General Purpose Standing Committee No 2

Health impacts of air pollution in the Sydney basin

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Terms of Reference

1. That General Purpose Standing Committee No. 2 inquire into and report on the health impacts of air pollution in the Sydney basin, and in particular:

    (a) Changes in the emissions of various air pollutants and the impact of those changes on air quality in the Sydney basin over the past three decades, including any 'hot-spots' where pollution is concentrated

    (b) the impact of NSW air pollution laws (including the *Clean Air Act 1961*, the *Protection of the Environment Operations Act 1997* and any regulations made under those Acts) on air quality over the past three decades

    (c) the causes of air pollution in the Sydney basin over the past three decades

    (d) the health impacts of air pollution on any 'at risk' groups

    (e) the financial impacts of air pollution on the NSW health system

    (f) the effectiveness of current laws and programmes for mitigating air pollution

    (g) strategies to reduce the health impacts of air pollution; and

    (h) any other relevant matter.

These terms of reference were self-referred by the Committee on 14 March 2006.

Committee Membership

Hon Robyn Parker MLC (from 25/9/06)	Liberal Party	*Chair*
Hon Patricia Forsythe MLC (to 22/9/06)	Liberal Party	*Chair*
Hon Tony Catanzariti MLC	Australian Labor Party	*Deputy Chair*
Hon Dr Arthur Chesterfield Evans MLC	Australian Democrats	
Ms Sylvia Hale MLC	The Greens	
Hon Melinda Pavey MLC	The Nationals	
Hon Christine Robertson MLC	Australian Labor Party	
Hon Henry Tsang MLC	Australian Labor Party	

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Chair's Foreword

Sydney is in a natural basin, bounded by the Blue Mountains to the west and the Pacific Ocean to the east. This makes it a beautiful place to live, but the physical features that make it beautiful also help make our air pollution the worst in Australia. For those people who are particularly susceptible to air pollution, the situation is more than just irritating, it is literally life threatening.

The health impacts of air pollution are disturbingly widespread, and it contributes to between 600 and 1400 deaths every year in Sydney alone.

As Sydney grows it faces increasing population pressure. Much of the city's future development is planned for the south and west, that is, Sydney's air pollution 'hot-spots'. To make matters worse, these areas are among the most ill served for public transport, leaving people little choice but to continue using the cars that are the major source of air pollution.

While the Committee heard evidence that demonstrates that air quality has improved over the last three decades, largely due to the relocation and better regulation of industry and its emissions, and improvements in fuels and engine technology, the rapid increase in the number of cars and their use presents us all with tough challenges.

The NSW Government, through a lack of departmental co-ordination, is putting its citizens at risk from air pollution. A lack of coordination between key Government departments is hindering the response to air pollution challenges. Last year, the NSW Auditor General recommended this situation be improved, but the NSW Government has taken little action. This Committee makes clear and specific recommendations that will strengthen the role of the Department of Environment and Conservation in strategic planning decisions, to make sure that future urban developments work to improve air quality, not make it worse. Action to build public transport infrastructure is needed, and needed now, if we are to avoid choking the city by forcing people to use cars for transport.

The Committee has also recommended improvements to the way in which air pollution information is provided to the community, with the aim of helping people who are at risk from air pollution to minimise its effects, and to raise awareness about its causes.

The NSW Government's closure of air quality monitoring stations and the cessation of air toxics monitoring is unacceptable. People at risk need accurate and timely information but under the Government's current arrangements, these citizens are being denied this vital information.

The Committee's recommendations to re-instate air quality monitoring stations in the CBD and in air pollution 'hot-spots', and to re-commence the monitoring of air toxics, are intended to assure the community that the information collected reflects the real air pollution picture.

The NSW Roads and Traffic Authority has also been a party to this air pollution failure. The consistent refusal of the NSW Roads and Traffic Authority to install health advisory signs at the entrance to the M5 East and other road tunnels is unfathomable, and the Committee has recommended the use of Variable Message Signs, already in existence at the entry to road tunnels, to advise motorists to take precautions against air pollution in tunnels. Media attention has brought the need for air pollution vigilance into sharp focus. Recent newspaper articles have canvassed plans to improve air quality in the M5 East tunnel by using portal emissions and this highlights the need for the Committee's

recommendation that the NSW Government take responsibility for the costs of meeting future air quality standards in relation to existing road tunnel infrastructure.

On behalf of the Committee I would like to thank all participants in this Inquiry, those people and organisations that took the time to write submissions outlining their concerns and suggestions, and those that appeared to give evidence in person. The Committee heard from a broad spectrum of Sydney's community, including representatives of community action groups, NSW Government agencies, the NSW Auditor General, and scientific experts.

I would like to take the opportunity to gratefully acknowledge the previous Chair of this Committee, the Hon Patricia Forsythe, whose work as Chair of the Committee is one small part of the large contribution she has made to the state of New South Wales. I wish her well in her future endeavours. I would also like to thank the Committee Secretariat – Rachel Callinan, Marie Burton, Elizabeth Galton, Michael Phillips and Simon Johnston - for their assistance in the conduct of the Inquiry and preparation of the Report. I particularly note the valuable contribution of Ms Jocelyn Yem, a participant in the 'Working in the Legislative Council' Development Program.

Hon Robyn Parker MLC
Committee Chair

Executive Summary

The quality of the air we breathe is fundamentally important to our health and wellbeing. Air pollution in the Sydney basin was first recognised as a problem in the 1950s. Since then, a number of programs and initiatives have been introduced to reduce the level of air pollution in Sydney, thereby reducing the health effects and financial impacts of air pollution on the community.

There are a range of natural and anthropogenic sources of air pollution in the Sydney basin, and Sydney's topography and meteorological conditions exacerbate the effects of these pollutants, creating air pollution 'hot-spots'.

In this Report, the Committee examines the changes in air pollution over the past three decades, identifies areas of concern and reviews strategies to address those concerns. The Committee's findings are summarised below.

Chapter 2

The severity of air pollution and its main sources have changed over the past three decades, due to technological and regulatory changes. Chapter 2 addresses Inquiry terms of reference (a) and (c) relating to the causes and sources of air pollution in the Sydney basin and the changes over the past three decades, and identifies those air pollutants that are of primary concern from a health perspective.

There has been an overall improvement in air quality over the last three decades, particularly in the reduction of four out of six of the air pollutants measured under the National Environment Protection Measures for Ambient Air Quality (Air NEPM). There remain significant challenges in reducing the impact of the remaining two air pollutants in the Sydney basin – photochemical smog (ozone) and particle pollution. The growing population and the expansion of those urban areas that are already considered air pollution 'hot-spots' further compounds this problem.

To this end, the Committee believes the NSW Government has a responsibility to explicitly address this issue to ensure that future development does not contribute adversely to air pollution 'hot-spots'. The Committee has recommended that the Department of Planning develop and implement a strategy to address the impact of future urban development in existing air pollution 'hot-spots', such as in south-western and western Sydney.

Chapter 3

The Inquiry terms of reference (d) and (e) relate to 'the health impacts of air pollution on any "at risk" groups' and 'the financial impacts of air pollution on the NSW health system'. The NSW Government advised that air pollution caused between 643 – 1,446 deaths annually in the Sydney region, and that a 'conservative estimate' of the health related financial costs due to air pollution was between $706 million and $5,994 million per annum.

It is clear from the range of evidence received during the Inquiry that air pollution has an impact on the health of the population of the Sydney basin, exacerbated by a number of factors, including the unique topography of the region. However, there is difficulty in determining what role air pollution plays as a cause or factor in any specific health event. Accordingly, the Committee understands the difficulty in gaining a full appreciation of the financial cost of the health impacts of air pollution on the NSW health

system, but believes that whilst this difficulty exits for any single episode, it is not relevant when calculating the total cost of air pollution on the health of the population.

A more accurate estimate of air pollution costs on the NSW health system would make incorporating air pollution into development and strategic planning easier. It must be costed so it can be compared to the likely expense associated with it. Nevertheless, it remains indisputably clear that the health impacts of air pollution are significant, and therefore action should be taken to reduce air pollution and limit exposure for 'at-risk' groups and the population at large.

