



## Premier of Western Australia

Our Ref: 24-139251/ES



Senator Rachel Siewert  
Committee Chair  
Standing Committee on Community Affairs References Committee  
PO Box 6100  
Parliament House  
CANBERRA ACT 2600

Dear Senator Siewert

Thank you for your email dated 14 December 2012 regarding the Standing Committee on Community Affairs References Committee – Submission for Inquiry into the Impacts on Health of Air Quality in Australia.

Please find attached a submission from the Western Australian Government addressing the terms of reference of the Inquiry. The contact officer for any further inquiries is Mr Jason Banks, Deputy Director General Environment, Department of Environment and Conservation, Locked Bag 104, Bentley DC WA 6893;

I trust this information is of assistance to the Committee.

Yours sincerely

Colin Barnett MLA

**PREMIER**  
29 MAY 2013

Att

## SUBMISSION FOR SENATE INQUIRY INTO THE IMPACTS ON HEALTH OF AIR QUALITY IN AUSTRALIA

### The impacts on health of air quality in Australia, including:

#### (a) Particulate matter, its sources and effects

Airborne particles may be solid or liquid (aerosols) and are produced by a wide range of human activities as well as natural sources. Human activity sources include combustion processes in motor vehicles (especially diesel-fuelled vehicles); industrial and commercial boilers and incinerators; mineral/soil mining and transport; power generating plants; solid fuel domestic heating; domestic incineration; and burning of vegetation (e.g. for bushfire mitigation or clearing of agricultural stubble). Natural sources of airborne particles include fine soil particles and smoke particles from bushfires. The cumulative impacts of these diverse sources need to be considered. As well as particles (PM<sub>10</sub> and PM<sub>2.5</sub>), key air pollutants of concern in Western Australia are ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>).

Emissions from motor vehicles, especially diesel, are a significant source of particulate air pollution in many Australian urban areas. A vehicle's duty cycle, age, loads carried, kilometres travelled and maintenance regimes influences its emissions. Since 2006, the proportion of diesel vehicles in the national fleet has increased from 10.6% to 14.7%. Passenger vehicles and light commercial vehicles (LCVs) were the major contributors to this increase. Over the same period, LCV registrations with diesel fuel increased 67.4% (Australian Bureau of Statistics, 2011).

Particles in smoke from biomass burning have been a major concern for air quality, however there have also been exceedances of the O<sub>3</sub> standard as a result of burns, and there is increasing evidence that other pollutants may also be present in large concentrations. The application of prescribed fire is the primary mitigation strategy used to manage fuel loads in forests and other vegetation in Western Australia. Smoke from domestic wood heaters also continues to be an issue in regional areas, and the older and hills suburbs of Perth.

Industrial air emissions include not only stack emissions but also fugitive dust. In regional areas, fugitive dust is generated by transport activities and storage areas such as ore stockpiles and is often compounded by naturally occurring dust.

Airborne particles are commonly classified by their size as total suspended particles and inhalable particles (coarser fraction PM<sub>10</sub> and finer fraction PM<sub>2.5</sub>; PM<sub>10</sub> refers to particles that are less than 10 µm in diameter and PM<sub>2.5</sub> refers to particles that are less than 2.5 µm in diameter). Inhalable particles are associated with increases in respiratory illnesses such as asthma, bronchitis and emphysema. In general, particles in the PM<sub>10</sub> size fraction have been strongly associated with increases in respiratory symptoms, hospital admissions and mortality. Fine particles such as PM<sub>2.5</sub> can easily enter into the lungs and aggravate lung tissue. Exposure to fine particles has been found to be strongly associated with premature mortality.

Other health effects from particulates include aggravation of respiratory and cardiovascular diseases, decreased lung function, asthma attacks and cardiovascular problems such as heart attacks and cardiac arrhythmia.

**(b) Those populations most at risk and the causes that put those populations at risk**

Individuals who are particularly sensitive to air pollution and particles include older adults, people with heart and lung disease, and children. One factor to be considered is that the immune systems of older adults and people with heart and lung disease are often compromised and therefore cannot deal with environmental impacts as easily as those of younger and healthier individuals. Children's respiratory systems are not fully developed, making them more susceptible to air pollution.

