



Vehicle Emissions: Discussion Paper

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Executive Summary

At the 20 February 2017 meeting the South Metropolitan Zone requested that WALGA investigate whether vehicle diesel emissions are considered as part of relevant State Government policies and considered as part of major transport and infrastructure projects during the benefit-cost ratio analyses by the Commonwealth and State Governments. The Zone also requested a review into methods to reduce vehicle diesel particulate pollution and to consider the impact on human health.

A report on diesel emissions and transport planning was presented to the WALGA State Council Infrastructure Policy Forum at the meeting on 5 July 2017. Members concluded that Local Government policy and actions should focus on those matters for which they have responsibility, particularly land use planning, human health and community wellbeing. The Forum recommended that:

1. WALGA develops a succinct policy position in relation to ensuring vehicle emissions do not adversely affect community wellbeing through appropriate land-use planning and other cost effective measures.
2. The draft policy position be considered by WALGA Zones and State Council.

An amended report was provided to the WALGA State Council Infrastructure Policy Forum on 7 March 2018. The members concluded that the paper should be directed back to the South Metropolitan Zone for further feedback and comment.

Motor vehicles contribute significantly to higher levels of emissions in Australia and are estimated to contribute 60-70 per cent of nitrogen oxides emissions and up to 40 per cent of hydrocarbons emissions. Motor vehicles emit an array of carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons and particulate matter that has adverse impacts on community wellbeing and air quality. Diesel engines, more than petrol engines, emit particulate matter (PM) and nitrogen oxides which pose health risks to the community. Particulate matter, mostly particles under 2.5 micrometers in diameter (PM_{2.5}), can penetrate the lungs and can contribute to cardiovascular illness and death. As the population grows in urbanised areas, there will be increasing demand for transport and this will likely impact on air quality. Busy roads and dense urban areas are more likely to have higher particulate and emission levels.

Australian ambient air quality standards and advisory reporting standards are set by the National Environment Protection Council (NEPC) under the National Environment Protection Measure for Ambient Air Quality. Air pollution levels are regularly monitored, and those exceeding acceptable levels are reported on.

The Commonwealth Government has had road vehicle emission standards for new vehicles in place since the early 1970s and over time these have been progressively updated and strengthened to fall into line with the United Nations standards where possible. The standards known as the Australian Design Rules are regulated under the *Motor Vehicle Standards Act 1989 (Cth)*. The current minimum standard for new heavy vehicles is Australian Design Rule 80/03, which is based on the Euro V standards and the current minimum standard for light vehicles is Australian Design Rule 79/03 and 79/04 based on Euro 5 standards. With population increasing resulting in increased demand for vehicles, Euro 5/V is likely to be insufficient to maintain adequate air quality by year 2050 and Australia will need to adopt newer standards.

The Western Australian State Government is addressing air quality through Perth Air Quality Management Plan (AQMP) which was developed in 2000 provides strategic direction for air quality until 2029. In addition, as part of the plan the Department of Water and Environmental Regulation periodically runs the 'CleanRun' program that monitors the exhaust emissions of passing vehicles using a remote sensing device. This program could be run on a more regular basis.

The State Government is also setting up Infrastructure WA and there is an opportunity in to ensure vehicle emissions are considered in the assessment framework for large scale infrastructure projects.

During the planning, designing and construction of large scale infrastructure projects, Local Governments could follow Main Roads WA lead to improve how they address overall air quality. This could include where feasible adopting a preference for the installation of roundabouts, rather than traffic signals, as in most cases they reduce congestion resulting in less concentrated vehicle emissions in a particular area. Local Governments can also use the Infrastructure Sustainability Council of Australia's Rating Scheme which evaluates projects based on sustainability (i.e. environmental, social, economic and governance) of the design, construction and management of infrastructure.

Urban forest plays a significant role in improving air quality in inner city/metropolitan areas. Research has demonstrated that trees filter contaminants in air and reduce motor vehicle hydrocarbon and nitrogen oxide vehicle emissions. There are many WA Local Governments developing and implementing urban forest strategies and similar initiatives aimed at reducing the loss of trees and where possible increasing tree canopy cover. Local Governments are developing policies to address loss of trees on private land and are actively planting trees in public open spaces such as verges and parks and near car parks to improve air quality.

Most Local Governments have developed health or transport related strategic plans that include promoting alternative methods of transport (walking and cycling) to their communities which directly contributes to improving air quality. With the introduction and rollout of the Your Move program, in partnership between Local Governments and the Departments of Transport and Local Government, Sport and Cultural Industries, more local communities are being mobilised to pursue alternative modes of transport.

Local Governments have fleet purchasing policies that consider vehicle emission standards, however there is opportunity that Local Governments may compare the output of vehicle emissions during the purchasing of new fleet, in addition to their fleet policies. This would assist in identification of the vehicle with the least emissions and the lowest impact on local communities.

There are approximately 2 million electric vehicles being used worldwide, however only 1,369 electric vehicles were sold in Australia in 2016 which is approximately 0.1% of the market. While the uptake of electric vehicles has been slow in Australia, Local Governments may encourage the uptake of electric vehicles to their communities by creating policies or strategies and also considering the installation of supportive infrastructure such as charging stations.

Background

At the 20 February 2017 meeting the South Metropolitan Zone requested that WALGA advocate to State Government that the impact on human health of vehicle diesel particulate emissions are fully integrated into transport and urban planning with a view to reducing the harm caused by them.

Specifically, WALGA will:

- a) seek to ensure that diesel particulate emissions and their cost to human health and the consequent need to reduce them are integrated into all relevant State Government policies as these are updated and reviewed;
- b) advocate for an integrated approach by all levels of government to the reduction in absolute terms of vehicle diesel particulate pollution; and
- c) support the integration of the health costs of diesel particulate pollution into benefit – cost ratio analyses used to evaluate transport infrastructure and other significant projects.

