VICTORIAN GOVERNMENT SUBMISSION TO

MINISTERIAL FORUM ON VEHICLE EMISSIONS

IMPROVING THE EFFICIENCY OF NEW LIGHT VEHICLES – DRAFT REGULATION IMPACT STATEMENT

VEHICLE EMISSIONS STANDARDS FOR CLEANER AIR – DRAFT REGULATION IMPACT STATEMENT

BETTER FUEL FOR CLEANER AIR – DISCUSSION PAPER

Introduction

The Andrews Labor Government is committed to ensuring Victoria is a leader in responding to the challenge of climate change. The recently passed *Climate Change Act 2017* provides Victoria with a world leading legislative foundation to manage climate change risks, maximise the opportunities that arise from decisive action, and drive the transition to a climate-resilient community and economy with net zero emissions by 2050. Achieving net zero emissions by 2050 will ensure Victoria plays its part in global efforts to keep warming well below a 2°C rise above pre-industrial levels.

On 29 January 2017, the Government announced a 2020 target to reduce greenhouse gas emissions by 15-20 per cent below 2005. This target was announced as part of a broader package of climate change commitments in Victoria's Climate Change Framework which sets out the Government's vision for a net zero emissions, climate-resilient Victoria as well as the steps the Government is taking in the period to 2020 to commence the transition.

The Government has also established the TAKE2 pledge program. Through this program, the Government will take action to reduce emissions from its own operations, and establish policies and programs to reduce emissions across all sectors of the economy. Voluntary pledges to action are invited from local government, businesses, community sector organisations, educational organisations and individuals. Key actions by the Government include setting renewable energy targets of 25 per cent by 2020 and 40 per cent by 2025, and strengthening the Victorian Energy Efficiency Target scheme.

For Australia to play its full part in meeting the goals of the Paris Agreement, the Commonwealth must also step up to the plate. The Commonwealth's current review of national climate change and energy policy settings is, therefore, critical. Victoria welcomes these reviews and believes they provide an important opportunity to establish a more ambitious, stable and enduring approach to Australia's transition to a low carbon economy. Victoria stands ready to be an active and constructive partner in this endeavour.

Currently, the transport sector contributes around one-fifth of Victoria's total greenhouse gas emissions. As such, significant changes will be required in the sector over time to ensure it operates in a manner consistent with the State's 2050 target.

The Government's goal is for Victoria to have an effective, integrated and climate-resilient transport system that provides a wide range of travel choices for all Victorians, including electric and autonomous vehicles. The Government is already taking action on a number of fronts, including:

- investing in and enhancing public transport;
- developing an effective and integrated transport system;
- supporting walking and cycling through Active Transport Victoria and implementing the Cycling Strategy 2016-2026; and
- supporting innovation in new technology – including funding to support a commercial electric vehicle manufacturing facility and development of Australia's first self-driving vehicle.

Strong and effective national action is also required. Importantly, the Commonwealth has identified transport as an area with significant potential for large-scale and cost effective greenhouse gas emission reductions over the period to 2030.

Victoria welcomes the Commonwealth's release of the draft Regulation Impact Statements *Improving the efficiency of new light vehicles* and *Vehicle Emissions standards for cleaner air*, as well as the *Better fuel for cleaner air* discussion paper. These documents indicate a new fuel efficiency/CO_2 emissions standard could reduce Australia's greenhouse gas emissions while also reducing fuel costs for vehicle owners, and that proposed changes to vehicle noxious emissions and fuel quality standards will complement this reform while generating major public health benefits.

While the changes will produce long term savings for vehicle owners, there may be some increase in short term costs as vehicle manufacturers, importers and fuel suppliers adjust to the new requirements. Victoria recommends the Commonwealth consider ways of minimising the financial impacts of the proposed new standards on low-income and disadvantaged households.

Victoria supports the broad direction of the proposed reforms, but believes there is scope for further improvements in the Commonwealth's proposals. Key issues are discussed further below, while the full list of comments, including detailed technical comments, are provided in the Appendix.

Summary of Submission's Key Points

Improving the efficiency of new light vehicles (Fuel Efficiency RIS)

- The RIS should investigate the potential for a stronger Australian vehicle fuel efficiency standard than the currently proposed Target A (105gCO_2/km, phased in by 2025).
- Victoria welcomes the RIS' valuation of emissions reduction benefits, but notes that the US EPA applies higher values than assumed in the RIS analysis. Following the US EPA approach would result in a higher estimate of benefits.
- The proposed scheme should be based on CO_2 emissions (rather than fuel consumption); adopt the sales weighted fleet average approach; use the proposed "limit curve" method; be based on a "footprint"-based vehicle attribute; phase the standards in through a series of progressively ramped annual targets, and provide for inter-year borrowing and banking to allow vehicle importers to more cost effectively manage their obligations.
- One standard covering all passenger vehicles, SUVs and light commercial vehicles is supported.
- Scheme credits and multipliers are not favoured. If such credits are to be provided (for example, for electric and low-emissions vehicles), care needs to be exercised to ensure there are no perverse effects on continuing efforts to improve the emissions performance of the conventionally-powered road vehicle fleet.
- State and local governments across Australia, including the Victorian Government, are already taking action to support the transition to electric, low emission and smart vehicles. The Ministerial Forum's February 2016 Vehicle Emissions Discussion Paper canvassed the role of possible complementary measures to any new vehicle emissions standards. No further information has been released to date on the Ministerial Forum's plans in this area. Victoria recommends the Commonwealth use the current Ministerial Forum Review process to work with the States and Territories on a strategic national approach to complementary policies that will support the proposed new vehicle emissions and fuel quality standards.