The Committee recommends that NSW Health conduct or be involved in further research to identify groups that are at a health risk due to the effects of air pollution in the Sydney basin, whether due to topographical, demographical, epidemiological, social or physical factors. The Committee further recommends that the Department of Environment and Conservation's policy on air quality, *Action for Air*, should take the health costs and consequences of air pollution into account in the planning and approval process as well as considering overseas standards.

Two useful existing strategies for minimising the health effects of air pollution on the community are also discussed, the Regional Pollutant Index and the Air Pollution Health Alert System. However, more can be done to expand these programs to further target groups that are at risk, or to target individuals who may not realise that they are at risk, through the use of new technology in delivering the existing advisory services. The Committee has made recommendations to that effect.

Chapter 4

Inquiry terms of reference (b) and (f) refer to the impact of NSW air pollution laws on air quality over the last three decades and the effectiveness of these laws in mitigating air pollution. The regulatory and policy framework for the management of air quality in the Sydney basin is outlined.

In 2005, the NSW Auditor-General released the performance audit report, *Managing Air Quality: Department of Environment and Conservation*. The audit examined the NSW Government's efforts to improve air quality, focusing on progress with the *Action for Air* and *Action for Transport 2010* plans. The audit also reviewed the Government's efforts to curb motor vehicle usage, encourage greater use of public transport, promote cleaner cars and fuels, and integrate air quality in transport planning. It is clear that there is still a strong need to increase the profile of air pollution in the community and to demonstrate progress towards clearly defined objectives.

In order to achieve this, the Committee recommends that, further to the Auditor General's recommendations, an annual status report on progress against defined targets associated with *Action for Air* should be prepared. Changes to existing strategies and policies should also be clearly identified in the annual *Action for Air* updates, and an appendix of the updates should identify redundant strategies in order to provide an overview of changes in policy direction over time.

The Committee recognises the need to improve coordination between key government departments in relation to air pollution, also identified by the Auditor General in *Managing Air Quality*. The Committee have therefore recommended that the current advisory role of the Department of Environment and Conservation (DEC) in relation to strategic planning for Sydney be reviewed and upgraded to a more central strategic role with the intention of ensuring that air quality issues are given a higher priority. The Committee has also recommended that the NSW Government require NSW Health and DEC to be an integral part of the Department of Planning's environmental assessment processes for major projects;

and that DEC work co-operatively with the Department of Health in the setting of evidence based policy and standards, regular reporting and long term data analysis in relation to air pollution.

The Committee believes that the current system of industry self-regulation is an appropriate way of monitoring the emissions of a large number of industries with limited resources. However, it is essential that DEC and NSW Health have sufficient resources available to be able to fulfil the more central strategic roles recommended in this Report, as well as sufficient resources to perform those environmental audits and inspections that are an integral part of the self-regulatory system, and to adequately monitor and report on air pollution across the Sydney basin. The Committee has recommended that the NSW Government make sufficient resources available to DEC and NSW Health to enable them to fulfil these responsibilities.

Chapter 5

Chapter 5 examines the range of international guidelines and national standards which relate to the monitoring and reporting of air pollution levels in New South Wales. There is also ongoing local and international research that informs the national standards for safe levels of air pollutants. A recent review of the World Health Organisation guidelines resulted in a tightening of standards across a range of common air pollutants, including those of particular concern in Sydney, ozone and particulate matter.

Monitoring air pollution

The Air NEPM, the national ambient air quality standard that all states and territories must meet by 2008, relates to six key air pollutants (carbon monoxide, nitrogen dioxide, photochemical oxidants [as ozone], sulphur dioxide, lead and particulate matter - PM_{10}). An advisory reporting standard exists for $PM_{2.5}$ particles, and there is also a National Environment Protection (Air Toxics) Measure to monitor five highly toxic chemicals.

Given that the Air NEPM is currently under review until 2008, the Committee recommends that the NSW Government play an active role in ensuring that the national standards are best suited for the community at large, taking into account international research and best practice.

Evidence received by the Committee highlighted both the existing detrimental and the as-yet unquantified potential health effects of fine and ultra fine particulate matter. Given the evidence suggesting that diesel and other fuels produce fine and ultra fine particles, the Committee recommends that further research into the health effects and measurement of fine and ultra fine particles be undertaken by the NSW Government, particularly DEC and NSW Health, in cooperation with the National Environment Protection Council. The Committee further recommends that the NSW Government take immediate action to reduce levels of fine and ultra fine particles.

As highlighted in the Audit Office's report, *Managing Air Quality*, there is concern that DEC no longer routinely measures air toxics in New South Wales, particularly given the limited amount of information available regarding these pollutants and their effects.

There is also serious concern that the community, particularly those groups more susceptible to air pollution, may be at a risk that is currently unquantified. Accordingly, the Committee has recommended that DEC, in addition to monitoring levels of air toxics, work towards actively reducing the levels of these toxics in the Sydney basin.

Over the past few years, the air quality monitoring network across Sydney has been reduced. The Committee recommends that DEC undertake the review of the monitoring network as recommended by the Auditor General in *Managing Air Quality*, allowing the planned review of the Air NEPM to inform the future network composition. Furthermore, due to the widespread community concern regarding the closure of some stations in the Sydney basin, particularly the Sydney central business district's station and in air pollution 'hot-spots', the Committee recommends that DEC ensure that air quality information is able to be captured in all relevant areas by reinstating recently closed air quality monitoring stations in those areas.

Informing the community

Public reporting of air pollution is an opportunity to raise awareness about the sources and dangers of air pollution. It is also a means for linking levels of pollution with particular activities by individuals and industry.

The Committee recommends that key air pollution performance information produced by NSW Government agencies be validated by an independent body such as the Audit Office, and information and reports released by DEC be easily understood by, and accessible to, the public.

The Regional Pollutants Index (RPI – discussed in Chapter 2) measures levels of ozone, particles and nitrogen dioxide, however, it only reports on the pollutant that is highest in concentration over the reporting period. To allow the RPI to be more meaningful for the whole community and to emphasise the pollutants that are currently the highest priority in NSW, the Committee recommends that the RPI be expanded to include levels of ozone and particulate matter (both $PM_{2.5}$ and PM_{10}), as well as the air pollutant with the highest level, and be linked to the source or activity that causes the pollution.

Information provided to the community can be enhanced by linking the existing reporting mechanisms, such as the RPI and Air Pollution Health Alert System, with existing services such as daily television, radio, newspaper and internet weather reports. It is important that the community be made aware of how local air pollution may affect them, and how their activities may affect the level of air pollution.

Chapter 6

Chapter 6 examines a number of specific air pollution issues that have an impact on the health of people living within the Sydney basin, including motor vehicles, road tunnels, diesel vehicles and indoor air pollution.

Motor vehicles

Problems caused by private motor vehicle use have two causes – a lack of viable public transport and other alternatives to the use of the car for transport, and the linked community attitude that favours the use of the car. NSW Government action to reduce the use of the car therefore should focus on these areas. Meeting and exceeding the public transport objectives once contained within *Action for Transport 2010* and now reconfigured in the Metropolitan Strategy and the draft *State Plan* will send a clear message to the community that public transport is a reliable, viable and environmentally responsible alternative to the private motor vehicle. The Committee therefore recommends that the NSW Government develop clear public transport infrastructure objectives and performance indicators, to be incorporated into the completed *State Plan*, with progress towards those objectives annually reported to the NSW Parliament.

The Committee notes that the NSW Roads and Traffic Authority (RTA) has been working cooperatively with the trucking industry in reducing vehicle emissions, and its own actions in ensuring that its vehicle fleet sets an example to other motorists.

There is scope, however, to improve the current system of monitoring vehicle emissions, both for heavy vehicles and for cars. The Committee recommends an expansion of emission testing for diesel trucks as part of the registration process and the investigation of the feasibility of a similar program for light vehicles, and that the NSW Government consider the most cost-effective way to reduce particles from existing diesel vehicles and explore possible models such as off-set arrangements with industry or large fleet owners.

Linking the registration cost of vehicles to the amount of emissions produced would encourage greater use of vehicles with smaller more fuel-efficient engines, hybrid vehicles, and alternative fuels. The Committee makes a recommendation that the NSW Government investigate this option.

The Committee notes that steps have been taken to reduce the volatility level of petrol in summer months. Preventing or reducing the emissions of petrol vapours has the potential to result in air quality improvements. To this end, the Committee recommends that the NSW Government consider making the introduction of stage 2 vapour recovery equipment at service stations compulsory over a reasonable time period to be determined in consultation with all affected stakeholder groups.