RESOLUTION

Moved: Cr Sam Wainwright

Seconded: Cr Tim Barling

A report on diesel emissions and transport planning was presented to the WALGA State Council Infrastructure Policy Forum on 5 July 2017. Members concluded that Local Government policy and actions should focus on those matters for which they have responsibility, particularly land use planning, human health and community wellbeing. The importance of efficient supply chains to port for the economic wellbeing of West Australians was highlighted. The Forum recommended that:

1. WALGA develops a succinct policy position in relation to ensuring vehicle emissions do not adversely affect community wellbeing through appropriate land-use planning and other cost effective measures.
2. The draft policy position be considered by WALGA Zones and State Council.

Moved: Cr Blight

Seconded: Cr Cullen

An amended report was provided to the WALGA State Council Infrastructure Policy Forum on 7 March 2018. The members concluded that the paper should be directed back to the South Metropolitan Zone for further feedback and comment.

Introduction

Motor vehicles emit an array of carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons and particulate matter that has adverse impacts on community wellbeing and air quality. Diesel engines in particular, emit particulate matter at levels higher than petrol engines which are of most concern for the community. Particulate matter, mostly particles under 2.5 micrometers in diameter (PM_{2.5}), can penetrate the lungs and can contribute to cardiovascular illness and death^{1 2 3}. Diesel emissions were listed as a 'known carcinogen' by the International Agency for Research on Cancer, part of World Health Organisation, in June 2012.⁴ Additionally ozone, a secondary pollutant formed from the interaction of hydrocarbons and nitrogen oxides has detrimental effects on the environment and human health.

The majority of the Australian population live in an urban environment. The continued growth in population, together with increased demand for transport and growing urbanisation will contribute to the growth in vehicle emissions over time. Busy congested roads and dense urban areas are more likely to have higher particulate and emission levels. In Australia motor vehicles are estimated to contribute 60-70 per cent of nitrogen oxides emissions and up to 40 per cent of hydrocarbons emissions⁵. Under current policy settings, transport emissions are projected to increase by 20 per cent in 2029-2030⁶.

Although only comprising 16 per cent of vehicles in Australia, light diesel vehicles tend to emit nitrogen oxides at a higher rate per vehicle relative to light petrol vehicles (within current standards). Ten per cent of Australia's greenhouse gas emissions, or 57 million tonnes per annum, are produced from light vehicles and this is likely to increase over time with population growth. It is estimated that the growth in light vehicles could add eight million tonnes of greenhouse gas emissions and an estimated \$5 billion in energy costs to the economy each year by 2030⁷.

¹ Department of Environment and Conservation NSW. (2005). Health Costs of Air Pollution in the Greater Sydney Metropolitan Region, Air Pollution Economics.

<http://www.environment.nsw.gov.au/resources/air/airpollution05623.pdf>

² Golder Associates. (2013). Exposure Assessment and Risk Characterisation to Inform Recommendations for Updating Ambient Air Quality Standards for PM_{2.5}, PM₁₀, O₃, NO₂ SO.

<http://www.environment.gov.au/system/files/pages/df7ed5d-1eaf-4ff2-bfe7-dbb7ebaf21a9/files/exposure-assessment-risk-characterisation.pdf>

³ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

https://infrastructure.gov.au/roads/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

⁴ International Agency for Research on Cancer, World Health Organisation. (2012). Press Release No. 213, 12 June 2012 https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

⁵ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

⁶ Department of Infrastructure and Regional Development. (2016). Improving the efficiency of new light vehicles: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Fuel_Efficiency_RIS.pdf

⁷ Department of Infrastructure and Regional Development. (2016). Improving the efficiency of new light vehicles: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Fuel_Efficiency_RIS.pdf

Approximately a quarter of all transport related emissions are from heavy vehicles (vehicles over 3.5 tonnes) even though they comprise a mere four per cent of all vehicles in Australia. Additionally heavy vehicles make up approximately 25 per cent of all road transport fuel consumed in Australia⁸.

The Australian Automobile Association tested 30 different passenger and light commercial vehicles to see if real world driving produced higher emissions than in controlled laboratory tests. The test was undertaken in accordance with the Real Driving Emissions procedure in Melbourne between May 2016 and June 2017. The results showed that “of the 12 diesel vehicles tested, 11 did not achieve the regulated nitrogen oxides limit and were on average three times higher than their respective limits.” The results also found that “27% of petrol vehicles exceeded the carbon monoxide limit.”⁹

On a global level vehicle emissions in places such as Japan, London, Paris and Mexico, the levels of nitrogen oxides have been severe enough to issue or consider issuing bans on diesel vehicles with Japan issuing fines for those contravening the ban. Some countries are considering phasing out diesel powered vehicles and providing incentives including promoting cycling and walking and the use of electric, hydrogen and hybrid vehicles¹⁰.

Vehicle Emissions and Health

Vehicle emissions have significant effects on the cardio-respiratory system and are known to contribute to reduced lung function, heart disease, stroke, respiratory illnesses, and lung cancer as well as have effects on asthma and allergy sufferers. Air pollution alone is estimated to contribute to a 68 per cent increase in deaths between 2005 and 2010 in Australia¹¹.

