Light Vehicle CO₂ Emissions Standards Discussion Paper: CASANZ Comments & Response

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Authors:

Robin Smit, Chair of the Transport Special Interest Group

Robert Kennedy, Chair of the Greenhouse Special Interest Group
1. Introduction

The Clean Air Society of Australia and New Zealand (CASANZ) is a non-governmental, non-profit organization formed in the 1960s to bring together people with an interest in clean air and the study of air pollution. Its interests have since grown to include broader environmental management affairs, including Special Interest Groups focussing on Transport Emissions and Greenhouse Gas issues. The Society has approximately 620 members in Australia, New Zealand and other countries.

CASANZ welcomes the opportunity to comment on the issues raised in the above Discussion Paper, which are aimed at achieving a significant reduction in greenhouse gas emissions from the transport sector. The Society believes that such reductions can best be achieved by a concerted, holistic program involving transport fuel pricing, fuel efficiency, fuel substitution and other policy measures.

CASANZ believes that an approach where the various parties (car manufacturers, fuel suppliers, consumers) are (to some extent) held responsible for their CO₂ emissions, is a sensible way forward (“polluter pays principle”). For instance, combination with other measures such as stamp duty charges, changes to vehicle registration fee structure, rebates, fleet purchasing frameworks and improving consumer awareness could help “internalise” the issue of climate change for the general public and influence buying behaviour, which in turn changes market demand and indirectly affects car manufacturers. At this stage, consumers only take future fuel savings into account to a limited extent.

The combination of CO₂ standards and other fiscal measures will modify the costs structure of transport, which will affect buying behaviour (with changes to fleet composition) and traffic activity. So the combined effects could be quite effective. For example, the relatively high taxes on cars and fuels in Europe have led to cars being significantly more fuel efficient than in the US and Australia. Another point is that policies to encourage consumers to buy technologically advanced vehicles with low CO₂ emissions would help car manufacturers directly by reducing the economic risks of market failures.

a. Fuel Pricing

As noted in Figure 4 of the Discussion Paper, there are already significant differences in actual CO₂ emissions between the European Union (154 g/km in 2008), Australia (222 g/km), and the United States (240 g/km). This difference is predominantly due to a preference for smaller, often diesel powered, vehicles in the EU when compared to the US, with Australia holding the middle ground. An AIP-sourced comparison of 2010 petrol prices shows that fuel pricing in these three regions {EU (Au$ 2.05/litre), Australia (Au$ 1.35/litre) and the US (Au$ 0.85/litre)} is in a strong inverse relationship with the above CO₂ emissions. As noted in paragraph 2 on page 8 of the Paper, CO₂ emissions are “a reflection of the complex interaction of consumer preferences for particular categories or types of vehicles”, and CASANZ believes that fuel pricing largely drives these preferences.

It is noteworthy in paragraph 2 of Section 2.2 that “The Government has decided that transport fuels for light vehicles will be permanently excluded from the carbon pricing scheme”, while electricity and diesel for use in public transport are not excluded. This disparity is likely to hinder the wider use of public transport in Australia, and, based on the EU experience, result in a slower uptake of newer, smaller more-fuel efficient vehicles.
b. Fuel efficiency
Tables 2 and 3 of the Discussion Paper present a number of options for efficiency savings and costs from existing and expected technologies, with Table 2 based on a 2007 UK study, and Table 3 on a 2011 US study. There are very significant differences between the two Tables, most notably in the efficiencies attributed to “Direct injection and lean burn” (10-13 % for the 2007 UK study versus 1-2 % for direct injection in the later US study). CASANZ understands that lean burn technology is no longer being applied in petrol engines (expected to be) available in Australia, due to difficulties in meeting NOx emission standards over the full range of engine operation.