Rail freight emissions

The Committee notes that the de-electrification of Sydney's goods lines means that all rail freight in and out of Port Botany is moved by diesel-powered engines but that there is no regulatory framework in place to control hazardous emissions from those engines. In this regard, the Committee recommends that the NSW Government immediately investigate and implement a system to regulate diesel emissions from freight train engines.

Road tunnels

There is currently a lack of clear responsibility for monitoring compliance with air quality standards set for road tunnels and, accordingly, there is the need for greater clarity of roles and responsibilities in relation to managing air quality.

It is appropriate that DEC be the regulatory body for the continuing operation of road tunnels, and that owner/operators of such facilities should be required to hold an Environment Protection Licence, to ensure that the agency with the expertise is the agency that monitors and enforces the air quality standards set for the project. The Committee therefore recommends that the operation of road tunnels be added to the list of activities in Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998. Furthermore, the Committee recommends that a review be undertaken of the full range of pollution causing activities to determine which additional activities should be included under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.

Existing and future road tunnels should be constructed to allow for the future installation of the necessary technology to meet new and improved air quality standards as they arise. The Committee recommends that the NSW Government accept responsibility for the reasonable cost of meeting future air quality standards in relation to existing road tunnel infrastructure.

Furthermore, to ensure that the community is not required to compensate private sector operators for the future installation of such technology, the NSW Government should ensure that future PPP contracts require the private sector operator not only to make provision for the installation of technology to meet future air quality standards, but also to facilitate that installation if and when it occurs.

Variable Message Signs (VMS) exist both at the entrance to and in Sydney road tunnels. The Committee recommends that the RTA use VMS to easily and effectively convey simple precautionary measures to motorists regarding the health impacts of the air quality in the tunnel ahead.

Indoor air pollution

Air pollution does not just exist outdoors – it also affects people inside their own homes. Unflued gas heaters, which create elevated levels of nitrogen dioxide, are a major source of indoor air pollution.

Given the obvious health impacts of unflued gas heaters, particularly for groups 'at risk' of air pollution such as the elderly or people with asthma, the Committee recommends that the NSW Government ban the sale of such heaters in NSW and investigate ways of phasing out the use of existing heaters.

Solid fuel heaters

Solid fuel heaters are a major source of particle pollution, particularly in winter. While the 2005 reforms to the *POEO Act* and the actions of local councils go a significant way toward reducing the problem of solid fuel heater emissions, further action is warranted, such as a subsidy scheme to encourage the replacement of solid fuel heaters with heating sources that produce less air pollution. This is particularly important in those 'hot-spot' areas of the Sydney basin – the south-western and western regions. The Committee recommends that the NSW Government investigate schemes to encourage the replacement of solid fuel heaters with less polluting alternatives.

Summary of Recommendations

Acronyms

AQMN - Air Quality Monitoring Network

CNG - Compressed Natural Gas

CO – Carbon monoxide

COPD – Chronic Obstructive Pulmonary Disease

DEC – Department of Environment and Conservation

EDO – Environmental Defender's Office (NSW)

EPA – Environment Protection Authority

EPHC – Environment Protection and Heritage Council

EPL – Environment Protection Licence

ETS – Environmental Tobacco Smoke

GMR – the Greater Sydney Metropolitan Region, includes Sydney, Illawarra and lower Hunter

LBL – Load Based Licensing

LCTAG – Lane Cove Tunnel Action Group Inc

LPG – Liquified Petroleum Gas

MAQS - Metropolitan Air Quality Study

NEPC – National Environment Protection Centre

NEPM - National Environment Protection Measure

NO – Nitrogen oxide

NO_2 – Nitrogen dioxide

NO_x – Nitrogen oxide compounds

O_3 – Ozone

PAH – Polycyclic aromatic hydrocarbons

PM_{10} – Particles defined by size of particle, where 10 is 10 micrometres (μm)

RTA – Roads and Traffic Authority

ROC – Reactive organic compound

RPI – Regional Pollutant Index

SOE Report – State of the Environment Report

SSROC – Southern Sydney Regional Organisation of Councils

VKT – Vehicle kilometres travelled

VOC – Volatile organic compound

WHO – World Health Organisation

WSROC – Western Sydney Regional Organisation of Councils

Chapter 1 Introduction

The quality of the air we breathe is fundamentally important to our health and wellbeing. In this Report, the Committee examines the changes in air pollution over the past three decades, identifies areas of concern and reviews strategies to address those areas of concern. This chapter provides an overview of the inquiry process, including a brief outline of those New South Wales reports and plans relating to air pollution that are referred to throughout the report. The structure of the report is also described.

Inquiry terms of reference

1.1 The Inquiry terms of reference were adopted on 14 March 2006, under the Committee's power to make a self-reference. They are reproduced on page iv of this Report.

1.2 The terms of reference required the Committee to examine the health impacts of air pollution in the Sydney basin, changes over the last three decades and the effectiveness of the regulatory framework in addressing air pollution.

Conduct of Inquiry

Election of new Chair

1.3 On 19 September 2006, the Chair of General Purpose Standing Committee 2, the Hon Patricia Forsythe MLC, resigned from the Legislative Council. On the same date, the Hon Robyn Parker MLC was nominated as a member of General Purpose Standing Committee No. 2,[1] and was subsequently elected as Chair on 25 September 2006.[2]

Submissions

1.4 The Committee called for submissions through advertisements in the *Sydney Morning Herald* and the *Daily Telegraph* on 17 June 2006. The Committee also wrote to key stakeholders and interested parties inviting them to make submissions.

1.5 The Committee received a total of 41 submissions, which are available on the Committee's website at www.parliament.nsw.gov.au/gpsc2. Submissions were received from a range of government agencies, community organisations and private citizens. The Committee appreciates the effort and interest shown by those organisations and individuals who made submissions.

1.6 A list of submissions is contained in Appendix 1.

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1 Legislative Council, New South Wales, *Minutes of Proceedings, No. 14*, 3rd Session of the 53rd Parliament, 19 September 2006, item 9

2 General Purpose Standing Committee No. 2, Legislative Council, New South Wales, *Minutes of Proceedings, No. 79*, 3rd Session of the 53rd Parliament, 25 September 2006, item 3

Public hearings

1.7 The Committee held two public hearings at Parliament House on 16 August 2006 and 11 September 2006. The Committee heard evidence from the Department of Environment and Conservation, NSW Health, the NSW Roads and Traffic Authority, the Ministry of Transport, the NSW Audit Office, the Department of Planning, and from scientific experts, community groups and other relevant witnesses. Transcript of these hearings are available on the Committees website.

1.8 Witnesses at the hearings are listed in Appendix 2.

Relevant documents

1.9 The following documents are relevant to the Inquiry and are referred to throughout the Report.

NSW Government *Action for Air*

1.10 In 1998 the NSW Government released *Action for Air*, its 25-year whole of government quality management plan for the Greater Metropolitan Region (GMR) covering Sydney, the Lower Hunter and the Illawarra. It is the principal strategic policy document for the management of air quality in NSW.[3]

1.11 *Action for Air* focuses on regional air pollution. The strategies in the plan represent a comprehensive attack on the two pollutants of primary concern: photochemical smog (ground-level ozone); and fine particle pollution. The main sources of air pollution in the region are identified as emissions from motor vehicles, industry, and commercial and domestic sources.

1.12 The NSW Department of Environment and Conservation is responsible for regularly reviewing and updating *Action for Air*. Chapter 4 of this Report provides more detail on *Action for Air* in the context of detailing the NSW Government's regulatory and policy framework for the management of air quality.