A study by the Bureau of Infrastructure and Transport and Regional Economics (BITRE) in 2000 measured particulate matter of less than 10 micrometres (PM₁₀) as a “surrogate pollutant” to capture the effects of all other pollutants. The study concluded that “in 2000 motor vehicle pollution accounted for between 900 and 4,500 morbidity cases—cardio-vascular disease, respiratory disease, and bronchitis—and for between 900 and 2,000 early deaths”. It is likely that 85% of these deaths would have occurred in the city. The study then estimated that this would have contributed to health costs of between \$1.1 billion and \$2.6 billion (central estimate \$1.8 billion) for early mortality and between \$0.4 billion to \$1.2 billion (central estimate \$0.8 billion) for morbidity.¹²

⁸ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

⁹ Australian Automobile Association. (2017). Real World Driving Emissions Test – 2017 Fuel Economy and Emissions Report. <https://www.realworld.org.au/wp-content/uploads/2017/10/Real-World-Driving-Emissions-Test-Summary-Report.pdf.pdf>

¹⁰ BBC News. (2016). Four major cities move to ban diesel vehicles by 2025. <http://www.bbc.com/news/science-environment-38170794>

¹¹ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

¹² Bureau of Transport and Regional Economics (BITRE). (2005). Health impacts of transport emissions in Australia: Economic costs. https://bitre.gov.au/publications/2005/files/wp_063.pdf

Vehicle Emissions and Commonwealth Government Air Quality Standards

As the population grows in urbanised areas, there will be increasing demand for transport and depending on how this is powered, may negatively impact on air quality. Australian ambient air quality standards and advisory reporting standards are set by the National Environment Protection Council (NEPC) under the National Environment Protection Measure for Ambient Air Quality. Air pollution levels are regularly monitored, and those exceeding acceptable levels are reported on. These standards are shown in Table 1.

Table 1. Standards for Pollutants

Pollutant	Averaging Period	Maximum concentration standard	Maximum allowable exceedances
Carbon Monoxide	8 hours	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	None
Photochemical oxidants (as ozone)	1 hour	0.10 ppm	1 day a year
	4 hours	0.08 ppm	1 day a year
Sulfur dioxide	1 hour	0.20 ppm	1 day a year
	1 day	0.08 ppm	1 day a year
	1 year	0.02 ppm	None
Particulates as PM ₁₀	1 day	50 µg/m ³	None
	1 year	25 µg/m ³	None
Particulates as PM _{2.5}	1 day	25 µg/m ³	None
	1 year	8 µg/m ³	None

In addition the NEPC aims to reduce particulate matter of less than 2.5 micrometers (PM_{2.5}) by 2025 as this is recognised as most harmful to the community. The goal for this is shown in Table 2.

Table 2: Goal for Particles as PM_{2.5} by 2025

Pollutant	Averaging period	Current maximum concentration standard	2025 maximum concentration
Particulates as PM _{2.5}	1 day	25 µg/m ³	20 µg/m ³ by 2025
	1 year	8 µg/m ³	7 µg/m ³ by 2025

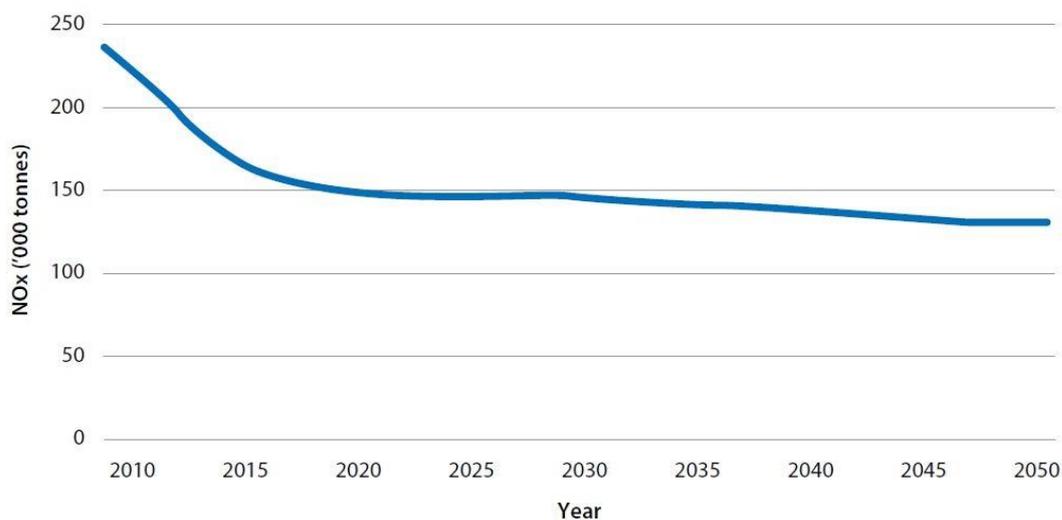
Commonwealth Government Vehicle Emission Standards

The Australian Government has had road vehicle emission standards for new vehicles in place since the early 1970s and over time these have been progressively updated and strengthened to fall into line with the United Nations standards. The standards known as the Australian Design Rules are regulated under the *Motor Vehicle Standards Act 1989* (Cth).

The current minimum standard for new heavy vehicles is Australian Design Rule 80/03, which is based on the Euro V standards, with equivalent US or Japanese standards accepted as alternatives. The current minimum standard for new light vehicles is Australian Design Rule 79/03 and 79/04 based on Euro 5 standards. The Euro V standard (heavy vehicles) was mandated in January 2011 and the Euro 5 standard (light vehicles) by 1 November 2016.