Research supports an independent role of particles in causing adverse health effects. This independent role has been documented through epidemiological studies that have carefully disentangled the effect of particles from the effects of other pollutants, and by toxicological studies that have suggested mechanisms by which particles may cause adverse health effects.

The implications of the health evidence for particles are wide ranging.  $PM_{10}$  and  $PM_{2.5}$ , are associated with both short-term and long-term health effects. For various health outcomes, there has not been any indication of a threshold below which adverse effects of particulate pollution would not be observed, particularly for sensitive individuals. The results of studies conducted in Australia show that adverse health effects are observed at current  $PM_{10}$  and  $PM_{2.5}$  levels experienced in Australian cities.

**Air Pollution and Health Studies in Western Australia**

The *Australian Child Health and Air Pollution Study* (ACHAPS) examined the cumulative effects and day-to-day effects of air pollution on primary school-aged children in Sydney, Melbourne, Brisbane, Adelaide, Perth and Canberra in 2007 and 2008. The most important finding from ACHAPS was the consistent and strong association between  $NO_2$  and adverse health effects, particularly long-term  $NO_2$  exposure on asthma and other respiratory conditions. These findings are consistent with international research, such as the Southern California Children's Health Study.

**(c) The standards, monitoring and regulation of air quality at all levels of Government**

The Western Australian Department of Environment and Conservation (DEC) is responsible for monitoring air quality and regulating industry emissions to manage air quality in Western Australia. DEC also provides technical, scientific and strategic advice on air quality to the Environmental Protection Authority (EPA), State and Federal Government agencies, and local governments. DEC participates in national air quality policy development and implementation, including the development of a new National Plan for Clean Air. DEC leads, through the Standing Council on Environment and Water (SCEW); and advises and assists with the implementation of the Perth Air Quality Management Plan, with a focus on motor vehicle emissions and haze from domestic wood heaters.

## Standards

The Western Australian Minister for Environment reports annually to the National Environment Protection Council on compliance with various standards and goals under the National Environment Protection (Ambient Air Quality) Measure (Ambient Air Quality NEPM).

## Monitoring

DEC monitors ambient air quality via a fixed network to meet its obligations under the Ambient Air Quality NEPM. DEC maintains and operates eight metropolitan and five regional fixed air quality monitoring stations to assess the presence of pollutants, including carbon monoxide (CO), NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub> and particles. These ambient air quality data are made publicly available through hourly updates on DEC's website, and in publications such as the annual Western Australia Air Monitoring report.

The annual air monitoring report prepared by DEC includes analyses of air quality throughout the State, together with air quality trends. DEC currently has air monitoring sites located in Perth (8), Bunbury (1), Busselton (1), Collie (1), Albany (1) and Geraldton (1).

Western Australia has had no exceedances at the NEPM monitoring stations of the SO<sub>2</sub> or CO standards during the past 10 years. For both NO<sub>2</sub> and SO<sub>2</sub>, ambient concentrations have remained low, and for CO there has been a decreasing trend. However, there have been a few exceedances for O<sub>3</sub>, and maximum concentrations have approached the standard. For particles such as PM<sub>10</sub> and PM<sub>2.5</sub>, there have been numerous exceedances and no discernible trend. These exceedances have been attributed to biomass burning.

The results of Air Toxics NEPM compliance monitoring in 2005/06, as well as the additional complementary air quality study in 2007/2008, indicated that air toxics levels in Perth are low compared to international standards and below Air Toxics NEPM Monitoring Investigation Levels. Due to these findings, no additional Air Toxics NEPM compliance monitoring has been undertaken, however DEC has undertaken campaign monitoring of a number of air toxics as part of background air quality studies.

DEC also conducts strategic campaign monitoring programs to investigate and inform local air quality issues. Background air quality studies have been conducted in Kwinana and Midland in response to community concerns about emissions from industrial areas.

DEC uses a portable roadside monitoring station on a campaign basis to monitor vehicle exhaust emissions and promote proper servicing and maintenance of vehicles. DEC undertook roadside vehicle testing of over 42,000 vehicles in 2010/11. Analysis of the testing results to date indicates that there is a need to further monitor and manage in-service diesel and petrol vehicle exhaust emissions.

In general, the vast majority of emissions from all fuel types are by a small number of gross emitting vehicles. Results point to a number of reasons for poor emission performance. Most notably the age, fuel type, engine capacity, driving behaviour (e.g. severe acceleration and speed) and use of vehicle correlate strongly with emission performance.