NSW Government *Action for Transport 2010*

1.13 In 1998 the NSW Government released *Action for Transport 2010: New South Wales* and *Action for Transport 2010: Sydney*, 10-year construction plans relating to the development of transport infrastructure. When referring to the policy document *Action for Transport 2010* in this Report, the Committee is referring to the *Action for Transport 2010: Sydney* document.[4]

1.14 The strategies in the plan include encouraging the use of public transport, reducing car dependency, improving air quality and safeguarding the environment. *Action for Transport 2010*

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3 NSW Government, *Action for Air*, Environment Protection Authority, 1998, accessed 9 October 2006, < http://www.environment.nsw.gov.au/resources/actionair.pdf>

4 NSW Government, *Action for Transport 2010*, 1998, accessed 20 October 2006, <www.urbantransport-technology.com/projects/sydney2>

has been superseded by other NSW Government strategic documents, such as the Metropolitan Strategy and the draft *State Plan.*

NSW Government *City of Cities: A plan for Sydney's future* (the Metropolitan Strategy)

1.15 In 2005 the NSW Government released *City of Cities: A plan for Sydney's future*, otherwise known as the Metropolitan Strategy. The Metropolitan Strategy is a broad framework to facilitate and manage the growth and development of metropolitan Sydney over the next 25 years. It contains a section on sustaining and improving the environment, including air quality.[5]

NSW Government *Health and Air Pollution Research Program (HARP)*

1.16 Air pollution health research commenced in NSW in 1993 with the Health and Air Pollution Research Program (HARP), which ran until 1996.[6] The HARP studies demonstrated adverse health effects of air pollution, and were followed up with a number of air pollution and health studies in relation to birth weight, gestational age, daily mortality, hospital admissions, child respiratory health, cardiovascular disease in elderly people and blood lead in children.[7]

NSW Government *Metropolitan Air Quality Study: Outcomes & Implications for Managing Air Quality*

1.17 The three-year *Metropolitan Air Quality Study (MAQS)*, undertaken by the Environment Protection Agency in the early 1990s (1992-1995), was released in 1996. *MAQS* provided an overview of the state of air pollution in the Sydney region, and was an impetus for the reconfiguration of the air quality monitoring network.[8]

NSW Government *State of the Environment Reports* (*SOE* Reports)

1.18 The NSW Department of Environment and Conservation (encompassing the Environment Protection Agency) produces a *State of the Environment* report. This report is issued every three years and provides details on the current status of the main environmental issues in New South Wales in accordance with the requirements of section 10 of the *Protection of the Environment Administration Act 1991*.[9] The most recent report, *State of the Environment 2003*, was produced in 2003 and is the fifth such report released in NSW.

5 NSW Government, *City of Cities: A plan for Sydney's future*, Department of Planning, accessed 9 October 2006, <www.metrostrategy.nsw.gov.au>

6 Submission 25, NSW Government, p12

7 Submission 25, Appendix 8

8 Submission 25, Appendix 6. Document listed on publications list at: <www.environment.nsw.gov.au/publications/epa/air.htm>, accessed 9 October 2006

9 NSW Government, *State of the Environment* Reports, Department of Environment and Conservation, accessed 28 September 2006, <www.environment.nsw.gov.au/soe/index.htm>

NSW Government *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region*

1.19 In November 2005, the Department of Environment and Conservation released a report titled *Air Pollution Economics: Health Costs of Air pollution in the Greater Sydney Metropolitan Region*. This report provides information on the health costs of ambient air pollution in Greater Sydney.[10]

NSW Audit Office *Managing Air Quality: Department of Environment and Conservation*

1.20 In April 2005, the Auditor-General released the performance audit report *Managing Air Quality: Department of Environment and Conservation*. The aim of the audit was to examine the NSW Government's efforts to improve air quality, focusing on progress with the *Action for Air* and *Action for Transport 2010* plans.[11]

1.21 The audit also reviewed the Government's efforts to curb motor vehicle usage, encourage greater use of public transport, promote cleaner cars and fuels, and integrate air quality in transport planning.[12]

1.22 The Audit Office made 23 recommendations in its report, and provided the relevant agencies with the opportunity to respond to those recommendations. To date no detailed follow-up work on the performance audit has been undertaken by the Audit Office.[13]

Report structure

1.23 **Chapter 2 Air pollution in the Sydney basin.** This chapter provides an overview of existing air pollutants in the Sydney basin, with detail on their sources and characteristics. Changes in air pollution over the last three decades are detailed.

1.24 **Chapter 3 Impacts of air pollution.** This chapter details the health impacts of air pollution, looking at the effects of particular air pollutants and the susceptibility of groups 'at-risk'. The financial impacts of air pollution are also examined.

1.25 **Chapter 4 Regulatory and policy framework for the management of air quality.** This chapter outlines the policy and regulatory framework for managing air pollution in the Sydney basin, and examines the effectiveness of the framework. Suggestions for improvements to the framework are made.

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10 NSW Government, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region*, Department of Environment and Conservation, 2005, accessed 28 September 2006, <www.environment.nsw.gov.au/publications/epa/air.htm>

11 Audit Office of New South Wales, Auditor-General's Report Performance Audit, *Managing Air Quality: The Department of Environment and Conservation*, 2005, accessed 10 October 2006, <www.audit.nsw.gov.au/publications/reports/performance/2005/air_quality/Airquality-contents.html>

12 Audit Office of New South Wales, p2

13 Mr Bob Sendt, Auditor-General, Audit Office of New South Wales, Evidence, 16 August 2006, p44

1.26 **Chapter 5 Air quality standards and monitoring.** This chapter details the national standards for monitoring air quality and the monitoring network that exists in the Sydney basin. The Committee analyses the efficacy of the standards, monitoring and reporting in relation to air pollution levels.

1.27 **Chapter 6 Specific issues.** This chapter addresses some of the specific air pollution issues of particular concern. The impact of motor vehicle emissions on air pollution is particularly examined.

Chapter 2 Air pollution in the Sydney basin

The composition of air pollution and its severity have changed over the past three decades, due to technological and regulatory changes. In this chapter the Committee outlines the causes and sources of air pollution in the Sydney basin, examines changes over the past three decades and identifies those air pollutants that are of primary concern from a health perspective.

Background

2.1 The New South Wales Parliament first recognised that air pollution in Sydney was becoming a problem in the 1950s. Following the commencement of air quality measurements in 1951, the Parliament established a special committee to investigate 'smoke nuisance' in NSW in 1954. The committee recognised the need to address the growing problem of air pollution and, as a result, legislation containing industrial air pollution control programs was introduced in the form of the *Clean Air Act 1961* (NSW) (the *CA Act),* administered by the then Department of Public Health.[14]

2.2 Following a number of amendments to the *CA Act* and associated Regulation, it became apparent in the mid-1980s that the Act required reform and accordingly the *Protection of the Environment Operations Act 1997* (the *POEO Act*) was introduced.[15] In 1998 the Environment Protection Authority (EPA) released *Action for Air*, a 25-year air quality management plan for the Greater Metropolitan Region of Sydney, the Illawarra and the Hunter. This plan targets key regional pollutants (photochemical smog and fine particles) as well as key pollution sources (industry, motor vehicles and domestic/commercial).[16] The policy and regulatory framework relating to air pollution in New South Wales will be further examined in Chapter 4.

2.3 In this chapter, the Committee outlines the changing aspects and sources of air pollution over the last three decades. Subsequent chapters discuss the health and financial impacts of air pollution, air pollution measurement and reporting standards, the regulatory framework relating to air pollution, the effectiveness of the current laws and programs, and the challenges that face efforts to reduce air pollution.

What is air pollution?

2.4 Air pollution is a generic term used to describe a number of different pollutants in the atmosphere. According to the *POEO Act*, air pollution is the emission of any air impurity, including 'smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists, odours and radioactive substances'.[17]

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14 Submission 25, NSW Government, p9 and Appendix 4

15 Submission 25, p9

16 NSW Government, *Action for Air*, Environment Protection Authority, 1998, accessed 9 October 2006, < http://www.environment.nsw.gov.au/resources/actionair.pdf> (*Action for Air*)

17 *Protection of the Environment Operations Act 1997* (NSW), Section 4

2.5 Within the Sydney basin, specific pollutants in the air include lead, carbon monoxide, nitrogen oxides, sulphur dioxide, a range of fine particles and chemicals.

2.6 In the NSW Government submission to the Inquiry, the two main areas of immediate concern for the Sydney basin were identified as follows:

- to achieve national ozone standards
- to better control particle emissions.[18]

Air pollutants

2.7 The following section describes the main air pollutants of concern in the Sydney basin: photochemical smog (as ozone), fine particles, air toxics, lead, sulphur dioxide, carbon monoxide and nitrogen dioxide.