The adoption of the Euro 5/V standards have resulted in improvements in air quality, however with population increasing resulting in increased demand for vehicles, it is likely to be insufficient in the long term. BITRE has projected that nitrogen oxides and PM for both light and heavy vehicles would plateau or increase by 2050 if Australia doesn't adopt more stringent vehicle emission standards over time (Figures 1-4).¹³

Figure 1: Projected impact of existing noxious emissions standards (Euro 5) on NOx emissions from the light vehicle fleet (2010–2050)

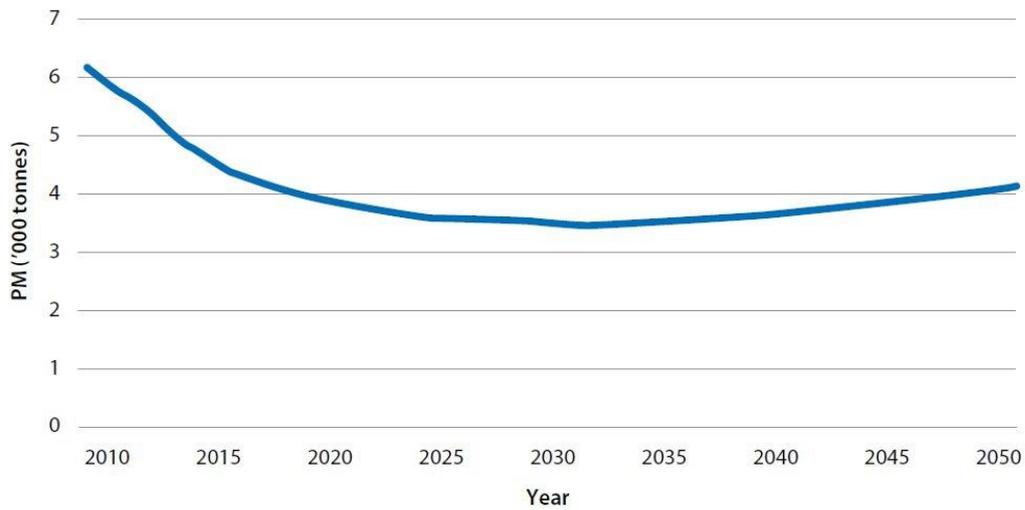


Source: BITRE projections, 2016

¹³ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

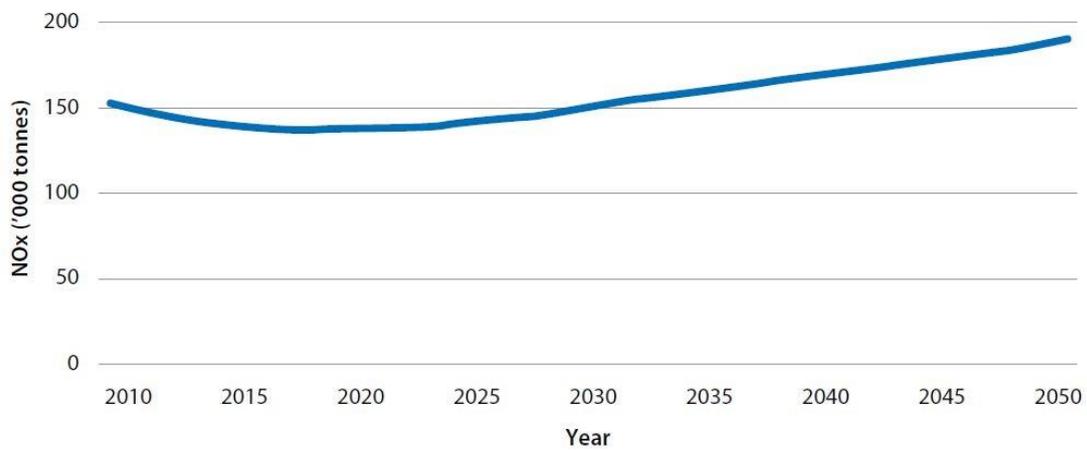
https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

Figure 2: Projected impact of existing noxious emissions standards (Euro 5) on PM emissions from the light vehicle fleet (2010–2050)



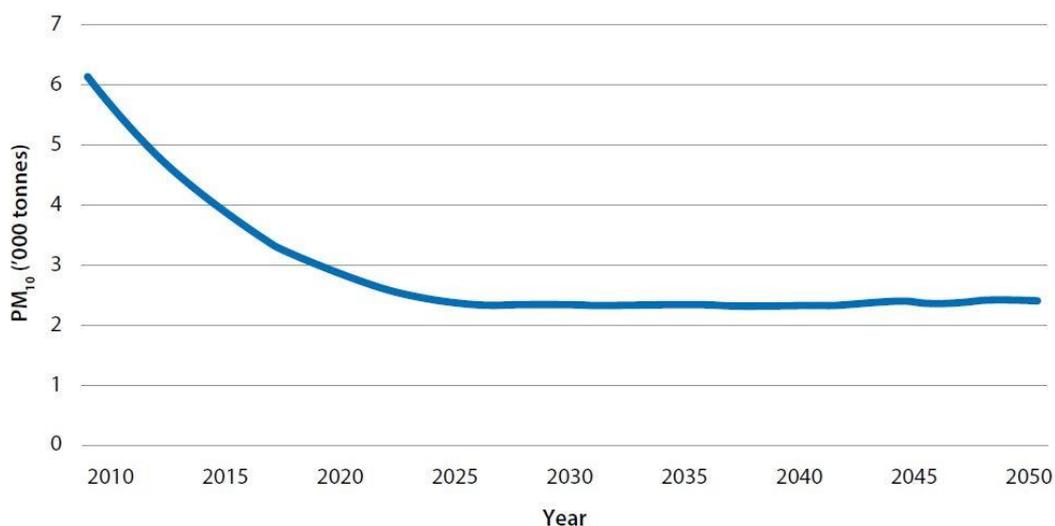
Source: BITRE projections, 2016

Figure 3: Projected impact of existing noxious emissions standards (Euro V) on NOx emissions from the heavy vehicle fleet (2010–2050)



Source: BITRE projections, 2016

Figure 4: Projected impact of existing noxious emissions standards (Euro V) on PM emissions from the heavy vehicle fleet (2010–2050)



Source: BITRE projections, 2016

The Ministerial Forum on Vehicle Emissions is currently deliberating whether Australia should further adopt the Euro VI (heavy vehicles) and Euro 6 (light vehicles) emission regulations that were adopted in Europe in 2012 and 2014 respectively. Equivalent standards were also adopted in most developed countries. If Australia adopts the Euro 6 (light vehicles) regulations this will likely result in approximately a 55 per cent reduction in the emission limits for nitrogen oxides for light diesel vehicles. If Australia adopts the Euro VI (heavy vehicles) regulations this will likely result in an 80 per cent reduction in emission limits for nitrogen oxide, a reduction in emission limits for PM by up to 66 per cent, and the adoption of a more robust testing regime. Tables 3, 4 and 5 demonstrate the difference between Euro 5/Euro 6 limits in both petrol and diesel vehicles for light passenger, light commercial and Euro V/Euro VI limits for heavy vehicles.¹⁴

Table 3. Euro 5 and Euro 6 standards for **light passenger** vehicle emissions.