Vehicle emissions standards for Cleaner Air (Noxious Emissions RIS)

- The RIS uses a damage cost approach to estimating public health benefits. The preferred approach is air quality modelling and health risk assessment using an impact pathway approach. Impacts on mortality and morbidity rates are key outcomes and relevant statistics ideally should be used to communicate the public health benefits and support the analysis.
- Significant secondary pollutants such as ozone are not mentioned in the benefit analysis. Exclusion of the benefits of reducing secondary particles, black carbon emissions and non-health impacts, as well as the potential benefits of reducing ozone suggests the proposals' benefits are likely to be greater than currently indicated in the RIS.
- The concerns about social cost of carbon assumptions in the Vehicle Fuel Efficiency RIS apply similarly to the noxious emissions RIS.

Better Fuel for Cleaner Air Discussion Paper (Fuel Quality standards paper)

- Options B-D are considered the strongest options for further analysis in a RIS.
- The proposed approach to estimating public health benefits seems reasonable, but should take account of the issues previously raised regarding this aspect of the noxious emissions RIS.

- Assessment of greenhouse gas reduction benefits should be consistent with the approach recommended for the fuel efficiency and cleaner air standards RIS'.
- Cost implications of the new standards for domestic fuel refiners is an important issue. The RIS should include some estimate of the likely cost and refinery related emissions impacts, preferably based on direct information from the industry.

More detailed comments on the three documents are provided in the Appendix.

1. Improving the efficiency of new light vehicles (Fuel Efficiency RIS)

1.1 Emissions Reduction Objective

The RIS looks at three emissions reduction targets, based on the 'strong', 'medium' and 'mild' standards proposed by the Climate Change Authority (CCA) in its 2014 report (p27). The "strong" option (Target A) would produce an overall fleet average target of 105gCO_2/km in 2025, an estimated 33% emissions reduction. The RIS also indicates that Target A will produce the greatest net benefits out of the three options, $13.9 billion by 2040. Given that the RIS suggests the net benefits increase in line with increased levels of ambition, it is unclear why the RIS has not considered evaluating the costs and benefits of an even more ambitious emissions reduction target? In this context, it is noted that many other countries are already committed to more ambitious targets – for example, the European Union, China and South Korea are all already committed to reducing vehicle emissions by 27-28% by 2020. These are all broadly similar orders of emissions reductions as proposed under the RIS' "strong" option, but delivered a full five years earlier. The RIS results suggest there is a need to investigate the potential for a stronger Australian vehicle fuel efficiency standard than is currently proposed.

1.2 Carbon Cost Assumptions

The RIS uses the US EPA's social cost of carbon to estimate the benefits of greenhouse gas emissions reductions. The RIS uses a flat $35/tonne carbon value, which is the US EPA's central estimate for the social cost of carbon for 2015. It is important however to recognise that the US EPA values rise over time to reflect the increasing costs of greenhouse gas emissions. The US EPA's social cost of carbon rises to US$42/tonne by 2020, and US$50/tonne by 2030. As the costs and benefits of the proposals are being compared over the 2020-2040 period, it would be more appropriate for the RIS to factor in an increasing social cost of carbon over this period, which would result in a higher estimate of benefits. The RIS acknowledges that the approach used is "conservative".

The RIS sensitivity tested its carbon cost assumptions by using a "low" carbon value of $12.10/tonne in its analysis. The main concern with this aspect of the RIS is there is no corresponding test of a "high" carbon value. This omission downplays the potential benefits of the proposed standards. The US EPA's estimates for the social cost of carbon with lower discount rates could be used for the higher values in the sensitivity analysis.

1.3 Technology Costs

Table 2 of the draft RIS presents CO_2 reductions and cost increases for a range of technologies, which are taken from Table 14 of the ABMARC report. Neither document indicates how these reductions and costs were determined nor what their level of uncertainty is. It would be helpful if the final RIS elaborated on these costs.

1.4 Scheme Design

The RIS outlines a range of important issues regarding the design of a fuel efficiency standard. Victoria believes the scheme design needs to satisfy the following basic principles – it should:

- be as simple and clear as possible;
- be easy to administer and enforce;
- foster continuing reductions in CO_2 emissions in the general passenger and light commercial vehicle fleet; and
- provide manufacturers and importers with as much flexibility as possible to meet their obligations.