DEC continues to investigate ambient air quality in regional areas, including Port Hedland, Goldfields and Collie, as part of its commitment to manage environmental impacts in key regional centres. DEC is actively engaged in managing air quality issues resulting from high particulate concentrations in Port Hedland through environmental assessments and supporting the implementation of the Port Hedland Air Quality and Noise Management Plan. DEC also supports and works collaboratively with the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment to engineer, trial and apply the application of light detection and ranging technology to fugitive dust.

### **Regulation**

DEC has responsibility under Part V of the *Environmental Protection Act 1986* for the licensing and registration of prescribed premises, licensing of controlled waste transporters, and administration of a range of regulations in WA. DEC also monitors and audits compliance with works approvals, licence conditions and regulations; takes enforcement actions as appropriate; and develops and implements departmental licensing and industry regulation policy.

DEC is focused on reducing emissions and also administers regulations under the Environmental Protection Act to reduce the impacts of air quality on health. Regulations include the:

- Environmental Protection (Domestic Solid Fuel Burning Appliances and Firewood Supply) Regulations 1998;
- Environmental Protection (Petrol) Regulations 1999;
- Environmental Protection (Recovery of Vapours from the Transfer of Organic Liquids) Regulations 1995;
- Environmental Protection (Unauthorised Discharges) Regulations 2004;
- Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992; and
- Environmental Protection (Goldfields Residential Areas) (Sulfur Dioxide) Regulations 2003.

### **National Plan for Clean Air**

In 2011, the Council of Australian Governments (COAG) identified air quality as a priority issue of national significance and agreed that SCEW would develop and implement a National Plan for Clean Air to improve air quality and community well-being.

The National Plan for Clean Air will follow the 2010 Environment Protection and Heritage Council approved integrated approach for air quality, and include the revision of air quality standards and the development of an exposure reduction framework that will identify cost-effective actions to reduce air pollution. The development of the National Plan will be completed in two stages, with a focus on particles in Stage 1. It is anticipated that the National Plan will be completed by the end of 2014, subject to funding constraints.

Stage 1 is underway and is scheduled for completion by July 2013. The key components of Stage 1 are:

- health risk assessment for particles, O<sub>3</sub>, NO<sub>2</sub> and SO<sub>2</sub>, with the identification of potential new standards for particles (both PM<sub>10</sub> and PM<sub>2.5</sub>);
- exposure reduction framework for particles;
- development of emission and exposure reduction actions; and
- integrated cost-benefit analysis for particles.

Additional abatement measures have been proposed and will be considered in the economic analysis. The proposed measures include:

- diesel trains – emission standards, accelerated replacement of old locomotives, and driver assistance software to reduce fuel use;
- in-service diesel equipment – retrofitting high polluting diesel engines with particle filters (a New South Wales program that would be extended to other jurisdictions);
- shipping – low sulfur fuel at berth and memorandum of understanding to reduce vessel speed as ships approach and depart ports;
- coal dust – best practice controls at coal mines that are technically and economically feasible;
- electric vehicles – measures to encourage uptake of electric and hybrid electric passenger vehicles;
- behaviour change programs for LCV fleets – an extension of DEC's CleanRun EcoDrive program, which maximises fuel economy by operating the engine more efficiently, to the national commercial vehicle fleet; and
- vehicle maintenance program – using a portable remote-sensing device, with vehicles receiving a poor emissions result targeted for maintenance.

At this time, no decisions have been made to pursue these measures.

DEC participates in inter-jurisdictional working groups to implement national projects and provides policy advice to the Minister for Environment on SCEW issues. Western Australia is represented on a number of SCEW working groups, including the Ambient Air Quality Impact Mitigation and Ambient Air Quality Impact Assessment. Through this involvement, DEC has been actively involved in the development of the National Plan for Clean Air.

## **Perth Air Quality Management Plan**

The Perth Air Quality Management Plan (Perth AQMP) was released in December 2000 to ensure that clean air is achieved and maintained throughout the Perth metropolitan region over the next 30 years. An Implementation Strategy was released in June 2002. The Perth AQMP, together with the Implementation Strategy, are whole-of-government initiatives that were developed via a consultative process, including key Government agencies with lead roles in implementation.

