

# Submission to the Better Fuel for Cleaner Air Discussion Paper

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Healthy planet, **healthy people.**

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Doctors for the Environment Australia (DEA) is a voluntary non-profit, non-politically aligned national organisation of medical doctors and students which advocates on health issues arising from environmental damage. It is funded by its members and does not receive funding from industry or other organisations.

DEA welcomes the opportunity to respond to the discussion paper 'Better Fuel for Cleaner Air' and notes that the scope of the paper is limited to consideration of fuel quality standards while vehicle emission standards and fuel efficiency (greenhouse gas emissions per kilometre) are to be considered separately by the Department of Infrastructure and Regional Development.

## Summary

### Fuel quality

DEA supports the need to improve fuel quality for the following reasons:

1. Sulfur dioxide, from fuel containing a high concentration of sulfur, is a respiratory irritant and contributes particularly to child breathing difficulties. Sulfur in fuels interferes with catalytic converters in exhaust systems to render the extraction of harmful particulates and noxious substances less effective. Sulfur in fuels also interferes with the performance of new engine technologies such that they cannot improve fuel economy and efficiency for which they are designed.

Australia is the last of the OECD countries to reduce the concentration of sulfur in fuel. Therefore, DEA urges the government to mandate for both 91 RON and 95 RON fuels to contain no more than 10 ppm to bring us into line with Europe now, and virtually all of the developed world by 2020.

2. Higher octane fuel: Fuels of higher octane allow the use of more advanced engine technologies resulting in better fuel efficiency and reduced noxious emissions. These noxious emissions and particulates are associated with four of the five leading causes of death: heart disease, lung cancer, respiratory disease and strokes.

By reducing pollution and carbon emissions there will be huge savings to the community in health costs.

Although not part of this discussion, DEA urges Australia to adopt the Euro6/VI vehicle standards as soon as possible in order to take advantage of anticipated improvement in fuel standards.

## Why government action is needed

- a) Competing interests between petroleum and automotive industries leads to indecision
- b) Failure of co-regulation and self-regulation
- c) Health costs of pollution and green-house gas emissions is borne by the government and not by industry
- d) Australia is well-placed as an island nation to mandate for standards throughout the country
- e) With increasing globalisation, it is more rational to have standards conforming with the best in the OECD for easier trade and reduced need for costly local compliance requirements.

## Policy options

Of the policy options offered, DEA believes that either B, C, or D would be appropriate. We appreciate that Option C does allow for continuation of 91 RON (albeit with sulfur reduced to <10 ppm) which leads to slightly higher carbon intensity but we do not wish to advocate for an option which would impose higher costs on a section of the community who can least afford it. However 91 RON should be given a run-out time of 2-5 years.

Options A and E are definitely unacceptable.

## Other points

The uptake of electric and hybrid vehicles is increasing. If these are recharged from renewable sources, emissions and pollution from private transport will reduce dramatically. Electrified public transport which emits fewer emissions per capita than private cars, will also produce even fewer emissions when electricity from renewables is added to their grid.

## Discussion

In April 2016 DEA provided a submission on the Vehicle Emissions Discussion Paper which dealt with both vehicular emissions and fuel quality.<sup>2</sup> As iterated in the current Discussion Paper (page 5) "good vehicle design and fuel standards work together" so it is somewhat artificial to consider fuel quality in isolation.

Adequate fuel standards though are necessary to achieve the objectives of the Fuel Quality Standards Act 2000 viz

- Reduce the level of pollutants and emissions arising from fuel use that may cause health and environmental problems
- Facilitate the adoption of better engine and emission control technology
- Allow the more effective operation of engines
- Ensure where appropriate that information about fuel is provided where fuel is supplied

The extent to which these objectives have been met is mixed.