The Climate Change Authority (CCA) 2014 report on vehicle emissions standards made a number of recommendations on scheme design. Victoria generally agrees with the CCA's recommendations. In particular Victoria supports the following key design principles:

- the standard should be based on CO_2 emissions (rather than fuel consumption), as this directly aligns with the emissions reduction objective and is fuel-agnostic;
- a sales weighted fleet average approach should be used (coupled with introduction of the new Worldwide Harmonised Light Vehicles Test Procedure);
- the proposed "limit curve" approach to setting emissions standards is supported, as it will facilitate the fleet averaging approach;
- the vehicle "footprint" (rather than mass-based) approach is preferred, as this more directly encourages cost-effective responses in vehicle design based on "lightweighting" which will also better preserve other important characteristics such as vehicle utility. However, the relative merits of the alternative approaches should be explored in more detail;
- phase-in should occur through a series of annual targets, progressively ramping up to the new standard; and
- as part of the phase-in process, banking and borrowing options should be made available to vehicle importers to allow them to manage their obligations across years cost effectively.

More detailed responses to specific questions about scheme design can be found in the Appendix.

1.5 Single versus Multiple Standards

The RIS explores the potential for applying separate standards to passenger vehicles, SUVs and light commercial vehicles in different combinations. This aspect of the RIS is based on the ABMARC study's conclusion that a single common standard would effectively impose stricter requirements on light commercial vehicles. The International Council on Cleaner Transportation (ICCT) argues however that the technologies available to improve the efficiency of cars, SUVs and light commercial vehicles are very similar; that having separate standards increases the risks of consumers and

importers migrating towards higher emissions vehicles; and that best practice would be to regulate all vehicles under the one limit curve. The CCA's 2014 report also considered this issue, and noted that, in practice, most light commercial vehicle sellers in the Australian market also sell significant numbers of passenger vehicles. On this basis, it concluded vehicle importers and manufacturers would not be significantly disadvantaged under one common standard and should be able to comply by adjusting their respective vehicle mixes.

There are significant benefits with retaining one common standard, it:

- simplifies administration of the standard;
- maximises the ability of importers to choose how to meet the overall environmental outcome, by allowing them to vary their vehicle mix;
- eliminates the problem of how to classify SUVs (an issue that only arises if the standard separates passenger vehicles and light commercial vehicles); and
- reduces the risks of encouraging consumers to migrate towards the use of higher-emissions vehicles over time (as appears to have happened in the US[1]).

Victoria recommends adoption of a single standard covering all passenger vehicles, SUVs and light commercial vehicles.

1.6 Scheme Credits and Multipliers

Victoria has reservations about the use of multipliers or credits under the standard. As the RIS notes, credits based on specific technologies require government to pick the technologies. This is undesirable as governments are not best placed to make such judgements. While the emissions benchmark approach avoids this problem by focussing on more objective performance-based criteria, this in turn raises other issues. Setting emissions benchmarks as the basis for awarding credits or multipliers requires decisions about appropriate thresholds. This introduces the risk of strategic and gaming behaviours by importers to maximise their credits while minimising actual environmental improvements in their vehicles. It would be inequitable, for example, to award credits to a vehicle that is minimally modified in order to come under a threshold, while not recognising more significant emissions reductions in another vehicle that still falls above the threshold. While there may be a case for off cycle credits in principle, the costs and complexity of effectively administering the accompanying testing and compliance regime is considered likely to outweigh the benefits. The CCA expressed similar concerns in its 2014 Report.

1.7 Electric, Low Emission and Smart Vehicles

The RIS raises the possibility of giving importers credits for the importation of electric and other low-emissions vehicles. This approach, which already exists under EU standards, gives importers additional flexibility in meeting the standard while also incentivising the deployment of such vehicles in the market. If new Australian standards adopt this approach it will be important to ensure the crediting rules minimise the risk of any perverse effects on continuing efforts to improve the emissions performance of the conventionally-powered road vehicle fleet. This may involve capping

[1] See for example Turrentine and Kurani, Car Buyers and Fuel Economy, Institute of Transportation Studies, University of California, Davis, 24 April 2006

the total amount of credits that importers can generate this way, and reviewing and adjusting crediting arrangements regularly in response to ongoing changes in the broader vehicle market.

While such credits may increase the availability of electric and other low emission vehicles in the Australian market, more effective uptake will require a more comprehensive suite of responses from all governments. ClimateWorks' April 2016 report *The Path Forward For Electric Vehicles In Australia - Stakeholder Recommendations* highlights the range of reforms that are needed. In addition to new national vehicle emissions standards, the report recommended:

- measures to increase demand for lower emission vehicles and fuels (eg. up front purchase rebates, parking, registration and transit lane benefits);
- measures to encourage the supply of supporting infrastructure;
- incorporating low emission vehicles into government vehicle fleet purchasing;
- amending existing Luxury Car and Fringe Benefits Taxes and novated leasing arrangements to more effectively incentivise a shift to low emissions vehicles; and
- Commonwealth development of a national EV Roadmap.