CASANZ suggests that the forthcoming Regulatory Impact Statement (RIS) clearly sets out realistic assumptions as to the technologies, CO2 reductions and costs expected to be available for use in future years, to enable a proper assessment of the resultant benefit and cost.

c. Fuel Substitution
CASANZ notes that in Section 3.1.6 of the Paper, the emissions value ascribed to each vehicle model will be based on ADR81/02, using a standard reference fuel based on petrol or diesel derived from crude oil. Use of this ADR alone does not take into account the expected increase in the availability of biologically-derived fuel substitutes such as bio-ethanol and bio-diesel in future years, and does not reflect the fact that different vehicle brands and models are more-or-less capable of using such fuels. For example since late 2011, Holden Commodore engines can operate on E85 fuel, which may contain up to 85 % ethanol. However in contrast, many engine manufacturers will presently not warrant their engines for fuels containing more than 10 % ethanol or more than 5 % bio-diesel. Those that (intend to) do so should be recognised under the “Specific Technology” column in Table 2 or 3, as being capable of operation using increasing amounts of bio-fuels. This will encourage engine innovation and increase the market penetration of bio-fuels.

A similar situation applies to those dual-fuel vehicles capable of using either petrol or LPG as fuel. While the low cost of LPG is the primary factor favouring its use in high-mileage vehicles, the manufacturers of dual-fuelled vehicle should not be penalised by applying a petrol-only emissions certification under ADR81/02 to their engines.

d. Consideration of Potentially Adverse Policy Effects
CASANZ believes that part of a holistic approach is to consider potential adverse effects of mandatory CO2 emission standards. Although quantifying the impacts may be difficult, being aware of possible issues and, to the extent possible, addressing them will be essential for effective reduction of CO2 emissions from light-duty vehicles. A few of these potential issues are listed below:

- The ADR based fuel consumption figures are based on artificial driving behaviour (New European driving Cycle or NEDC), which is known to significantly underestimate real-world fuel consumption (~ 20%). In addition, vehicles may be explicitly calibrated to achieve good emissions and fuel consumption performance on the NEDC, but engine management will change to a different plan when driving in real-world conditions (e.g. to improve engine performance) leading to less favourable environmental performance. It is therefore important to also assess the “real-world” effects of the proposed policy measures in terms of reductions in actual CO2 emissions from transport – and compare these to anticipated effects based on NEDC data.
- The real-world difference in CO2 emissions performance between modern diesel cars and their equivalent modern petrol cars may be less in real-world driving conditions than the often stated figure of 20%. In addition, with ongoing developments in petrol car engines (turbo-charging, variable valve timing, etc.) and increasing use of exhaust after-treatment devices (e.g. DPFs) on diesel cars - with associated fuel penalties - this difference is expected to become smaller in the (near) future.
• Lowering the costs of transport by improving fuel economy may have rebound effects such as increased car use (expressed as e.g. VKT). This is an important issue and the extent to which this effect reduces the overall effectiveness of policy measures should be quantified (to the extent this is possible). It is noted that modelling (e.g. TREMOVE model in EU) is needed to determine the net effect of the various (combined) policy measures on consumer behaviour (buying, driving) and CO$_2$ emissions. These could provide negative feedback loops (like the rebound effect mentioned before) or positive effects (e.g. shift to smaller cars, alternative fuels).
• There may be potential air quality impacts of shifts in fuel mix, such as an increased uptake of LPG fuel. For instance, in the past, emission testing in Australia has shown that LPG after-market technologies could lead to inferior emissions performance and reduce air quality (e.g. very high CO levels, which would reduce CO$_2$ exhaust emission levels). These kind of effects should be considered in the analysis.
• Consideration of other GHGs (expressed as CO2-e emissions) would be important in order to make a fair comparison between different types of vehicles including the efficiency of non-engine components such as air conditioners. This is not an entirely uncharted area: e.g. CARB explicitly considers non-CO2 GHGs in the development of their transport and CO2 policies.

CASANZ suggests that the forthcoming Regulatory Impact Statement (RIS) discusses possible issues and addresses them to the point this is feasible, and otherwise directs further examination – if necessary.

2. Key Issues
The following comments relate to the Key Issues set out in Section 3 of the Discussion Paper, and follow the same order as in the paper.