Photochemical smog (ozone and nitrogen dioxide)

2.8 Photochemical smog is a complex mixture of chemicals, sometimes visible as a white haze. In Sydney, the most significant pollutant components of photochemical smog are ground level ozone and nitrogen dioxide. While ozone is present in both the lower (troposphere) and upper (stratosphere) atmospheres, in the upper atmosphere (more than 10km above the Earth), ozone plays an essential role in protecting plant and animal life from the harmful effects of ultraviolet radiation.[19]

2.9 Ground level ozone is the main concern in the warmer summer months, and nitrogen dioxide in winter. Ozone is considered a secondary pollutant in that it is formed in the atmosphere when two classes of chemical compounds, either reactive organic compounds (ROCs) or volatile organic compounds (VOCs) together with oxides of nitrate (NO_x), react under the influence of sunlight.[20]

2.10 Motor vehicles are the most significant source of pollutants contributing to the formation of ozone in Sydney. In 2003 in the Sydney region, motor vehicle emissions made up 38% of the total VOCs and 71% of NO_x.[21]

2.11 The major sources of VOCs are industrial processes, transport fuels, commercial/domestic users and vegetation.[22]

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18 Submission 25, p4

19 NSW Government, *Action for Air*, p43

20 NSW Government, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region*, Department of Environment and Conservation, 2005, p11, accessed 28 September 2006, <www.environment.nsw.gov.au/publications/epa/air.htm> (*Air Pollution Economics)*; NSW Government, *Action for Air*, p9

21 Submission 25, Appendix 6

22 Submission 24, Commonwealth Scientific and Industrial Research Organisation, p3

2.12 In addition to the sources listed above, ozone can be produced as a result of the chemical reactions that occur between naturally occurring NO_x and the biogenic emissions of VOCs. This can produce natural ozone concentrations at 30% of the national standard.[23]

Fine particles

2.13 Particle (or particulate) air pollution consists of minute solid and liquid particles directly emitted into the air, such as diesel soot, road and agricultural dust, and particles produced through photochemical reactions involving polluting gases that are a by-product of fuel combustion.

2.14 Particle pollution can sometimes be seen as brown haze, particularly in the cooler months of the year. These particles are very diverse in their chemical composition and physical properties, although they are typically less than 50 micrometres (μm) in size and can be smaller than 0.1μm in diameter.[24]

2.15 Particulate matter which is less than 10 micrometres in diameter (a micrometer is 1 millionth of a metre) is also known as 'respirable particles', and is commonly referred to as PM_{10}.[25] Similarly, particles less than 5 micrometres are referred to as PM_5, and less than 2.5 micrometers, $PM_{2.5}$.

2.16 The major source of particle pollution is industry (47%),[26] although it should be noted that in winter, the contribution of solid fuel heaters to particle pollution is significant, at up to 50% on some winter weekends.[27] Mobile sources, particularly diesel motor vehicles, contribute to just under 20% of particles in Sydney. Other sources include industry, domestic solid fuel heaters and open burning such as bushfires and backyard burning.[28] High levels of particle pollution are recorded during extreme weather conditions such as bushfires and dust storms.[29]

2.17 The Department of Environment and Conservation (DEC) advised that there is no discernible trend in the levels of $PM_{2.5}$ concentrations in the Sydney basin. However, DEC further advised that 'the levels of both PM_{10} and $PM_{2.5}$ will decrease as the new fuel standards are introduced and new motor vehicles standards penetrate the market'.[30]

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23 Submission 24, p4

24 NSW Government, *Action for Air*, pp11-12; Department of Environment and Conservation, *Air Pollution Economics*, p9

25 Department of the Environment and Heritage, <www.npi.gov.au/epg/npi/contextual_info/glossary.html> (accessed 18 October 2006)

26 Department of Environment and Conservation, *Air Pollution Economics,* p6

27 NSW Government, *Action for Air*, p12

28 Submission 25, Appendix 6, p2

29 NSW Government, *State of the Environment 2003* Report, Department of Environment and Conservation, Chapter 3, accessed 28 September 2006, <www.environment.nsw.gov.au/soe/index.htm> *(SOE 2003* Report)

30 Answers to questions on notice taking during evidence 11 September 2006, Department of Environment and Conservation, Question 2, p1

2.18 While the NSW Government has a reporting standard for larger particles (PM_{10}), there is no reporting standard for finer particles ($PM_{2.5}$), only an advisory reporting standard. *Action for Air* stated that, as there is no established threshold for fine particles where there are no negative health effects, setting a standard is difficult. The report also stated that the World Health Organisation (WHO) did not have specific goals for this reason.[31] It should be noted, however, that in October 2006, WHO released new guidelines for air pollution, which included guidelines for PM_{10} and $PM_{2.5}$.[32]

2.19 Concern is also growing in relation to the health risks of finer particles ($PM_{2.5}$ and PM_{1}), as these can travel into the lower respiratory tract and lodge in the very small airways of the lungs.[33] These issues will be further examined in Chapters 3 and 5.

Air toxics

2.20 'Air toxics' is a general term referring to a broad range of highly toxic chemical pollutants that pose significant health risks at low concentrations, accumulating in the human body and leading to chronic health impacts such as cancer. Air toxics consist of a number of heavy metals and inorganic and organic chemical compounds, such as dioxins, benzene, 1,3-butadiene and polycyclic aromatic hydrocarbons (PAHs).[34]

2.21 The Commonwealth Environment Protection and Heritage Council (EPHC) defines air toxic substances as:

> … gaseous, aerosol or particulate pollutants which are present in the air in low concentrations with characteristics such as toxicity or persistence so as to be a hazard to human, plant or animal life.[35]

2.22 The EPHC also noted that there is growing international recognition of the potential health risks associated with exposure to air toxics and of the need for action to minimise these risks:

> There is evidence that cancer, birth defects, genetic damage, immunodeficiency, respiratory and nervous system disorders can be linked to exposure to occupational levels of air toxics.[36]

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31 NSW Government, *Action for Air*, p15

32 World Health Organisation, *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide*, October 2006, p9

33 Department of Environment and Conservation, *SOE 2003* Report, Chapter 3; Submission 24, p4

34 Submission 24, p4; Submission 32, Western Sydney Region Organisation of Councils Ltd, p4; Submission 25, appendix 2, p44; Department of Environment and Conservation, *Air Pollution Economics*, p15

35 Environment Protection and Heritage Council, <www.ephc.gov.au/nepms/air/air_toxics.html> (accessed 6 October 2006)

36 Environment Protection and Heritage Council, <www.ephc.gov.au/nepms/air/air_toxics.html> (accessed 6 October 2006)

2.23 The *State of the Environment 2003* Report (*SOE 2003* Report) noted that there is growing concern worldwide that air toxics have the potential to adversely affect human health and the environment, even at relatively low concentrations.[37]

2.24 The *SOE 2003* Report also reported that an EPA study measured more than 80 air toxic compounds in NSW and found that ambient levels for most were very low. It was found that 23 of the compounds were never, or rarely, detected. However, taking into account the levels detected and individual toxicities, the compounds of most significance for NSW were benzene, 1,3-butadiene and PAHs. In the Sydney central business district, benzene was found to be the most problematic air toxic.[38]

Specific air toxics

2.25 The air toxics in the Sydney basin include benzene, 1,3-butadiene, PAHs, toluene and xylene.[39]

2.26 Benzene is a colourless, liquid, flammable, aromatic hydrocarbon that is a component of petrol or may result from incomplete combustion of fuels. The major source of benzene is motor vehicles, through vehicle exhaust and evaporative emissions. Personal exposure to benzene also occurs through smoking.[40]

2.27 Benzene is naturally broken down by chemical reactions within the atmosphere. The length of time benzene vapour remains in the air varies between a few hours and a few days, depending on environmental factors, weather and the concentration of other chemicals (such as nitrogen and sulphur dioxide) in the air.[41]

2.28 1,3-butadiene is a colourless gas, as a major product of the petrochemical industry, is used in the manufacture of synthetic rubber, latex paints and nylon.[42]

2.29 PAHs are a group of several hundred organic chemicals made solely of hydrogen and carbon and containing at least two fused aromatic rings. PAHs are formed mainly as a result of the incomplete combustion of organic materials during human activities such as the processing of coal and crude oil, combustion of natural gas, combustion of refuse, vehicle traffic and tobacco smoke, and natural processes such as carbonisation. In the air, they are generally found attached to particulate matter.[43]

2.30 Toluene is a colourless aromatic liquid, derived from coal tar or from petroleum refining, and is widespread in the environment due to its use in a variety of commercial and household products, and from tobacco smoke and motor vehicle exhaust.[44]