State and local governments across Australia are already taking action to better support the transition to electric, low emission and smart vehicles. From 2010 to 2014, Victoria conducted a $5 million dollar trial of electric vehicles, designed to make it a leader in the roll-out of EV technology. Victoria offers registration discounts for electric and hybrid vehicles. Over the past 14 years, the Victorian Government has introduced the largest number of hybrid vehicles to any government fleet in Australia. In December 2015 there were 1,218 active hybrid vehicles in the Victorian Government vehicle fleet. The Government will continue to look at opportunities to further reduce emissions from its own vehicle fleet. The Victorian Government's $200 million Future Industries Fund supports high growth, high value industries such as the new technologies sector that are critical to securing Victoria's future. The Government recently announced funding grants to SEA Automotive in Geelong to support its work producing electric powered commercial vehicles. The Government also recently announced a partnership with Bosch, the Transport Accident Commission and VicRoads to build the first vehicles in Australia with self-driving capabilities. The Government is providing $1.2 million funding to support this project. The new vehicles will be trialled to assess their implications for motorist behaviour, road infrastructure planning, traffic signalling systems and regulation. Victorian investment in the development of self-driving vehicle technologies is important for the future of high technology and vehicle component manufacturing in Victoria.

The Ministerial Forum's February 2016 Vehicle Emissions Discussion Paper canvassed the potential role of electric and other low emissions vehicles, information and education programs, taxation measures and fleet purchasing policies as possible complementary measures to any new vehicle emissions standards. No further information has been released to date on the Ministerial Forum's plans in this area. Victoria wants to work with the Commonwealth and other States and Territories to build on existing complementary policies. Victoria recommends the Commonwealth use the current Ministerial Forum Review process to work with the States and Territories to develop a strategic national approach to complementary policies that will more effectively support the introduction of the proposed new vehicle emissions and fuel quality standards.

2. Vehicle emissions standards for Cleaner Air (Noxious Emissions RIS)

2.1 Public Health Benefits

A comprehensive approach to estimating public health benefits requires air quality modelling and health risk assessment using an impact pathway approach. The impact pathway approach involves analysis of pollutants by source and the dispersion of pollutants in the atmosphere, calculation of the exposure of populations impacted, and the consequences of changes in the ambient concentrations of pollutants for a range of health outcomes in a form that can be valued.

The noxious emissions RIS uses a damage cost approach instead, which typically is used where primary research cannot be carried out due to data and time constraints. The damage cost approach draws on estimates of the impact of air pollutants from other studies, applying an average dollar per tonne of emissions to represent health costs avoided in different locations.

Without an impact pathway approach, the RIS is unable to provide any information on direct health outcomes i.e. changes in mortality, hospital admissions, emergency department attendances and changes in cancer risk that can be linked to exposure to pollutants. Impacts on mortality and morbidity rates are key outcomes and relevant statistics could be used to communicate the public health benefits and support the analysis presented in the RIS.

The impact pathway approach is particularly important where there are significant secondary pollutants to consider. Ozone is mentioned in the problem definition section but not in the benefit analysis. Ozone has significant health effects and therefore should be discussed in the benefit analysis. Ozone is a secondary pollutant (ie. it is not emitted directly from tailpipes). It is formed from precursor pollutants nitrogen oxides (NO_x) and hydrocarbons (HCs). It is difficult to determine whether decreases in the precursor emissions (NO_x and HCs) will lead to a decrease in ozone concentrations because the relationship is not linear and differs across airsheds. The omission of ozone in the benefit calculation may (or may not) lead to a more conservative benefits estimate than suggested in the RIS.

Further to these points, it is noted that some of the studies referenced derive values for fine particles ($PM_{2.5}$) while others derive values for coarse particles (PM_{10}). It is unclear how this has been accounted for in the averaging to derive suitable values for PM_{10} in the RIS' health damage estimates.

It is also important to recognise that emissions from vehicles do not necessarily reflect community exposure to air pollutants. The actual contribution of vehicle emissions to population exposure (and therefore to human health effects) is typically substantially greater than equivalent emission levels from, for instance, industrial point sources. It is unclear whether ground level concentrations of emissions have been considered in the estimation of health outcomes (given that motor vehicle emissions are released close to ground level and, typically, in close proximity to sensitive receptors). If not, this could result in underestimation of the proposal's health benefits. In addition, the RIS does not appear to acknowledge that population exposure is likely to increase further in future as a result of the long-term trend towards greater inner urban population density.

The benefits quantified in the noxious emissions RIS exclude the benefits of reducing secondary particles, black carbon emissions and non-health impacts, as well as potential benefits of reducing ozone. This suggests the proposals' benefits are likely to be greater than currently suggested in the RIS.

2.2 Maintenance costs

The RIS does not consider the maintenance costs associated with compliance with the proposed new standards, on the basis that there is little information available. It is unusual that a key cost component like maintenance costs would not be estimated (or at least some likely order of magnitude provided). The analysis would be more compelling if it provided a total cost figure to compare with the quantified benefit estimates. This would enable a clearer understanding of whether benefits exceed costs than is currently the case given that cost estimates are incomplete, and benefit estimates are conservative and incomplete (as they exclude benefits from reducing secondary particles and black carbon emissions, and non-health benefits of reducing the target pollutants).

2.3 Carbon Cost Assumptions

The concerns expressed about carbon cost assumptions in the Vehicle Fuel Efficiency RIS apply similarly to the cost benefit analysis in the noxious emissions RIS.