	Euro 5		Euro 6	
	Petrol/LPG	Diesel	Petrol/LPG	Diesel
Oxides of nitrogen (NOx)	60mg/km	180mg/km	60mg/km	80mg/km
Particulate matter (PM)	4.5mg/km	4.5mg/km	4.5mg/km	4.5mg/km
Particle number limit	No limit	6x10 ¹¹ /km	6x10 ¹¹ /km	6x10 ¹¹ /km

Table 4. Euro 5 and Euro 6 standards for **light commercial** vehicle emissions.

¹⁴ Department of Infrastructure and Regional Development. (2016). Vehicle emissions standards for cleaner air: Draft Regulation Impact Statement.

https://infrastructure.gov.au/vehicles/environment/forum/files/Vehicle_Noxious_Emissions_RIS.pdf

	Euro 5		Euro 6	
	Petrol/LPG	Diesel	Petrol/LPG	Diesel
Oxides of nitrogen (NOx)	82mg/km	280mg/km	82mg/km	125mg/km
Particulate matter PM	4.5mg/km	4.5mg/km	4.5mg/km	4.5mg/km
Particle number limit	No limit	6x10 ¹¹ /km	6x10 ¹¹ /km	6x10 ¹¹ /km

Table 5. Euro V and Euro VI emission standards for **diesel heavy vehicles**

	Euro V		Euro VI	
	Petrol/LPG	Diesel	Petrol/LPG	Diesel
Oxides of nitrogen (NOx)	2,000mg/kWh	2,000mg/kWh	400mg/kWh	460mg/kWh
Particulate matter PM	20mg/kWh	30mg/kWh	10mg/kWh	10mg/kWh

Vehicle Emissions and the State Government Strategic Plan for Air Quality

In Western Australia the Perth Air Quality Management Plan (AQMP) developed in 2000 provides strategic direction for air quality until 2029. The overall objective of the AQMP is to achieve the vision originally outlined by the Parliamentary Select Committee on Perth's Air Quality in its 1998 report:

“Perth’s air quality should be a reflection of the city itself. Clean air that is safe to breathe means that the city has an effective and efficient public transport system that is fully integrated with its urban design; where an imaginative blend of urban residential densities has created a community that uses the fullest range of transport methods and is therefore not car-dependent; and where industry provides employment and economic wealth without detracting from the city’s attractive natural and social environments” (Legislative Assembly, 1998).

The State Government’s ‘CleanRun’ Roadside Emissions Monitoring Program to Monitor Vehicle Emissions

As part of the Perth Air Quality Management Plan and the National Environment Protection (Diesel Vehicle Emissions) Measure (Diesel NEPM), the Department of Water and Environmental Regulation runs the ‘CleanRun’ program that monitors the exhaust emissions of passing vehicles using a remote sensing device. The program assists with identifying high emitting vehicles, helps drivers with identifying when their car needs servicing and raises awareness of vehicle emissions among drivers. It also assists drivers to understand the links between efficient vehicle performance and savings on fuel. During 2016 more than 20,000 vehicles at six sites were monitored, for two days per site across Perth and Mandurah. The remote sensing device is placed on the roadside to obtain data from emissions as vehicles pass by. The device also captures photographs of vehicle registration numbers to identify vehicle details (i.e. make, model). The details captured by the remote sensing device assist with analysing how vehicles are performing according to their age, make, model and fuel

type. The data collected assists with monitoring vehicle emissions over time.¹⁵ As the program only runs for a short time frame of two days per site, and the data is extrapolated, it would be beneficial if the program would continue over a longer period of time and in different locations. This would increase the accuracy of the vehicle emissions data collected.

Vehicle Emissions Considered During Assessment of Large Scale State Government Projects

Infrastructure Australia, established under the *Infrastructure Australia Act 2008*, is an independent statutory body which assesses, prioritises and progresses nationally significant infrastructure projects through an Infrastructure Priority List. Infrastructure Australia assesses projects from all tiers of government. Submissions are considered against the three assessment components:

- Strategic fit
- Economic, social and environmental value:
 - Economic impact: This includes limiting productive capacity; reducing productivity; constraining economic capability; constraining global competitiveness; safety impacts
 - Social impact: Including problems which result in, maintain or exacerbate major issues of social exclusion and/or quality of life, such as access to services and employment and safety
 - Environmental impact: Including issues such as greenhouse gas emissions, waste creation, noise pollution, visual intrusion, heritage impacts and more
- Deliverability¹⁶.

Infrastructure Australia's assessment component includes greenhouse gas emissions which includes carbon dioxide, methane and nitrogen oxides. The scope of the assessment component could be further strengthened through the consideration specifically of vehicle emissions such as particulate matter.

The WA State Government announced in February 2018 its intention to set up Infrastructure Western Australia, based on the models in other States and Infrastructure Australia. This provides an opportunity to recommend that vehicle emissions, not only greenhouse gas emissions, are considered in the assessment framework for large scale infrastructure projects.