## **Pollutants and emissions**

A report by the OECD in 2014 stated “while in OECD countries there has been a downward trend in emissions of pollutants from road transport over the last two decades, this has been offset by a shift from less-polluting gasoline vehicles to more polluting diesel vehicles. The full impact of air pollution occurs after a time lag. As a result, mortalities have not fallen in line with the overall decrease in air emissions”.<sup>3</sup>

Furthermore, a study reported in the British Medical Journal stated that “while overall pollution levels seemed to be dropping in the United Kingdom, the pollution itself seemed to be more toxic now”.<sup>4</sup>

DEA strongly disagrees with Recommendation number 7 of the Marsden Jacobs Report 2016 which states “no decision should be made to harmonise standards including in particular the sulfur content of unleaded petrol and premium unleaded petrol.”<sup>5</sup> This statement ignores the role of sulfur as a pollutant and importantly its role in diminishing the effectiveness of emission control devices such as particulate filters and catalytic converters. Reducing sulfur also allows the use of newer engine technologies that reduce carbon dioxide emissions. These issues are set out in 1.3 of the Discussion paper (page 16, 17) “Fuel parameters of concern: Sulfur in petrol”.

## **Vehicle emission standards**

Australia has lagged behind comparable countries and even developing countries in implementing tougher vehicle emission standards. A roadblock to adopting the more stringent Euro6/VI is the current fuel standard. This is described in Section 1.2 of the Discussion paper: “The quality of our fuel influences which technologies can be supplied to the Australian Market”.

## **Engine efficiency**

Engine efficiency is important because carbon emissions from vehicular transport in Australia contribute about 17% of our nation’s GHG emissions. Unless we make ambitious efforts in all spheres, we will not be able to meet our commitments to the Paris Agreement 2015 to keep global average temperature increase to less than 2°C.<sup>6,7</sup>

Improving efficiency is a small but important step in reducing emissions.

## **Supply of information**

We are not aware that information on fuel quality is prominently displayed at point-of-sale.

## Focus of Discussion Paper

The Discussion Paper deals with two parameters of particular concern: sulfur and octane in petrol.

### Sulfur

Sulfur clogs catalytic converters making them less effective in filtering emissions and reducing noxious substances emitted from vehicles. The presence of fuel with a high sulfur content therefore will limit the importation of vehicles capable of producing lower emissions, thus enhancing air pollution.

### Octane level

Higher octane fuels can be used in high compression petrol engines which are more fuel efficient and produce less greenhouse gas emissions. High compression engines also produce fewer noxious emissions. Improved fuel efficiency may even reduce fuel costs even though they are more expensive than low octane fuels. Greenhouse gas emissions from motor vehicles are an important contributor to the nation's total emissions.

Both these factors contribute to air pollution which has significant health impacts.

## Health Impacts of Fuel Quality

**DEA welcomes the attention given to the health impacts of vehicle emissions which are well summarised in the Executive Summary page 7 and in Section 1.1 pages 12-15**

*"Individuals with pre-existing conditions, such as asthma and allergies, are especially vulnerable to air pollutants. The effects on human health can include reduced lung function, ischemic heart disease, stroke, respiratory illnesses and lung cancer."<sup>8</sup>*

*In 2010, 1493 deaths were attributable to outdoor air pollution. The economic cost of premature deaths due to outdoor air pollution in Australia increased between 2005 and 2010 from \$4.6 billion to \$7.8 billion per annum and in OECD countries, it is suggested that road transport accounts for approximately half of the cost of these preventable deaths".*

### Air pollution

The World Health Organization has described urban air pollution as a "global health emergency" and stated that air quality is deteriorating around the world to the point where only one in eight people live in cities that meet recommended air pollution levels. Suburbs in Sydney and Melbourne and to a lesser extent other capital cities frequently do not meet air quality standards agreed to in the National Clean Air Agreement.<sup>9</sup> Exceedances of air quality standards in

Australia's cities show a deterioration in air quality in recent years. Data from the NSW Environmental Protection Agency in 2015 showed spikes in air pollution in inner Sydney suburbs -Liverpool, Rozelle and Earlwood -with levels of particulate matter well above new national standards.<sup>10</sup>