2.4 Interaction with Vehicle Fuel Efficiency RIS

The vehicle fuel efficiency RIS notes that if new fuel efficiency/CO_2 standards are introduced without corresponding improvements to existing noxious emissions standards, one of the effects may be an increase in noxious emissions as more passenger and light vehicles "dieselise" to comply with the fuel efficiency/CO_2 standard. This is another important reason to ensure current noxious emission standards are strengthened.

3. Better Fuel for Cleaner Air Discussion Paper (Fuel Quality standards paper)

3.1 Proposed Options

The discussion paper outlines five possible options for further analysis in a RIS. Subject to the outcomes of any future cost/benefit analysis, we offer the following initial observations:

- the potential 10ppm sulfur content limit is a key issue. This change will be needed in order to realise the benefits of Euro 6 emissions standards.
- the timing of any change to a 10ppm sulphur content limit will be important. The longer the delay, the lower the additional benefits arising from introduction of Euro 6 noxious emissions vehicle standards. It is noted that the noxious emissions RIS proposes implementation of the Euro 6 standards in Australia in 2019 /20.
- Options B-D are considered the strongest options for further analysis in a RIS; and
- any further consideration of Option E should note this option does not provide certainty and is not in line with international standards or the Hart report recommendations.

3.2 Public Health Benefits

The discussion paper outlines in broad terms the key aspects of its proposed approach to assessment of public health benefits. The proposed assessment should take account of the issues raised in section 3.1 of this submission regarding this aspect of the noxious emissions RIS. These issues include a need to present health benefits in terms of impacts on mortality and morbidity rates as well as health damage costs; using appropriate health damage cost metrics; being clear on the underpinning methodology, particularly in the treatment of $PM_{2.5}$ and PM_{10} values; taking account of ozone's additional health impacts, and making appropriate assumptions about longer-term population exposure to vehicle emissions.

3.3 Carbon Cost Assumptions

Assessment of greenhouse gas reduction benefits should be consistent with the approach recommended for the fuel efficiency and cleaner air standards RIS' (ie. the US EPA's social cost of carbon, adjusted to take account of rising carbon costs over the whole assessment period).

3.4 Potential Cost Implications for Domestic Refineries

The discussion paper notes the proposals may have cost implications for domestic fuel refineries if they have to make infrastructure upgrades to meet the new standards. The RIS notes there is limited information available on potential costs. It gives an indication of relative cost impacts on refineries for similar fuel quality changes overseas, and also notes that any phase out of unleaded petrol (91 RON) could produce more general benefits through simplification of current fuel distribution arrangements.

Victoria's two major fuel refiners, ExxonMobil (Altona) and VivaEnergy (Geelong) made submissions to the Commonwealth's February 2016 Vehicle Emissions Discussion Paper. ExxonMobil indicated that a move to a 10ppm sulphur content limit would require "extensive modifications" to existing plant, but little additional information on possible costs. It is noted the Australian Institute of Petroleum has indicated that the industry is already producing petrol with sulfur levels below 30ppm

in Sydney and Melbourne (both ULP and PULP in Sydney and PULP in Melbourne). The scale of change domestic refiners would need to make to meet a 10ppm standard, and the extent to which resulting costs could be passed on before domestic refining became uncompetitive relative to direct import of refined fuel, remains unclear. Cost implications of new standards for domestic fuel refiners is an important issue. The RIS should attempt some estimate of the likely cost and refinery related emissions impacts, preferably based on direct information from the industry.

4. Detailed Comments

More detailed comments on the two RIS' and discussion paper can be found in the Appendix.

APPENDIX - Improving the efficiency of new light vehicles draft RIS

Comment number	Page no. based on PDF version	Section	Comment
1	27	3.7.1	Why just look at the three targets given in the previous CCA 2014 report? The "strong" option (Target A) is a 33% reduction by 2025. EU and other countries already aiming at similar scale reductions by 2020/21. Given the RIS suggests the net benefits increase in line with increased ambition, why not evaluate the costs and benefits of a more aggressive emissions reduction target?
2	35, 73	4.1.3, Appendix B	Why use just a flat $35/tonne carbon price for the benefit modelling? This has the effect of understating the potential benefits (the RIS itself admits this approach is "conservative"). This value is sourced from the US EPA social cost of carbon for 2015, but the US EPA values are adjusted, rising over time. As costs and benefits are being compared over the 2020-2040 period, it would be more appropriate for the RIS to factor in the projected changes to the carbon price over this period in its calculations.
3	73	Appendix B	Why just sensitivity testing with a "low" carbon price, without a corresponding test on a "high" carbon price? Again, this downplays the potential benefits of the standards
4	35, 73	4.1.3, Appendix B	The ERF price isn't an estimate of the "benefit" of emission reductions, it's just the price paid for abatement through ERF auctions. There are plenty of upper and lower bound estimates of social cost of carbon that would be better suited for this purpose.
5	43	Question 1, Appendix A	Support a CO2-based parameter. This is consistent with the overall emissions reduction objective and it treats different fuels equally. Note however that there is a risk of a perverse outcome of promoting diesel vehicles (which are worse for air quality) unless vehicle noxious emissions standards are also tightened.
6	44	Question 2, Appendix A	Support the sales weighted fleet average approach. Also prefer the WLTP cycle for emissions testing because if more accurately reflects real world driving, and NDEW will fall out of general use. Note that using WLTP would be tied to EuroVI certification (WLTP is part of Euro VI).
7	46	Question 3, Appendix A	Support the proposed approach based on "limit curves". This approach maximises efficiency by allowing importers to adjust the composition of their fleet while still meeting overall emissions standards.
8	49	Question 4, Appendix A	Support a "footprint" based approach, as reducing vehicle size is the most effective way of reducing fuel consumption.