The Infrastructure Sustainability Council of Australia's Rating Scheme and the Application to State Government Projects

The Infrastructure Sustainability Council of Australia (ISCA) is a not for profit "peak industry body for advancing sustainability in Australia's infrastructure". The aim of ISCA is to improve the productivity and liveability of industry and communities through infrastructure sustainability. ISCA has developed the Infrastructure Sustainability rating scheme which evaluates sustainability (i.e. environmental, social, economic and governance) of the design, construction and management of infrastructure¹⁷. This includes considering emissions.

¹⁵ Department of Water and Environmental Regulation. CleanRun roadside emissions monitoring. <https://www.der.wa.gov.au/our-work/programs/204-cleanrun-roadside-emissions-monitoring>

¹⁶ Infrastructure Australia. (2017). Assessment Framework. http://infrastructureaustralia.gov.au/policy-publications/publications/files/IFA_Infrastructure_Australia_Assessment_Framework_Refresh_v26_lowres.pdf

¹⁷ Infrastructure Sustainability Council of Australia. IS Overview. <https://isca.org.au/is-rating-scheme/about-is>

The Northlink WA project, a Commonwealth and State Government funded project between Guilford Road and Muchea, was assessed using the ISCA Infrastructure Sustainability rating scheme. In October 2017 it was announced the southern section from Guildford Road to Reid Highway was given a rating of 93 which is the highest WA rating ever in transport infrastructure projects and the second highest ISCA score in Australia for a transport infrastructure project. The project considers optimising recycled product where possible and a grade-separated roundabout at Morley Drive that reduces congestion and associated emissions¹⁸.

Vehicle Emissions and the WA State Planning Strategy and Planning Policies

Site selection and consideration of site layout and urban form can assist in reducing adverse health impacts from motor vehicle emissions. Developments located near busy roads have particular challenges which require policies and strategies to mitigate.

In Western Australia consideration of air quality forms part of the State Planning Strategy, although it's not the primary aim. Throughout the WA State Planning Strategy there is consideration of air quality in terms of health, water, ecological and environmental concerns. The Strategy aims to ensure that "atmospheric pollutants are controlled to not adversely impact on the community and environment, and to meet recognised criteria". The objectives to ensure this outcome by 2050 include:

- Air quality management plans continue to be in place to avoid cumulative effects in airsheds where there are intensive emissions;
- Suitable buffer zones continue to separate incompatible land uses to ensure air, dust and odour emissions do not impact on human health, amenity and wellbeing;
- A risk based approach, that includes safeguards and contingencies, continues to be used where there is uncertainty regarding the nature and level of impact.

The consideration of air quality forms part of the SPP2 Environment and Natural Resources Policy. The Policy states that "planning strategies, schemes and decision-making should:

- (i) Promote urban development patterns, densities and form that support reduced travel demand, increased availability and access to public transport and that encourage walking and cycling.
- (ii) Have regard to the potential for conflict between sensitive land uses and activities with air emission impacts.
- (iii) Have regard to the relevant requirements of the National Environmental Protection Measure for Ambient Air Quality (1998), the Environmental Protection (Kwinana) (Atmospheric Waste) Policy (1992), the Environmental Protection (Goldfields residential areas)(sulphur dioxide) Policy (1992) and Statement of Planning Policy No. 4: State Industrial Buffer Policy."¹⁹

Furthermore State Planning Policy 4.1 Industrial Interface considers a State-wide approach to ensuring there are appropriate buffer zones in place around industrial zones, transport terminals, other utilities and special uses due to emissions. It also provides "for the safety

¹⁸ Main Roads WA. (2017). NorthLink WA achieves 'leading' sustainability rating

<https://project.mainroads.wa.gov.au/northlinkwa/newsinfo/news/Pages/sustainabilityachievement.aspx>

¹⁹ Western Australia Planning Commission (2003). Statement of Planning Policy 2: Environment and Natural Resources Policy. https://www.planning.wa.gov.au/dop_pub_pdf/SPP_2_0.pdf

and amenity of surrounding land uses while having regard to the rights of landowners who may be affected by residual emissions and risk.”²⁰

Liveable Neighbourhoods is an operational policy that guides the structure planning and subdivision for greenfield and large brownfield (urban infill) sites. Currently the WA Planning Commission has released draft 2015 version of Liveable Neighbourhoods. This policy recommends buffers and envelopes including setbacks and maximum heights which, although not directly acknowledging, would address air quality. The document focusses on mitigation of noise and improvement of amenity and ‘vitality’ instead.

Local Governments Land Use Planning Policies

Local Governments already have planning policies that consider sustainability, water sensitive design and public open space. Although majority of these policies don’t aim to address air quality, through the implementation of these policies air quality would be improved. There may be an opportunity for Local Governments to create new Council policies that address air quality to acknowledge the issue of vehicle emissions on community health. This approach however would not have statutory provisions under Local Planning Schemes.

Local Governments - Planning, Designing and Construction of Infrastructure Projects

During the planning, designing and construction of large scale infrastructure projects, Local Governments could improve how they address overall air quality. Local Governments could consider following Main Roads WA’s lead. This could include:

- where feasible adopting a preference for the installation of roundabouts, rather than traffic signals, as in most cases they reduce congestion resulting in less concentrated vehicle emissions in a particular area.
- using renewable/recycled materials that have a smaller carbon footprint and produce less emissions during construction.
- reporting plant emissions during construction of projects, including plant and vehicle fleet used. Ensuring that plant equipment used for construction meets current Australian standards of Euro 5 (light vehicles) and Euro V (heavy vehicles).
- using the Infrastructure Sustainability Council of Australia’s Rating Scheme to assess projects²¹.