Q1  Do you support the setting of staged short and medium term targets?
CASANZ supports the setting of short (2015), and medium term (2020) targets. It also supports the setting of an aspirational target for later years, consistent with the ultimate aim of stabilising atmospheric greenhouse gas concentrations at 450 ppm equivalent, as stated in Section 2.1 of the paper.

Q2  If yes, do you consider 2020 is the logical date for a firm second stage target?
To enable an adequate lead time for technology to adjust to meet the above targets, CASANZ considers 2020 to be a logical date. But, given the significant length of the time period up to 2020, it will be important to combine these dates with ambitious emission standards. It is noted that thorough consideration of the combined emission targets and their base years is quite important as they will impact on total cumulative emission reductions. In particular the definition of the trajectory towards the targets in time is relevant, where the shape of this trajectory (linear, non-linear) can lead to substantially different total CO$_2$ emission reduction outcomes.

Q3  Do you consider it is appropriate to set a target beyond 2020 at this stage?
CASANZ favours delaying the setting of a firm target beyond 2020 until the outcome of the 2015 target is assured. This later target should take into account the three parts of the program (fuel price, efficiency and substitution) discussed in sections a – c of the above Introduction.

Q4  Do you consider 2010 is the appropriate base year for determining the targets?
2010 is an appropriate year.
Q5  What rate of CO2 emissions reduction do you consider is achievable by 2015 and 2020 in Australia?

CASANZ believes that a CO2 reduction rate of 2.5% until 2015, and 5% from 2015 until 2020 is achievable. This applies to a fleet average. It is consistent with Scenario 5 in Table 4, and with reduction targets being set in the EU and USA.

Q6  What do you think is a reasonable CO2 target for the Australian new light vehicle fleet in 2015 and 2020?

Based on the above reduction rates, 187 g/km in 2015 and 145 g/km in 2020.

Q7  Are there any impediments to Australia achieving the more ambitious rates of reduction embodied in Scenarios 5 and 6 above?

CASANZ believes that the rates of reduction given in Scenarios 5 and 6 may require changes in consumer preferences for particular types of vehicles, and a more widespread use of bio-fuels and LPG. These are canvassed in the Introduction.

Q8  Do stakeholders have any information on costs and benefits of standards which would assist the Department of Infrastructure and Transport in the preparation of the cost benefit analysis for the implementation RIS?

CASANZ has no specific information.

CASANZ believes that a combination of the vehicle and engine manufacturers and an independent consultant are best placed to assist the DIT in preparing the cost benefit analysis for the RIS. This is the process that was applied in e.g. Europe. The work was conducted/coordinated by technical specialists from TNO (comparable to CSIRO), with strong involvement of the vehicle manufacturers and the European Commission. This ensured a balanced and impartial discussion of the issues.

Q9  Should Australia set a single set of CO2 targets for all light vehicles, or is there merit in establishing separate targets for passenger vehicles (cars and SUVs) and for LCVs (utes and vans)?

To avoid confusion as to what defines the two types of vehicle, CASANZ suggests a single set of targets covering all light vehicles.

Q10  Do you support the idea of bonus credits for new technology vehicles (such as EVs), flex fuel vehicles and other technologies, or should the CO2 standard be purely performance based, treating all vehicles on the same basis (using the CO2 emissions result on the standard ADR test)?

Inclusion of new technologies such as fuel cells and electric vehicles in the legislation may accelerate their development and use, with obvious benefits in terms of total CO2 emissions. Of course, this requires consideration how to measure and/or compute CO2 emissions (test protocols) from these new technologies in order to provide a base for comparison to conventional technologies.

As discussed in the Fuel Substitution section above, CASANZ supports the use of bonus credits for vehicles capable of operating on a variety of bio-fuels or LPG, with the credit dependant on the reduction in CO2 emissions resulting from the expected use of such fuels. For “pure” electric vehicles, the credit must take into account the emissions from the power source providing the electricity.

Q11  If you support credits, what vehicle types do you consider qualify for a credit and why?