APPENDIX - Improving the efficiency of new light vehicles draft RIS

9	57	Question 5, Appendix A	There should be no segmentation between light vehicle types. Most light commercial vehicle manufacturers also sell passenger vehicles, so they have the capacity to comply with one standard by altering their vehicle mix. Setting separate standards for light commercial and passenger vehicles is more complex, raises risks of gaming behaviours by importers and could encourage migration toward the higher emission class of vehicle (as appears to have happened in the US. Ref Turrentine & Kurani, Car Buyers and Fuel Economy, Energy Policy 2007).
10	57	Question 6, Appendix A	SUVs should not be separately defined. Note this issue does not arise if the standard avoids segmenting different light vehicle types.
11	58	Question 7, Appendix A	Support an annual targets approach, as this will ensure early and sustained improvement and provide industry certainty.
12	58	Question 8, Appendix A	Do not support a segmented approach to setting targets.
13	58	Question 9, Appendix A	Implementing a percentage-based phase in could be complex.
14	58	Question 10, Appendix A	Flexibility important to ensure cost-effective compliance. Support US -style banking and borrowing options to support implementation of a progressive annual targets approach.
15	66	Question 11, Appendix A	Do not support use of multipliers or credits for low-emissions vehicles under the Standard. Credits based on specific technologies require Government to pick the technologies, which is undesirable. Emissions benchmark approach raises risks of gaming behaviours and potentially compromises efforts to further improve mainstream vehicle fleet efficiency. There may be a case for off cycle credits in principle, but the costs and complexity of effectively administering a testing and compliance regime are likely to outweigh the benefits.
16	68	Question 12, Appendix A	Exempting small-volume importers could encourage increased import of substandard vehicles. Anyone importing a light vehicle should be required to comply with the standard. Special simplified provisions (eg. giving such importers a "deemed" emissions value, with corresponding surcharge) should be considered.
17	68	Question 14, Appendix A	Support a financial penalty that is sufficient that the cost of paying the financial penalty exceeds the cost to an entity of meeting regulatory requirements.

APPENDIX - Vehicle emissions standards for cleaner air draft RIS

Comment number	Page no. based on PDF version	Section	Comment
1	3	Exec Summary	Clarify basis of estimated number of deaths due to air pollution. RIS says half of 1483 deaths in 2010 attributable to vehicle emissions, sourced from OECD study. Says this is 68% increase from 2005. Basis for the latter claim unclear. Also, estimates significantly lower than Australian Institute of Health and Welfare study into burden of disease and injury in Australia (2007) which is often used and found over 3,000 deaths attributed to urban air pollution in 2003 http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442459747
2	4	Exec Summary	clarification is needed on what the proposal is talking about regarding introduction of Euro 6 (Euro 6d) and existing Euro 6 already in place in Europe - eg in Australia are they proposing 55% reduction in NOx for light vehicles compared to Euro 5 AND the introduction of the new Worldwide harmonised Light vehicle Test Procedure?
3	9,10	1.1, 1.2	Ozone is mentioned in the problem definition section but not mentioned in the benefit analysis. Ozone has significant health effects and therefore should be discussed in the benefit analysis. Ozone is a secondary pollutant that is, it is not emitted directly from tailpipes. It is formed from precursor pollutants nitrogen oxides (NOx) and hydrocarbons (HCs). It is difficult to determine whether decreases in the precursor emissions (NOx and HCs) will lead to a decrease in ozone concentrations because the relationship is not linear (see Fuel Quality Standards Act Final Report). https://www.environment.gov.au/system/files/resources/b9e8164d-7f7f-4671-bf62-cacf2eec245a/files/act-review-final-report.pdf The omission of ozone in the benefit calculation may (or may not) lead to an even more conservative benefit total than suggested.