Local Governments Improving Air Quality through Urban Forest Policies

Urban forest plays a significant role in improving air quality in inner city/metropolitan areas. Research has demonstrated that trees filter contaminants in air and reduce motor vehicle hydrocarbon and nitrogen oxide vehicle emissions^{22 23}. Car parks provide one of the best

²⁰ Western Australia Planning Commission. (1997). State Planning Policy 4.1 State Industrial Buffer Policy. http://www.planning.wa.gov.au/dop_pub_pdf/SPP4_1.pdf

²¹ Main Roads WA. (2017). Environmental Footprint.

<https://www.mainroads.wa.gov.au/AboutMainRoads/AboutUs/Sustainability/Pages/footprint.aspx>

²² Block, A., Livesley, S. & Williams, N. (2012). Responding to the urban heat island: Literature review of the potential of green infrastructure, Melbourne: Victorian Centre for Climate Change Adaptation Research.

<http://www.vcccar.org.au/sites/default/files/publications/VCCCAR%20Urban%20Heat%20Island%20-WEB.pdf>

²³ Beecham, S. & Lucke, T. (2015). Street Trees in Paved Urban Environments - The Benefits and Challenges. Adelaide, University of Adelaide. <https://www.treenet.org/resources/street-trees-in-paved-urban-environments-the-benefits-and-challenges/>

opportunities for tree planting to combat the higher level of emissions, however retrofitting trees into existing car parks remains a challenge²⁴. There are WA Local Governments which have tree planting policies and strategies, actively planting street trees within verges or parks and near car parks to improve air quality, among other things including reduced heat island effect, increased health benefits and amenity for residents. The implementation of urban forest measures however are limited by inconsistent “Western Australian Government policies, inadequate protection for existing trees, lack of a requirement for revegetation in new developments; lack of funding in support of urban forest measures; and a lack of knowledge regarding the benefits of an urban forest”²⁵. Air quality improvement will be one of the outcomes of WALGA’s urban forest policy work with the Department of Planning, Lands and Heritage and in the development of a guide for Local Governments to support the development of urban forests in Western Australia.

Local Governments and Community Wellbeing

Under the *Public Health Act 2016*, Local Governments have a responsibility to initiate, support and manage public health planning for the local community and develop and implement policies and programs to achieve the objectives of the *Act*²⁶. As such Local Governments are required to develop local public health plans to foster healthy local community environments which might extend to considering addressing air quality.

Currently most Local Governments have developed transport related strategic plans that include promoting alternative methods of transport (walking and cycling) to their communities. Previously this was promoted through the TravelSmart network. Certain Local Governments still employ specific TravelSmart Officers or sustainability roles to deliver travel behaviour change to their communities.

In 2013 the City of Cockburn was the first Local Government to be involved with the introduction of the Your Move program. The program is a collaboration between the Department of Transport (DoT) and the Department of Sport and Recreation (DSR) and was created as an innovative community based behaviour change program which built on the elements of DoT’s TravelSmart and Living Smart programs and DSR’s Active Smart program. The Your Move initiative aims to empower and mobilise communities to use alternative forms of transport and become more physically active. The program is delivered through highly localised, personalised information, one-on-one conversations and ongoing feedback.

Local Government Fleet Purchasing Policies

Local Government have fleet policies as a guide when purchasing new fleet. Generally the fleet policies include the following criteria:

- Basic Whole of Life
- Operator Assessments (including safety)

²⁴ City of Sydney. (2013). City of Sydney Urban Forest Strategy 2013.

http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0003/132249/Urban-Forest-Strategy-Adopted-Feb-2013.pdf

²⁵ Simes, L. (2017). Climate Change Policy Statement Review Discussion Paper November 2017.

²⁶ Public Health Act 2016

[https://www.slp.wa.gov.au/pc/prod/filestore.nsf/FileURL/mrdoc_37099.htm/\\$FILE/Public%20Health%20Act%202016%20-%20%5B00-e0-00%5D.html?OpenElement](https://www.slp.wa.gov.au/pc/prod/filestore.nsf/FileURL/mrdoc_37099.htm/$FILE/Public%20Health%20Act%202016%20-%20%5B00-e0-00%5D.html?OpenElement)

- Mechanical Assessments (including safety)
- Local Government's Management assessment based on Operator and Mechanical Assessments
- Vehicle emission standards – minimum of Euro 5, although new standard Euro 6 has been considered.

Driver training may also be offered by Local Governments to staff to ensure appropriate usage of vehicles results in appropriate fuel consumption and performance of the vehicle.

The City of Canning's Light Vehicle Fleet Management Policy encourages more efficient and safe vehicles. This policy explicitly states that pool vehicles and employee vehicles should not exceed emissions of more than 185g/km and 235g/km respectively. The City of Canning also has a Sustainability Policy with the adopted principle of reducing fossil fuel dependence.

Local Governments could, in addition to their fleet purchasing policies, consider harmful vehicle emissions similarly to the City of Canning, when evaluating tenders during the process of purchasing new fleet. This may mean looking and comparing the output of various vehicle emissions and choosing the vehicle with the lowest emissions.

Local Governments and the Consideration of Electric Vehicles

Electric vehicles are those that require no internal combustion engine to operate and can be plugged in to recharge²⁷. When powered by renewable energy electric vehicles produce no vehicle emissions and even when powered from the electricity grid the vehicle emissions are comparable to normal petrol based engines²⁸. There are approximately 2 million electric vehicles being used worldwide, however only 1,369 electric vehicles were sold in Australia in 2016 which is approximately 0.1% of the market²⁹. Although electric vehicles are a relatively new concept in Australia they are expected to gain popularity in the future. Compared to other countries, such as Europe, the electric vehicle uptake in Australia is much lower mostly because the Commonwealth Government has not been involved with encouraging the uptake of this technology. New electric vehicles being released to the market in 2018 in Australia include BMW i3 and i3s, Audi Q7 e-tron, Hyundai IONIQ, Jaguar I-PACE, and Nissan LEAF³⁰.