See above. A credit should also be applied to those fuel saving technologies (such as integrated start-stop) which will not be adequately assessed under ADR81/02.
Q12 Do you support an attribute based standard?

Based on the EU and US experience, CASANZ supports an attribute-based standard for setting emission targets.

Q13 If so, do you have a preference for mass or footprint?

CASANZ has no preference for a particular attribute at this stage, but proposes that the selected attribute should comply with a number of criteria, including:

1. robustness (i.e. not leading to adverse outcomes with respect to CO₂ emission reductions),
2. simplicity,
3. consistency with overseas legislation, and
4. easy to monitor.

It is strongly recommended that the RIS provides a comparison between Mass and Footprint attributes for the same vehicles, so that any vehicles which differ significantly in the comparison can be identified.

Q14 If you do not favour an attribute based standard, what is your preferred approach and why?

See above.

Q15 Do you consider there are any other data elements which might also be required for the standards to be effective and enforceable?

CASANZ considers that the data elements given in Section 3.2.2 to be adequate.

Q16 Do you agree that the current VFACTS database (supplemented and audited as necessary) is suitable as the primary data source for assessing and reporting compliance with the standards?

Provided it is subjected to comprehensive auditing to ensure completeness and accuracy, the VFACTS database should be suitable as a source for assessing compliance with the standards. It is noted that footprint (wheel base x track width) is generally seen as the best variable to use (e.g. difficult to cheat as cars are already optimised on a long wheel base) for an attribute based standard. In Europe, however, the problem w.r.t. CO₂ standards was that there was no readily accessible and comprehensive information on wheel base and track width at the time the standards were developed e.g. in vehicle registration databases and data provided by car manufacturers, etc. – so mass was considered the next best option. It is unclear if the VFACTS database contains this type of information.

Q17 Do you also agree that data collected for the purposes of the standard should be made publicly available on an annual basis?

The data should be publicly available.

Q18 Do you agree that the Motor Vehicle Standards Act is the most appropriate primary legislation under which to write appropriate CO₂ regulations?

Q19 If not, what alternative legal framework would you propose?

Based on the information available in Section 3.2.4 of the Discussion Paper, the Motor Vehicle Standards Act would appear to be the appropriate primary legislation for implementation of mandatory emission standards. This Act would need to be supported by suitable regulations.
**Q20** Do manufacturers, particularly importers, have any views regarding the identification of responsible entities under the standards?

**Q21** Do you consider there is merit in allowing manufacturers to pool, or is it an approach that manufactures are unlikely to pursue?

There could be merit in pooling as it would give manufacturers more flexibility. At the end of the day, it is the maximum reduction in fleet average CO₂ levels and the most cost-effective way to achieve this that matter.

**Q22** Do you think there is sufficient merit to warrant the inclusion of banking and trading systems as a feature of Australia’s CO₂ standards?

**Q23** Do you agree such systems are only possible where annual targets are set?

While a banking and trading system does add complexity to the proposed system, the concept of a “reward” for early introduction of new technology to reduce CO₂ emissions has merit and should be investigated. This reward approach (through a reduction in fuel excise) was used as a component of the successive reduction in sulphur contents of diesel fuel over the past decade. A *pseudo* annual target could be developed by a linear interpolation of the 2015 and 2020 standards.

**Q24** Do you agree that financial penalties are the most effective way to address non-compliance?

**Q25** If not, what alternative would you suggest?

Yes, but the applicability/strictness of the penalties would depend on the level of ambition of the emission targets and associated target years, which would reflect the level of risk that a target is not met. So if the risk is reasonably high, an option could be (based on the experience of implementation of the National Pollutant Inventory in the 1990’s), a “name and shame” approach be used to address non-compliance for the initial 2015 compliance year, with financial penalties in place for non-compliance in the (later) 2020 year. For consistency, the penalty should be based on the carbon price applying to other emission sources (such as electricity generation) at that time. If the risk is not particularly high, then a financial penalty for non-compliance should be set for 2015.