The Perth AQMP outlines 126 actions aimed at improving Perth's air quality. These actions seek to address emissions from major sources and consider issues such as land use and transport planning that can influence emission levels. While these actions have been adapted over the past 11 years, the overall objective to maintain and improve Perth's air quality has remained constant.

There are currently 10 initiatives covering community education; vehicle emissions reduction; industrial emissions reduction; health research; modelling and monitoring; indoor air quality; land use and transport planning; haze reduction; small-to-medium enterprise emission reduction ; and smoke management.

The five-year review of the Perth AQMP was undertaken in 2007 by a Review Steering Committee established by the EPA. The review identified some shortcomings in the management and implementation of the Plan and provided recommendations aimed at improving efficiency and commitment to the Perth AQMP. The Air Quality Coordinating Committee, responsible for the development and oversight of the Plan, along with lead agencies, continues to lead redevelopment of the Perth AQMP as well as implementing reforms to streamline coordination of air quality management actions.

### **(d) Any other related matters**

#### **Air quality in Western Australia**

A recent study from the Queensland University of Technology examined long-term trends in CO, SO<sub>2</sub>, O<sub>3</sub> and particles in four Australian cities, including Perth, from 1996 to 2011. The study found that CO, SO<sub>2</sub> and particles levels had decreased, while O<sub>3</sub> levels had increased in Perth. O<sub>3</sub> concentrations are used as an indicator of photochemical smog. O<sub>3</sub> is formed by the reactions between nitrogen oxides and reactive organic compounds in the presence of heat and light. The principal sources of these precursors are motor vehicles, combustion processes and refining, and petrochemical and solvent-based industries.

#### **Current drivers of air quality**

There are a number of factors that are currently influencing air quality in WA, including industrial development and population growth. Future air quality trends will also be influenced by a range of factors, including climate change.

WA is experiencing strong economic growth including large development projects around the State. With the rapid development and growth, developments in designated industrial estates are becoming increasingly constrained by emissions and potential land use conflicts. Emissions from industrial estates in some areas are now predicted to reach, and exceed, airshed capacity with respect to protecting priority environmental values, placing limitations on further industrial expansion.

WA's rapid population growth has continued development to the north and south of Perth as well as an expansion of a number of major regional centres. As a result, there has been a significant increase in the number of vehicles as well as vehicle kilometres travelled. With increasing population growth and industrial development, there has also been an increasing demand for energy which has, and will continue to have, an impact on regional areas near coal-fired power stations.

Increases in ambient temperature will result in increases in daily O<sub>3</sub> concentrations as well as maximum O<sub>3</sub> concentrations. Temperature increases will also cause an increase in evaporative emissions from vehicles and storage facilities. Particle concentrations may also increase due to particle generation resulting from the presence of O<sub>3</sub>. It is also anticipated that there will be an increase in bushfires and prescribed burning (so as to mitigate bushfires) which will result in increases in daily exposure to air toxics and particles.

Land planning and air quality has become an increasingly important issue in WA where land separating industry and sensitive land uses is eroded by land development, giving rise to the need for improved buffer design. The current situation is putting increasing pressure on environment and planning agencies as they seek to effectively balance industrial development and growth with the needs of land owners and developers.

The incorrect assumption that incompatible land uses can be resolved by a purely scientific process, such as the measurement or modelling of simple air quality parameters, has caused instances of amenity and air quality impacts on WA communities. This process typically fails to fully account for the impact on amenity. The most common realisation of a reduction in amenity is evident in odour complaints. DEC has also consistently recorded odour as the cause of one-third to one-half of all pollution complaints received.

#### **Mechanisms for tackling issues**

WA is currently operating a number of programs being delivered through the Perth AQMP and other initiatives that could be adopted nationally or by individual jurisdictions. DEC programs such as CleanRun EcoDrive are working to decrease air pollution, including particulates and O<sub>3</sub> levels through a reduction in motor vehicle emissions. CleanRun EcoDrive is a behaviour change program for LCVs that maximises fuel economy while reducing emissions by operating the engine more efficiently. TravelSmart Workplace, a joint DEC/Department of Transport initiative, is a program supporting workplaces to enable and encourage their employees and clients to use travel alternatives. TravelSmart Workplace supports organisations to prepare and adopt workplace travel plans for their employees.

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