Infrastructure that supports electric vehicles is also being implemented to encourage the uptake of electric vehicles. Across Australia there are approximately 476 electric vehicle charging stations³¹. The Queensland State Government built the Cairns to Coolangatta electric vehicle highway which is being promoted as the longest electric vehicle highway in Australia³². In Western Australia the RAC has built an electric highway between Perth and

²⁷ Queensland Government. (2017). Electric Vehicles.

<https://www.qld.gov.au/transport/projects/electricvehicles/about>

²⁸ Electric Vehicle Council. (2017). Submission to Ministerial Forum on Vehicle Emissions.

http://electricvehiclecouncil.com.au/wp-content/uploads/2015/05/Electric-Vehicle-Council_Submission-to-Ministerial-Forum-on-Vehicle-Emissions1.pdf

²⁹ Electric Vehicle Council. (2017). The State of Electric Vehicles in Australia.

<http://electricvehiclecouncil.com.au/wp-content/uploads/2015/05/State-of-EVs-in-Australia-2017.compressed.pdf>

³⁰ Motoring. (2018). Electric vehicles coming to Australia in 2018. <https://www.motoring.com.au/electric-vehicles-coming-to-australia-in-2018-110600>

³¹ Electric Vehicle Council. (2017). Submission to Ministerial Forum on Vehicle Emissions.

<http://electricvehiclecouncil.com.au/wp-content/uploads/2015/05/State-of-EVs-in-Australia-2017.compressed.pdf>

³² Queensland Government. (2017). Electric Vehicles.

<https://www.qld.gov.au/transport/projects/electricvehicles/about>

Margaret River, with Local Governments taking over ownership and maintenance. The Local Governments involved include the Shire of Augusta-Margaret River, Shire of Bridgetown-Greenbushes, City of Bunbury, City of Busselton, Shire of Donnybrook-Balingup, Shire of Harvey City of Mandurah and Shire of Nannup.³³

The City of Canning Council considered a paper at the 20 February 2018 meeting regarding an electric vehicle charging network. The City of Canning already has four electric vehicle charging points within the administration building and these will be utilised once the City procures electric vehicles. The City of Canning has met with the Australian Eclectic Vehicles Association and discussed different levels of charging infrastructure that may be needed.

The City of Canning contacted nearby Local Governments to determine their support:

- Town of Victoria Park – not investigated electric vehicles but are open to it
- City of South Perth – not interested at this point in time
- City of Melville – considering encouraging electric vehicle charging at a development approval level for key activity centres. Considering will also be given to charging stations in their integrated transport plan when it is drafted.
- City of Armadale – currently considering installation needs for facilities that are planned to be built or upgraded. They are in consultation with Synergy about products and locations.
- City of Cockburn – already has two existing AC chargers at both the Civic Centre and Success Library, which are powered by rooftop solar and free to use. The Renewable Energy Vehicle Project team, sponsored by the RAC and the University of WA, donated the charge points for Cockburn Central and they City will cover the cost of installing and connecting this to power.
- City of Swan – recently have installed electric vehicle charging for two parking bays adjacent to the administration building. These are to be used to charge their staff pool vehicles and are also publically available.

The City of Canning has also considered proposed locations which the electric vehicle charging infrastructure may be installed and these will require further investigation³⁴.

The City of Canning is also part of the Cities Power Partnership. The Cities Power Partnership is a national program that advocates for the uptake of clean energy and emission reduction. Local Governments who sign up to the partnership agree to take steps towards addressing 5 key actions across renewable energy, efficiency, transport and working together. According to the website the City of Armadale, City of Bunbury, City of Fremantle, City of Gosnells, City of Kalgoorlie-Boulder, City of Kwinana, City of Melville, Shire of Serpentine-Jarrahdale, City of Swan have all pledged their support as part of this national partnership.³⁵

There is an opportunity for the all levels of Government to be involved with encouraging the uptake of electric vehicles. Local Governments could create policies or amend existing policies that would support the uptake of electric vehicles and also policies that would support creating the necessary infrastructure (e.g. charging stations) for electric vehicles. It is however acknowledged that without supportive Commonwealth Government involvement

³³ RAC Electric Highway. <https://rac.com.au/about-rac/advocating-change/sustainability/electric-highway>

³⁴ City of Canning. (2018). Ordinary Council Meeting Minutes 20 February 2018. <https://www.canning.wa.gov.au/en/My-City/Agendas-and-Minutes>

³⁵ Cities Power Partnership. (2018). <http://citiespowerpartnership.org.au/what-is-the-partnership/>

in the form of an overarching electric vehicle policy framework, these actions would be stand alone and limited in their effect.

Conclusion

Vehicle emissions are a concern for the wellbeing and vitality of local communities. Motor vehicles emit carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons and particulate matter that have adverse impacts on air quality, human health and community wellbeing. Of most concern are particulate matter emissions.

The Commonwealth Government's role is to monitor air quality and to regulate new vehicles. The WA State Government is addressing the issue through the Perth Air Quality Management Plan and sporadically running the CleanRun roadside emissions monitoring program. There is an opportunity for the CleanRun program to be expanded and run more frequently. The State Government is also setting up Infrastructure WA and there is an opportunity in this space to ensure vehicle emissions are considered during the assessment of large scale infrastructure projects.

Local Governments also have a responsibility to acknowledge and address the issues. Local Governments are already carrying out tree planting programs and promoting alternative forms of transport to their communities. While Local Governments have fleet purchasing policies that consider vehicle emission standards, there is opportunity that Local Governments may compare the output of vehicle emissions during the purchasing of new fleet, in addition to their fleet policies. While the uptake of electric vehicles has been slow in Australia, Local Governments may encourage the uptake of electric vehicles to their communities by creating policies or strategies and also considering the installation of supportive infrastructure such as charging stations.

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