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37 Department of Environment and Conservation, *SOE 2003* Report, Chapter 3

38 Department of Environment and Conservation, *SOE 2003* Report, Chapter 3

39 Department of Environment and Conservation, *Air Pollution Economics*, p16

40 Department of Environment and Conservation, *Air Pollution Economics*, p17

41 Department of Environment and Conservation, *Air Pollution Economics*, p16

42 Department of Environment and Conservation, *Air Pollution Economics*, p17

43 Department of Environment and Conservation, *Air Pollution Economics*, p18

44 Department of Environment and Conservation, *Air Pollution Economics*, p18

2.31 Xylene is one of the family of isomeric, colourless, aromatic hydrocarbon liquids produced by the distillation of coal, refining of petroleum and is a component of vehicle exhaust. It is also a common component in household products.[45]

Lead

2.32 Lead is a toxic metal that can damage human health when inhaled or ingested, and is known to cause learning disabilities and to retard mental development in children. The main sources of lead in the air are vehicles fuelled by lead petrol and base-metal works.[46] There has however, been a significant decline in the levels of airborne lead following the introduction of a number of lead reduction programs since the 1960s and the phasing out of leaded petrol in the 1980s.[47]

2.33 The *SOE 2003* Report stated that, with a complete ban on lead in petrol, the primary source of lead in air at the regional scale has been eliminated. Using current methodology, it was reported that ambient levels of lead are now frequently below detection limits and it was envisaged that in the near future there would no longer be a need to routinely monitor for lead in the atmosphere.[48]

2.34 Associate Professor Chris Winder, School of Safety Science, University of New South Wales, in evidence to the Committee, suggested however that the lead alternative, manganese, is a pollutant that may be a future concern:

> One pollutant to keep a watching brief on is manganese, as it may be being used as a replacement for lead in petrol. I consider that in the long term, manganese would be worse than lead as an environmental pollutant.[49]

Sulphur dioxide

2.35 Sulphur dioxide can irritate the respiratory system, contributing to diseases such as chronic bronchitis. Ambient sulphur dioxide in NSW results largely from combustion of fossil fuels and smelting of mineral ores containing sulphur. Major sources are power stations, oil refineries and base-metal processing plants.[50]

2.36 In its submission to the Inquiry, the NSW Government advised that sulphur dioxide concentrations are well below the national standard in Sydney. This is due to the availability and use of low sulphur fuels and the closure of major point sources, such as the copper smelter at Port Kembla.[51]

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45 Department of Environment and Conservation, *Air Pollution Economics*, p19

46 NSW Government, *Action for Air*, p44

47 Submission 24, p3

48 Department of Environment and Conservation, *SOE 2003* Report, Chapter 3

49 Answers to questions on notice taken during evidence 16 August 2006, Associate Professor Chris Winder, Question 1, p1

50 NSW Government, *Action for Air*, pp44-45

51 Submission 25, p5

Carbon monoxide

2.37 Carbon monoxide is a clear odourless gas produced by the incomplete combustion of organic compounds. It is an asphyxiant that reduces the oxygen carrying capacity of the blood, placing additional strain on the heart as it increases its output to compensate, and impairs perception and judgement at low levels.[52] While there has been a reduction in the levels of carbon monoxide in the Sydney central business district, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) noted that there is 'growing appreciation of the significance of the role played by carbon monoxide in photochemical smog formation'.[53]

Nitrogen dioxide

2.38 Nitrogen dioxide is mainly formed through fuel combustion in motor vehicles and industry and is an important constituent of photochemical smog. High levels are also found indoors when unflued gas appliances are used.[54] The issue of indoor air pollution from unflued gas heaters is further examined in Chapter 6.

Greenhouse gas emissions

2.39 Greenhouse gases are gases that contribute to global warming, and comprise a number of the specific pollutants described above.

2.40 In its submission to the Inquiry, the Western Sydney Regional Organisation of Councils Ltd (WSROC) raised greenhouse gas emissions, such as carbon dioxide, methane and nitrous oxide, as pollutants of concern.[55]

2.41 The NSW Government noted that transport activity currently contributes to approximately 12% of greenhouse emissions in NSW,[56] and WSROC claimed that this is growing in significance faster than contributors from other sectors (such as energy generation activities).[57]

Changes in air pollution in the Sydney basin over the last three decades

2.42 Over the past three decades, the major causes of pollution have changed. Some pollutants have been better controlled (such as industrial emissions) or eliminated altogether (such as emissions from backyard burning and leaded petrol). Population growth, the growth in the

52 NSW Government, *Action for Air*, p44; Department of Environment and Conservation, *Air Pollution Economics*, p14

53 Submission 24, p3

54 Submission 24, p3; Submission 25, Appendix 11

55 Submission 32, Western Sydney Regional Organisation of Councils Ltd, p4

56 NSW Government, *Action for Air*, p20

57 Submission 32, p10

state's economy and the continued growth in motor vehicle ownership have resulted in significant changes to the dynamics of air pollutants.[58]

2.43 In giving evidence to the Committee, Mr Chris Eiser, Manager, Atmospheric Science, DEC stated that 'our air is much cleaner that it was in the 1960s and even in the 1980s from all the measurements we have taken of the ambient [atmosphere]'.[59]

2.44 In the 1950s and 1960s, when air quality became an issue of concern, the focus was primarily on inner-city power stations, gas works, oil refineries and chemical works and factories. As Sydney expanded in the 1970s, the focus shifted to other pollutants, including carbon monoxide, lead and photochemical smog. In the 1980s, as the number of industrial developments outside Sydney (particularly in the Hunter) grew, city power stations closed and industry moved offshore, the focus within Sydney switched to control of motor vehicle emissions, which has remained a focus for subsequent years.[60]

2.45 In its submission, the NSW Government noted that major improvements have been made through:

> Significantly reducing air pollution from industrial sources through stronger and more effective regulation in the *Protection of the Environment Operations Act 1997* and the Clean Air Regulations.
>
> Reducing harmful emissions from motor vehicles through the introduction of unleaded petrol and cleaner fuels, particularly since 2000, and progressively cleaner vehicles (including a recent shift to new ultra-clean hybrid technologies).
>
> Reducing other sources of air pollution by banning backyard burning and tightening emission standards on home wood heaters and providing education to householders on how to run them.[61]

2.46 Notwithstanding the above, the NSW Government advised that a number of challenges in controlling air pollution still exist in relation to ozone levels, particle emissions, managing the impacts of climate change and managing air quality in road tunnels:

> To achieve national ozone standards. Sydney's ozone pollution is caused by the complex mix of emissions of volatile organic compounds and oxides of nitrogen, as well as the meteorology and the unique topography of the Sydney basin. Growth in car ownership continues to make achieving the standards a significant challenge.
>
> To better control particle emissions, particularly in light of emerging concerns about the health impacts of fine particles.
>
> To manage possible climate change impacts that may exacerbate bushfires and dust storms, which contribute to particle pollution and may lead to increased numbers of summer ozone episodes.

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58 Submission 25, p10

59 Mr Chris Eiser, Manager, Atmospheric Science, Department of Environment and Conservation, Evidence, 16 August 2006, p9

60 Submission 25, Appendix 3, p1

61 Submission 25, p4

To manage air quality in road tunnels.[62]

2.47 The Committee notes that the evidence received to the Inquiry broadly agrees that the air quality has improved over the last three decades.