APPENDIX - Vehicle emissions standards for cleaner air draft RIS

4	17	2.1	Important to consider that emissions from vehicles do not necessarily reflect community exposure to air pollutants. The actual contribution of vehicle emissions to population exposure (and therefore also human health effects) is typically substantially greater than equivalent emission levels from for instance industrial sources. Have ground level concentrations of emissions been considered in estimation of health outcomes given that motor vehicle emissions are released close to ground level and, typically, in close proximity to where people live and work? Failure to do so could result in potential underestimation of the proposal's health benefits. Note that EPA Victoria's report Future Air Quality in Victoria Publication 1535 forecasts increased population exposure to PM2.5, largely due to inner city population growth. Nox and HC are forecast to improve.
5	19	2.2	While the number of Euro 6 cars imported into Australia may increase in the absence of regulation, there is a risk that manufacturers will cripple their OBD systems to avoid drive annoyance in case of emission control failure.
6	21-23	Figures 2-5	Population exposure is likely to increase more than the figures suggest, due to more people located in inner city areas, particularly during day time. Refer EPA publication 1535 Future Air Quality in Victoria.
7	25	3.2.3	Voluntary scheme would also have less likelihood than the failed 2010 6.8 l/100km fuel consumption limit because the car buyer does not individually beneft from the improved emissions, but has to endure the cost and loss of utility that result from them.
8	27	3.2.6	Unclear about the basis for the statement that delaying Euro 6 will allow manufacturers to amortise their investments in Euro 5. Exactly what investments are these, given that we are only talking about vehicle imports, largely from countries that already require Euro 6?
9	30	4.2.3	it is unusual that a key cost component like maintenance costs would not be estimated (or at least some likely order of magnitude provided). Inclusion of some type of estimate would enhance the cost benefit analysis
10	32	4.3	An additional cost is more stringent SCR monitoring for Euro VI compared to Euro V. See http://www.theicct.org/sites/default/files/publications/ICCT_Overview_OBD-HDVs_20150209.pdf Table 13
11	33,80	4.3.1, Appendix A and B	Assumes a flat $35/tonne carbon price for cost modelling. Potentially understates costs of increased emissions. Should use US EPA social cost of carbon, as adjusted over time, for the 2020-2040 period.

APPENDIX - Vehicle emissions standards for cleaner air draft RIS

12	69	Appendix A and B	The preferred approach to estimating public health benefits is air quality modelling and health risk assessment using an impact pathway approach. The impact pathway approach involves analysis of pollutants by source and the dispersion of pollutants in the atmosphere, calculation of the exposure of populations impacted, and the consequences of changes in the ambient concentrations of pollutants for a range of health outcomes in a form that can be valued. The noxious emissions RIS uses a damage cost approach instead, which is typically used where primary research cannot be carried out due to data and time constraints. The damage cost approach draws on estimates of the impact of air pollutants from other studies, applying an average dollar per tonne of emissions to represent health costs avoided in different locations. The impact pathway approach is preferred to the damage cost approach. Without this, the RIS cannot provide any information on direct health outcomes i.e. changes in mortality, hospital admissions, emergency department attendances and changes in cancer risk that can be linked to exposure to pollutants. Impacts on mortality and morbidity rates are key outcomes and relevant statistics should ideally be used to communicate the public health benefits and support the analysis. The impact pathway approach is also particularly important where there are significant secondary pollutants to consider such as ozone, discussed above.
13	45	Appendix A and B	How have the values for particle number been derived as all of the health studies referenced derive values for particle mass? Does particle number contribute to different health outcomes or the same as particle mass? Ie. are they a different indicator for the same outcome? Have the benefits been added together?
14	45	Appendix A and B	RIS uses very broad geographic groupings (cities, the rest) which include a lot of variation in population density. The original BITRE 2010a methodology took an average of study values for the two groups. However, the more recent analysis of PAE Holmes provides a series of values by ABS Significant Urban Area Structure (SUA). Some discussion of whether the average figures are population weighted averages would be useful; as well as some discussion of the likely outcome of greater specificity for the valuation of health benefits

		references to point above	[1] Fuel Quality Standards Act Review Final Report [2] PAE Holmes, 2013, Methodology for valuing the health impacts of changes in particle emissions – Final Report, http://www.nepc.gov.au/system/files/pages/18ae5913-2e17-4746-a5d6-ffa972cf4fdb/files/methodology-valuing-health-impacts-changes-particle-emissions.pdf [3] P9, Review of the health impacts of emission sources, types and levels of particulate matter air pollution in ambient air in NSW, Woolcock Institute of Medical Research, Centre for Air Quality and Health Research and Evaluation (CAR), December 2015, http://www.car-cre.org.au/images/content/Health%20impacts%20of%20PM%20report_final%20for%20web.pdf

APPENDIX - Better fuel for cleaner air, Discussion Paper

Comment number	Page no. based on PDF version	Section	Comment
1	18	3.1	What other VOCs are there, are they relevant and do they need to be regulated? Common VOCs in petrol also are toluene, *n* -heptane, 1,2,4-trimethylbenzene, cyclohexane and p-,m-xylene – do these need short commentary as well? How do ethanol added fuels compare to petrol?
2	22-23, 27	3.1	Subject to the outcomes of any future cost/ benefit analysis, we note: • the potential 10ppm sulfur content limit is a key issue. This change will be needed in order to realise the benefits of Euro 6 emissions standards. • the timing of any change to a 10ppm sulphur content limit will be important. The longer the delay, the lower the additional benefits arising from introduction of Euro 6 noxious emissions vehicle standards. It is noted that the noxious emissions RIS proposes implementation of the Euro 6 standards in Australia in 2019 /20. • Options B-D are considered the strongest options for further analysis in a RIS; and • any further consideration of Option E should note this option does not provide certainty and is not in line with international standards or the Hart report recommendations.
3	23,43	3.1, Technical Annex	Why is there a 1mg/kg trace metal limit on Option D only? Shouldn't this also include really harmful trace metals such as Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Manganese, Mercury, Molybdenum , Vanadium etc.?
4	26	3.1	Unclear whether current limits on MTBE would remain under Alternative D. If not, are there proven health implications from MTBE exposure?
5	27	Question Set 1	Response to Q4. Should consider fuel standard for compressed natural gas.
6	27	Question Set 1	Response to Q6. option to best reduce emissions is Option D followed by Option B
7	28	Question Set 1	Response to Q7. 10ppm sulfur in petrol should be introduced with the introduction of Euro 6. This is consistent with the Hart report which indicated that 10ppm sulfur or less is ideal.