In spite of these spikes, an extensive review of the Fuel Quality Standards Act, the Marsden Jacobs Associates/Pacific Environment Report found a "quantifiable reduction" in pollutants overall, with the exception of ozone, in Sydney and Melbourne since the 2001 legislation was enacted. This suggests an improvement in both fuel quality and engine design. However, the failure to improve ozone levels is of great concern. Tropospheric ozone production is a chemically complex reaction between oxides of nitrogen and volatile organic compounds under the influence of sunlight. Ozone causes structural damage to lung architecture, especially the developing lungs of children leading to a reduction in lung function. The California Children's Health Study revealed that "children exposed to higher levels of particulate matter, nitrogen dioxide, acid vapour and elemental carbon, had significantly lower lung function at age 18, an age when the lungs are nearly mature and lung function deficits are unlikely to be reversed".<sup>11</sup> Improvement in the levels of the other pollutants is a trend unlikely to continue, given population increase and urban density levels.

Section 1.1 describes the adverse health effects of exposure to the various components of vehicular emissions so these will not be re-iterated here. However, DEA would like to stress that those living near locations of high pollution are particularly prone to adverse effects. Children are especially susceptible to asthma and wheeze because of their relatively small airways and they breathe more air per body weight than adults. Wheeze was associated with exposure to sulfur and particulate matter while asthma was associated with exposure to nitrogen dioxide.<sup>12</sup>

High sulfur dioxide levels can lead to other oxides of sulfur which can react with other compounds in the atmosphere to contribute to particulate matter pollution which may penetrate deeply into the lungs.<sup>13</sup>

Children born of families living close to highways were small for gestational age and had low birth weight<sup>14</sup>, and at the other end of the age-spectrum, elderly people living close to heavy traffic demonstrated a higher incidence of dementia.<sup>15</sup>

Little distinction has been drawn between petrol and diesel despite their very different emission profiles. Diesel vehicles now make up the fastest growing fuel type in Australia according to the Australian Bureau of Statistics.<sup>16</sup> Marketing of large and powerful diesel SUVs has been aggressively pursued without any price signals to discourage their purchase. Professor of Air Quality, Martin Williams, of Kings College London has pointed to the discrepancy between the level of emissions such as oxides of nitrogen from diesel and petrol engines; this is seen in lab tests, and in the real world of driving it is even greater. While catalytic converters on petrol driven cars reduce pollutants significantly, particulate filters

on diesel cars can degrade or fail, and diesel engine emissions of oxides of nitrogen have shown no appreciable reduction over the past twenty years.<sup>17</sup>

Diesel exhaust has been classified as a Class 1 human carcinogen by the International Agency for Research on Cancer.<sup>18</sup> The ill-effects of other substances are documented in the Discussion Paper Pages 19 and 20.

## **Why Government Action is Needed**

### *Health reasons*

There is general agreement that pollution from vehicular emissions should be curtailed to reduce adverse health effects which have been dealt with extensively above. As Australia's population grows, traffic congestion increases leading to unacceptable pollution near traffic hot-spots. The more vulnerable residents, the young and the elderly near these locations are less able to reduce their exposure. Legislative action is the only way to change traffic patterns and residential localities. Pressure from housing developers never ceases and it is only strong laws which take potential traffic pollution into account to protect residents.

There are huge potential cost savings to the health budget by implementing higher fuel and vehicle standards. An OECD report states that net benefits of implementing higher standards are "extraordinarily high".

### *Practical reasons*

There are so many competing interests in the petroleum and automotive industries that government action is the only way to achieve standards for both fuel and vehicles. Australian governments have been working to improve standards for nearly two decades and yet we are still lagging behind other developed countries throughout the world. This lag is testament to the power of the competing interests and the failure of any role of co-regulation or self-regulation. Australia as an island nation has the advantage of being able to control fully the operations of the motor vehicle industry within its borders.

