.2%	2.5%	Registrations since 2010. Only plug-in electric passenger cars.
Plug-in electric vehicle stock for all class segments in China ^{[33][34][35][36][37]}							
 China	444,447	113,355	38,592				Sales since 2011. All vehicle class segments. ⁽⁵⁾
Notes							
(1) Plug-in electric vehicle stock only includes cumulative sales or registrations of highway legal light-duty vehicles except where noted.							
(2) Kei cars are not included for the Japanese market share estimate. ^[11]							
(3) French registrations do not include plug-in hybrids, which were accounted together with regular hybrids (HEVs). ^[60]							
(4) European figures correspond to European Union member countries plus EFTA countries (Norway and Switzerland)							
(5) Plug-in electric passenger cars and heavy-duty commercial vehicles such as buses and trucks.							

**Registration of highway-capable plug-in electric cars by model in Australia
between 2010 and March 2015**

Model	Total 2010–2015 ⁽¹⁾	1Q 2015 ^{[104][110]}	2014 ^{[103][104]}	2013 ^[97]	2012 ^[105]	2011 ^[90]	2010 ^[106]
Mitsubishi Outlander P-HEV	1,093	198	895	–	–	–	–
Nissan Leaf	488	31	173	188	77	19	–
Mitsubishi i MiEV	252	0	0	15	95	30	112
Holden Volt	245	6	58	101	80	–	–
Tesla Model S	173	104 ⁽²⁾	69 ⁽²⁾	–	–	–	–
BMW i3	79	46	33	–	–	–	–
Tesla Roadster	11	0	0	0	5	6	–
Total registrations	2,341	385	1,228	304	257	55	112

Notes: (1) CYTD: current year-to-date sales through March 2015.

(2) Model S figures correspond only to registrations in [New South Wales](#) and [Victoria](#).^[104]

**Top 10 countries by plug-in electric passenger car market share
of total new car sales between 2015 and 2013**

Rank	Country	Market share (%) 2015 ^{[5][53]}	Rank	Country	Market share (%) 2014 ^[24]	Rank	Country	Market share (%) 2013 ^[72]
1	Norway	22.39 %	1	Norway	13.84 %	1	Norway	6.10 %
2	Netherlands	9.74 %	2	Netherlands	3.87 %	2	Netherlands	5.55 %
3	Iceland ^[71]	2.93 %	3	Iceland ^[70]	2.71 %	3	Iceland	0.94 %
4	Sweden	2.62 %	4	Estonia ^[70]	1.57 %	4	Japan	0.91 %
5	Denmark	2.29 %	5	Sweden ^[54]	1.53 %	5	France ⁽²⁾	0.83 %
6	Switzerland	1.98 %	6	Japan	1.06 %	6	Estonia	0.73 %
7	France	1.19 %	7	Denmark ^[73]	0.88 %	7	Sweden ^[54]	0.71 %
8	United Kingdom	1.07 %	8	Switzerland ^[74]	0.75 %	8	United States	0.60 %
9	Austria ^[75]	0.90 %	9	United States	0.72 %	9	Switzerland	0.44 %
10	China ^[41]	0.84 %	10	France ⁽²⁾	0.70 %	10	Denmark	0.29 %

Selected regional markets

Plug-in electric passenger car market share between 2015 and 2013

Hong Kong ^[76]	4.84 %	Hong Kong	-	Hong Kong ^[76]	0.39 %
California ^[58]	3.1 %	California ^[58]	3.2 %	California ^[58]	2.5 %
Europe ^{(1)[55]}	1.41 %	Europe ^{(1)[56]}	0.66 %	Europe ^{(1)[57]}	0.49 %

Notes: (1) European figures correspond to [European Union](#) member countries plus [EFTA](#) countries (Norway and Switzerland)

(2) The French market share corresponds to combined sales all-electric passenger cars and utility vans only (plug-in hybrids not included).

Source Wikipedia - https://en.wikipedia.org/wiki/Electric_car_use_by_country