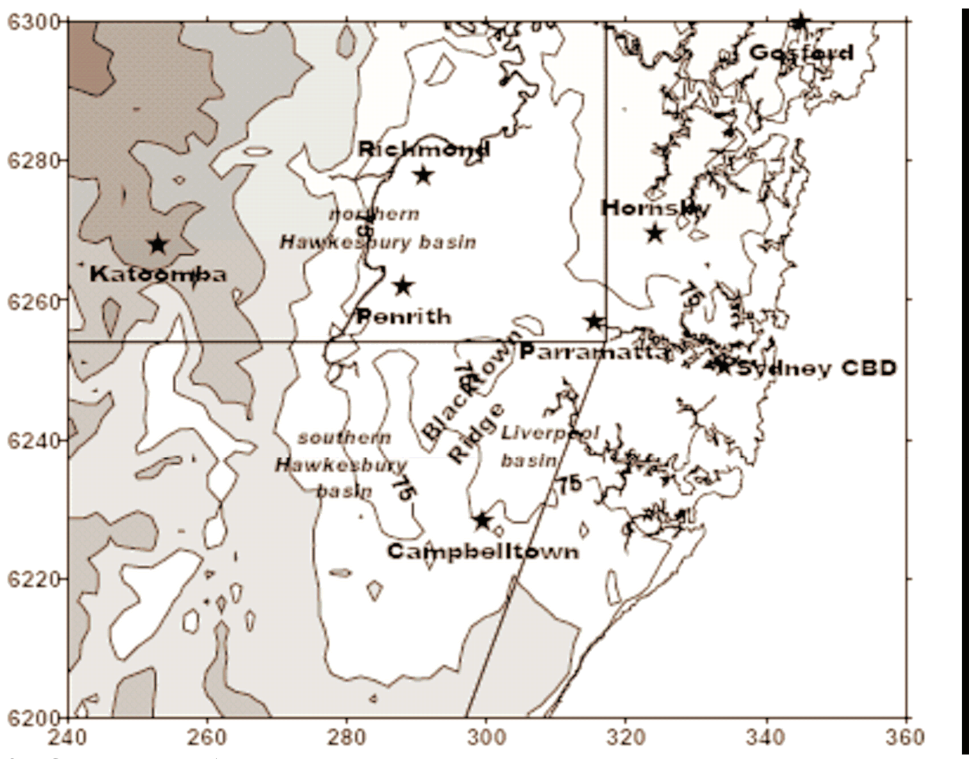
2.48 Chapter 4 of this Report further outlines the regulatory framework and its impact on air pollution over the last three decades.

The Sydney basin and related 'hot-spots'

2.49 In geological terms, the Sydney basin bioregion lies on the central east coast of NSW and covers an area of approximately 3,624,008 hectares, occupying about 4.53% of NSW. The bioregion extends from just north of Batemans Bay to Nelson Bay on the central coast, and almost as far west as Mudgee.[63]

2.50 However, the evidence received by the Committee focused on the Sydney region as shown in the map at figure 2.1, rather than the geographical structure of the Sydney basin. The lighter shaded areas represent lower altitude land and form the 'bottom' of the Sydney basin:

Figure 2.1 The Sydney Region



Source: Submission 25, NSW Government, Appendix 6, p1

62 Submission 25, p4

63 Department of Environment and Conservation <www.nationalparks.nsw.gov.au/npws.nsf/Content/Sydney+Basin+Bioregion> (accessed 18 October 2006)

2.51 The topography of Sydney and its surrounds forms a basin-like structure bound by elevated terrain to the north, west and south.[64] The Blacktown Ridge separates the Hawkesbury Basin, in the west of the region, from the rest of the Sydney region. Sydney's meteorology and unique topography exacerbates the existing air pollution problem in the Sydney basin.

2.52 The Sydney region is bounded by the Blue Mountains in the far west and is ideally shaped to capture polluted air when temperature inversions apply. Sea breeze air movement from the east tends to generate stagnant pools of polluted air, which form at the western end of the plain and, in particular, in the western and south-western parts of Sydney.[65]

2.53 In evidence to the Committee, Ms Sally Barnes, Acting Director-General, DEC, acknowledged that air pollution challenges existed in Sydney and commented that Sydney's climatic conditions and meteorology played a part in the air pollution problem:

> We have challenges we have to tackle. We have to keep tackling smog, indeed, but there are exceptional things about Sydney which make our challenges different to Melbourne, different to Adelaide, different to any other major city. If you are going to design a city to minimise air pollution you would not put a city where Sydney is.[66]

'Hot-spots' in the Sydney basin

2.54 The Inquiry's term of reference (a) is to inquire into and report on the health impacts of air pollution in the Sydney basin, particularly in relation to 'changes in the emissions of various air pollutants and the impact of those changes on air quality in the Sydney basin over the past three decades, including any 'hot-spots' where pollution is concentrated'.

2.55 While the Committee did not receive evidence from NSW Health or DEC regarding specific 'hot-spots' in the Sydney basin, some Inquiry participants highlighted areas they believe to be pollution 'hot-spots'.

2.56 In its submission to the Inquiry, WSROC stated that, due to Sydney's size and location, poor air quality is exacerbated under certain meteorological conditions, such as the development of local winds in response to terrain features. WSROC concluded therefore, that air quality can vary from one part of the region to another and, during the day, within various wind flows.[67]

2.57 In evidence to the Committee, Mr Mark Curran, President of community action group Residents Against Polluting Stacks, stated that 'there is now good evidence that pollution impacts are localised', indicating that 'hot-spots' within Sydney do exist. [68]

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64 Submission 17, The Western Sydney Alliance, p4

65 Submission 36, Planning Institute of Australia, pp3-4; Submission 24, p3; Submission 17, p4; Submission 37, Holroyd City Council, p1; Answers to questions on notice taking during evidence 16 August 2006, Department of Environment and Conservation, Question 1, p1

66 Ms Sally Barnes, Acting Director-General, Department of Environment and Conservation, Evidence, 16 August 2006

67 Submission 32, p9

68 Mr Mark Curran, President, Residents Against Polluting Stacks, Evidence, 16 August 2006, p52

2.58 Mr Nicolas Bleszynski, Media Coordinator, Asthma Foundation New South Wales highlighted the south-west of Sydney as being a problem area for air pollution in the Sydney basin.[69] The Western Sydney Alliance similarly highlighted that levels of air pollution are greater in western and south-western Sydney than other parts of the basin, with specific 'hot-spots' occurring in the areas of Bringelly and Badgerys Creek.[70]

2.59 Ms Janette Baros, a concerned citizen, also stated that Sydney's topography and meteorology traps pollution and creates a pollution 'hot-spot' in the 'western-south western Sydney basin':

> The Sydney basin is a classic "closed" basin, bounded by high terrain to the south, west and north, and by temperature differentials between land and ocean on the eastern side. Trapped pollution may accumulate and circulate inside the basin … until a strong wind, such as a "southerly buster" or strong westerlies, flushes 'dirty' air out of the basin. Temperature inversions exacerbate the smog trap situation with relative frequency.[71]

2.60 The draft report on *Regional Air Quality and Greenhouse Issues Affecting Development of North West and South West Sectors* prepared by the then Department of Infrastructure, Planning and Natural Resources (DIPNR) and the Environment Protection Authority (EPA) identifies south-west Sydney as having peak ozone concentrations significantly above the Sydney average and up to 75% above the national standard.[72]

Ozone in the Sydney basin

2.61 In its submission to the Inquiry, the NSW Government noted that Sydney's topography and meteorology is of particular concern in relation to the formation of ozone in western Sydney:

> Emissions of oxides of nitrogen and VOCs produced by morning peak hour traffic and other sources can be transported offshore. In the presence of sunlight they begin to react to form ozone and with the arrival of the sea breeze the reacting plume is transported across the Sydney basin arriving in western Sydney mid to late afternoon.[73]

2.62 Furthermore, the Government noted that as the population of western Sydney increases, more people may be exposed to concentrations that are above the national standard. Exceedances of the ozone standard predominantly occur in the south-west and north-west of Sydney.[74]

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69 Mr Nicolas Bleszynski, Media Coordinator, Asthma Foundation New South Wales, Evidence, 16 August 2006, p25

70 Submission 17, p8

71 Submission 34, Ms Janette Baros, p2

72 NSW Government, *Regional Air Quality and Greenhouse Issues Affecting Development of North West and South West Sectors*, Department of Infrastructure, Planning and Natural Resources, p6, accessed 9 November 2006, <http://www.metrostrategy.nsw.gov.au/uploads/Air_Quality_Summary_Report_NW&SW.pdf>

73 Submission 25, Appendix 6, pp1-2

74 Submission 25, Appendix 6, p2

2.63 WSROC stated that a key contributor to the peak ozone levels in western Sydney is the Sydney sea breeze, particularly in the summer months when the area becomes a 'hot-spot' where pollution is concentrated:

> The sea breeze often develops in the late morning to early afternoon from the north-east. The breeze then arrives in Western Sydney in mid to late afternoon with increased ozone levels, and the "aged" photochemical smog concentrations can increase as fresh emissions are mixed into the air as it travels across the basin.[75]