APPENDIX - Better fuel for cleaner air, Discussion Paper

8	29	Question Set 3	Response to Q13. consider change to diesel standard to also apply to non-road diesel vehicles, such as equipment used in mining, agriculture, construction. These are a significant contributor to particle and nitrogen oxide emissions. Despite consuming less diesel fuel than road transport nationally, the non-road diesel sector is estimated to produce higher fine particle emissions than on-road diesel vehicles. (Environ, 2014, Reducing emissions from non-road diesel emissions, An information Report prepared for the NSW EPA). Emissions from motor vehicles have reduced significantly over time largely due to the introduction of emission standards for new vehicles. There are no equivalent national emission standards for non-road vehicles in Australia.
9	29	Question Set 3	Further consider setting limits to lead use in avgas.
10	30	Question Set 4	Response to Q15. Support the consideration of listing these fuel additives on the Register of Prohibited Fuel Additives which would require public consultation and a legislative process.
11	35	4.3	US public health benefits cited need to be translated into Australian context. Australia has a comparatively more concentrated urban population so the public health outcomes are likely to be different. Can a dollar value be attributed to the mortality and morbidity data?
12	37	Question Set 6	Response to Q21. Ozone should be mentioned in the problem definition, and really it should be included in the analysis IF air dispersion modelling is going to be undertaken. Ozone is a secondary pollutant – not emitted directly. Ozone should also be mentioned qualitatively if not modelled. However, note that it is difficult to determine whether decreases in the precursor emissions (NOx and VOCs) will lead to a decrease in ozone concentrations without undertaking modelling as the relationship is not linear (see Fuel Quality Standards Act Final Report). The omission of ozone in the benefit calculation may (or may not) lead to an even more conservative benefit total than suggested.

APPENDIX - Better fuel for cleaner air, Discussion Paper

13	37	Question Set 6	Response to Q25. The NSW Government submission into the Australian Government's earlier February 2016 Vehicle Emissions Discussion Paper demonstrated that low sulfur fuel can benefit the existing fleet. The benefits of lower sulfur fuel to the existing fleet should be considered in the RIS assessment. ref NSW Government submission: https://infrastructure.gov.au/roads/environment/forum/files/NSW_Advisory_Committee_on_Tunnel_Air_Quality_amended.pdf This Fuel discussion paper (p32) indicates PM will be assessed, it is assumed that the PM assessment will be particles as PM2.5 (rather than PM10) consistent with Fuel Quality Standards Act Review. Co-benefits should also be quantitatively assessed where possible or at least discussed qualitatively: secondary particles and black carbon – consistency with noxious emissions RIS
14	36	4.3	Assessment of greenhouse gas reduction benefits should be consistent with approach recommended for the fuel efficiency and cleaner air standards RIS' (ie. the US EPA's social cost of carbon , adjusted to take account of rising carbon costs over the whole assessment period).
15	37	Question Set 6	Response to Q28. The Australian Institute of Petroleum indicate producing petrol with sulfur levels around below 30ppm in Sydney and Melbourne (both ULP and PULP in Sydney and PULP in Melbourne) – therefore should be no or little additional cost if mandate 30ppm as a minimum. reference page 5 of the Vehicle noxious emissions RIS https://infrastructure.gov.au/roads/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf
16	46	Questions related to fuel standards	Response to Q30. Options to lower the aromatic content in petrol to decrease toxic emissions and harmonise with the European Union and the Worldwide Fuel Charter should be considered (consistent with Hart report recommendation - decrease in aromatics to 35%) Lowering the aromatic content decreases the toxic content of exhaust, particularly benzene emissions, which are known to be carcinogenic.

APPENDIX - Better fuel for cleaner air, Discussion Paper

17	49	Questions related to fuel standards	Response to Q40: Include option to reduce Polyaromatic hydrocarbons (PAH's) in diesel –to match World Wide Fuel Charter Polyaromatic hydrocarbons in diesel: PAHs are a suspected carcinogen produced as a result of combustion. A proposal to decrease the polycyclic aromatic hydrocarbons in diesel to align with the EU limit of 8% m/m would assist in decreasing NOx and particulate matter in Australia
18	49	Questions related to fuel standards	Response to Q42. see Q13
19	54	Questions related to fuel standards	Response to Q55: E85 option to reduce sulfur content in E85 to 10ppm to align with best practice is supported
20	39-55	6-Technical Annex	Need to better contextualise the information contained in the tables for readers. For example, an indication whether a higher/lower figure is better for particular parameters would be useful.