### *Australia's place in the world*

The motor industry is trending more towards globalisation because of the savings afforded by economies of scale. Australia with its relatively small population and relative wealth is well-suited to be part of this global market. Therefore fuel quality should be brought up to the standards of the major manufacturing countries so that vehicles with more efficient and less polluting engines, which require fuels of higher standard to perform as intended, can be brought to our market – the harmonisation of standards. DEA therefore strongly urges the Vehicle Emissions Ministerial Forum to implement Euro6/VI standards for new imports to Australia as soon as possible. Standardisation also allows vehicle imports to be accepted without any modifications which can add considerably to savings in administrative costs and time.

## Discussion of Policy Options

The Discussion Paper offers five policy options to address fuel quality in Australia. The existing legislation is set to “sunset” in 2019. The options range from business as usual to adopting world standards as recommended by the World Wide Fuel Charter. Australia’s fuel quality standard is amongst the lowest in the OECD.

- Option A “business as usual” would condemn Australians to increasing levels of dangerous pollutants and the world to higher levels of greenhouse gases. Australia is ranked 63 out of 64 OECD countries (ahead of Mexico only) in petrol quality based on sulfur limits which can be up to 150 ppm in 91 RON and up to 50 ppm in 95+ RON fuel.
- Option B would introduce tighter controls on pollutants to bring Australian standards into line with EU standards. Specific measures include a minimal cetane number of 51 for all diesel, limitation of polycyclic aromatic hydrocarbons and a new standard for B20 biodiesel blend. 91 RON would be phased out over 2-5 years but it is not clear whether sulfur would be reduced to <10 ppm in the meantime.
- Option C is similar to Option B but retains the lower RON 91 petrol but the sulfur content would be reduced to 10 ppm. Older vehicles which would not benefit from the higher octane petrol would be able to continue using a less expensive fuel without adding to sulfur pollution.
- Option D is similar to Option B but with even stricter standards as recommended by the Worldwide Fuel Charter of a higher cetane number and limits on aromatics for diesel and stricter limits on olefins, trace metals and inorganic chloride in petrol.
- Option E has a staged introduction of world standards from 2020.

DEA does not support the adoption of options A, or E on the grounds that given the significant health risk and impact on the nation’s health budget, they are either insufficient (A ) or too delayed (E). The adoption of either B, C or D would be a most welcome addition to measures being taken throughout the community to reduce both air pollution and carbon emissions.

DEA does not have the expertise to analyse the respective costs and logistics of each of these Options and it may be that Option D is too costly and ambitious at this stage.

The reduction in sulfur content to 10 ppm (B, C, D and staged in E) is an important step. As discussed above, sulfur dioxide is a health hazard and reduces the efficiency of particulate filters, catalytic converters and the new engine technologies. DEA requests that the sulfur level be brought into line with the EU, Japan and the USA (2017) at a level of 10 ppm as recommended by the Hart Report regardless of any other changes to fuel standards.<sup>19</sup> Adoption of Option C

may benefit poorer members of society who cannot afford a new car but we would still suggest phasing out RON 91 over the next 2-5 years.

## Further Points on Fuel Use

We wish to stress that there is more to consider than fuel standards, engine efficiency and green-house gas emissions of standard automobiles.

It is noticeable that electric vehicles are becoming more common. Major vehicle manufacturers are now offering electric and hybrid vehicle options and their share of the market is expected to grow exponentially. The full benefits of electric vehicles and plug-in hybrids will be realised when their electricity is sourced from renewable energy. Tax and other policy measures should provide incentives for electric vehicles by accounting for the reduced harm they entail.<sup>20</sup>

Public transport can make a major contribution to reducing urban air pollution. The World Resources Institute states that "private cars account for less than one-third of trips in cities worldwide, but are responsible for 73% of urban air pollutants. Per capita, private cars generate three times more greenhouse gas emissions than public transport". Good urban design and public transport and making cities more amenable for bikes and walkers can reduce pollution and improve public health and well-being. Transport plays a key role in urban air quality.<sup>21</sup>

The combined economic cost of motor vehicle-related mortality (deaths) and morbidity (illness) was between \$1.6 billion and \$3.8 billion in 2000.<sup>22</sup>

## Answers to Question Sets

### Question set 1

*Policy Alternatives: Can you provide evidence of the costs and/or benefits of any of the listed policy alternatives?*

Any of the Options B, C, D, or E would provide benefits in terms of reduced health care costs. Savings achieved in the USA are documented in the Discussion Paper (page 36) while quantifying health cost savings in Australia will be ascertained by modelling of multiple factors including green-house gas emission benefits.

The OECD 2014 Report, Environmental Cost of Air Pollution, calculated that the cost of air pollution in Australia between 2005 and 2010 rose from US\$2.98 billion to US\$5.82 billion. The report also states that 50% of deaths from outdoor air pollution in the OECD are caused by road transport, and they add that diesel vehicles constitute the biggest problem.

Other questions in this set are beyond the expertise of DEA.

## **Question set 2**

No comment

## **Question set 3**

*Definition of fuels*

Since fuels in the future are likely to include more biofuel elements, it would seem timely to apply standards to all current non-fossil fuels including marine diesel, synthetic diesel and avgas.

## **Question set 4**

*Creating a Register of Prohibited Additives*

DEA strongly endorses the Department proposal for such a Register. Health and the environmental impacts of fuel additives should take precedence over considerations of engine performance. Less harmful additives should be sought. Ethanol has been suggested as an octane enhancer and its emission profile is less harmful than the compounds proposed for the register.

## **Question set 5**

*Area-specific standards*

No particular comment although it would seem impractical to confine use to any specific area and very difficult to control.

## **Question set 6**

*Cost/benefit analyses of alternatives*

DEA contends that the health benefits, as outlined in the Discussion Paper and set out by the WHO, OECD, and EPA (US), clearly outweigh the cost imposed on industry or consumers. For example, Holland in 2012 calculated the benefits of investing in clean air and compared them to the costs, with low, mid, high-policy scenarios and the maximum technically feasible solution. They found net benefits are "extraordinarily high". The health burden moreover is borne by the population and the next generation particularly.

## **Question set 21**

*Identification of all costs/benefits*

The discussion paper has correctly outlined the health burden. The costs to the health budget are often hidden and usually rely on extrapolation from large

cohort epidemiological studies. Air pollution is a “silent killer” and the full burden of disease may not be realised for years.

Greenhouse gas emissions are included in the cost/benefit analysis. We have dealt previously with these emissions in our submission to the Vehicle Emissions Working Group 2016. Australia is vulnerable to the impacts of climate change as we have witnessed with coral bleaching, record heat waves, bushfires and uncertain farm productivity. In a speech to the Insurance Council of Australia Annual Forum, Geoff Summerhayes, an executive board member of APRA, has described climate risks as “foreseeable, material, and actionable now”.<sup>23</sup> Addressing vehicle emissions and fuel standards must be part of that action now if Australia is to meet its obligations under the Paris Agreement.

## **Questions 22 to 60**

We have no comment on these technical matters.

## **Additional Recommendations:**

- That harmful effects of diesel with regard to carcinogenicity and fine particulate emissions be recognised in legislation. This will require that vehicles be tested under real world driving conditions and that passenger cars which do not meet Euro6 standard or equivalent be banned from import into Australia.
- That the Department of Human Services at the Federal level and the various departments of health in the States and Territory be involved in setting fuel and vehicle emission standards which are in the best interests of the health of Australians.
- That State environmental protection authorities be given the resources to properly assess the levels of pollutants for different airsheds and advise health departments accordingly.

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