2.64 The CSIRO concluded that in summer when the temperature and sunlight are optimum, and due to ozone's complex formation (both naturally occurring and from emissions), ozone remains a very difficult pollutant to control in Sydney.[76]

Particles in the Sydney basin

2.65 In evidence to the Committee, Mr Eiser, DEC, commented that extreme natural events add to particle levels in Sydney, particularly during times of drought, dust storms and bushfires.[77]

2.66 In its submission to the Inquiry, the NSW Government noted that, as the formation of particles is different from ozone, in that particles are predominantly a primary pollutant emitted directly from a source, exceedences of the national standards could occur in any part of Sydney:

> Most exceedences of the NEPM standard for particles (PM_{10}) occur as a result of extreme events such as bushfires, dust storms and large-scale hazard reduction burning. As a result of the arbitrary nature of events of this type, exceedences can occur anywhere in Sydney.[78]

2.67 WSROC commented that the outer fringe areas such as Baulkham Hills and Hawkesbury have high levels of particulate pollution due to bushfire and backyard burning.[79]

2.68 In its submission to the Inquiry, the Campbelltown City Council stated that an additional contributing factor to particulate air pollution in the area is Campbelltown's proximity to the Blue Mountains to the west and the ranges to the south, and consequent prevailing wind patterns:

> These topographical features have the effect of preventing the dispersal of fine particle pollution transported from other parts of the Sydney Basin and therefore increasing the level of localised air pollution.[80]

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75 Submission 32, p9

76 Submission 24, p4

77 Mr Eiser, Evidence, 16 August 2006, p9

78 Submission 25, Appendix 6

79 Submission 32, p10

80 Submission 19, Campbelltown City Council, p5

Sources of air pollution

2.69 There is a range of natural and anthropogenic (human made) causes of air pollution in the Sydney basin, including heavy and light industry, motor vehicle emissions, bushfires and hazard reduction burning, indoor air pollution and natural emissions from vegetation which create VOCs, a precursor to the formation of ozone.[81] In this Inquiry, the Committee has focused on anthropogenic sources of air pollution.

2.70 Anthropogenic sources include the burning of fuel such as in combustion-fired power plants, controlled burning in agriculture and forestry management, internal combustion engines, and wood, coal, fuel oil or natural gas burning fireplaces, stoves, furnaces and incinerators. Other anthropogenic sources include oil refining, general industrial activity, chemicals, dust and crop waste burning in farming, and fumes from paint, varnish, aerosol sprays and other solvents.

2.71 Natural sources of air pollution include dust from natural sources, methane emitted by the digestion of food by animals, certain trees that emit volatile organic compounds and smoke, carbon monoxide and particles from bushfires.

2.72 DEC uses various data sources (pollution inventories) to estimate emissions from pollution sources and is currently undertaking a comprehensive update of air emission inventories in the Greater Metropolitan Region. In evidence to the Committee, Mr Nigel Routh, Manager, Air Policy, DEC, advised that the new inventory will be released in 2007 and that it will be used to 'underpin future air quality management strategies'.[82]

2.73 In addition to these causes listed above, as mentioned in paragraphs 2.51 to 2.60, the features of Sydney's typography and meteorology influence the build up of pollution across the city and in the areas where the highest levels occur.

Motor vehicles

2.74 The three-year *Metropolitan Air Quality Study (MAQS)* undertaken by the Environment Protection Agency released in 1996 showed that motor vehicles continued to be the leading source of emissions for a range of emissions in the Sydney basin.[83]

2.75 Motor vehicles remain the most significant source of precursor pollutants for ozone in Sydney, and are the dominant source of carbon monoxide and nitrogen oxides (71%).[84] Motor vehicles are also a significant source of particle pollution, with just under 20% of particles coming from mobile sources.[85]

2.76 In its submission, the Environmental Defender's Office (NSW) (EDO) cited a 1997 report commissioned by the Commonwealth Department of Environment and Heritage which found

81 NSW Government, *Action for Air*, p10

82 Mr Nigel Routh, Manager, Air Policy, Department of Environment and Conservation, Evidence, 16 August 2006, p33

83 Submission 28, Southern Sydney Regional Organisation of Councils, p2

84 Submission 25, p11

85 Submission 25, Appendix 6, p2

that motor vehicles contributed up to 85% of carbon monoxide emissions, 90-97% of airborne lead and 3-11% of sulphur dioxide.[86]

2.77 Accordingly, the NSW Government's 25-year *Action for Air* plan identifies a reduction of emissions from motor vehicles as being of 'the highest priority'.[87]

2.78 Since the 1980s, there have been significant reductions in lead, sulphur dioxide, nitrogen dioxide and carbon monoxide emissions from motor vehicles through the introduction of unleaded petrol in 1986 and exhaust catalyst technology, and the subsequent banning of leaded petrol in 2002 in NSW.[88] Furthermore, a 1% benzene limit in fuel has been in force since 1 January 2006 (previously 3%).[89]

2.79 Despite these improvements, pollution caused by motor vehicles remains high.[90] The decline in motor vehicle emissions is offset by an increase in the number and usage of motor vehicles and increased vehicle kilometres travelled (VKT).[91]

2.80 The impact of increased motor vehicle use and inadequate public transport infrastructure are examined in further detail in Chapter 6.

Industrial sources

2.81 In its submission to the Inquiry, the EDO, citing the *SOE 2003* Report, stated that industrial works have long been identified as significant contributors to air pollution and gas emissions, contributing 40% of particle emissions in Sydney, the majority of sulphur dioxide, and 60% of oxides of nitrogen (a constituent of ozone).[92]

2.82 However, it should be noted that, due to tighter controls on industry through the *CA Act* and the *POEO Act* since the 1980s, industrial air emissions have reduced significantly.[93]

2.83 As mentioned in paragraphs 2.35 and 2.36, concentrations of sulphur dioxide in the Sydney basin have declined following the siting of coal fired power stations away from the Sydney

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86 Australian Academy of Technological Sciences and Engineering, *Urban air pollution in Australia - Community Summary*, cited in Submission 10, Environmental Defender's Office (NSW), p5

87 NSW Government, *Action for Air: An update September 2002*, Environment Protection Agency, September 2002, p3, accessed 16 October 2006, <www.environment.nsw.gov.au/resources/update.pdf>

88 Submission 25, p18; Submission 10, p3; Submission 24, p3

89 Answers to questions on notice taking during evidence 16 August 2006, Department of Environment and Conservation, Question 33, p10

90 Submission 29, Asthma Foundation New South Wales, p1

91 Submission 27, Residents Against Polluting Stacks, p1; Submission 25, Appendix 6, p2; Submission 10, p10; Submission 32, p13; Submission 34, p4; Submission 24, p3

92 Submission 10, p6

93 NSW Government, *Action for Air: 2006 Update*, Department of Environment and Conservation, 2006, p18, accessed 9 October 2006, <www.environment.nsw.gov.au/resources/actionforair06465.pdf>

region.[94] For example, total anthropogenic emissions of sulphur dioxide during 2003 in the Sydney region were estimated at around 13,800 tonnes per annum, which is only 4.6% of the total anthropogenic sulphur emissions for the Greater Metropolitan Region. However, higher concentrations are observed in the Illawarra and lower Hunter regions as a result.[95]

2.84 In addition to large industry, sources also include lesser polluting industries and commercial premises such as panel beaters, spray painters, charcoal chicken outlets, dry cleaners, printers, auto-dismantlers, motor vehicle repair and service shops and petrol stations.[96] In response to this, DEC established a Cleaner Industries Unit (now called the Business Partnerships Section) in 1998 to improve the environmental performance of businesses not licensed by DEC.[97]

2.85 The Kingsford Smith airport is a major single source of industrial air pollution, responsible for 2% of all nitrogen dioxide emissions and 3.2% of all sulphur dioxide emissions in the Greater Metropolitan Region. In addition to the aircraft emissions, Ms Baros highlighted the fact that more than 95% of access to the Sydney airport is by road, therefore increasing the amount of pollution generated by the airport.[98]

Bushfires and hazard reduction burning

2.86 The reduction in open burning and the ban on backyard incinerators has removed a previously significant source of fine particles in the air since the late 1980s. The key smoke management issues now are in relation to hazard reduction burns.[99]

2.87 Smoke from bushfires and hazard reduction burning is made of tiny particles of water vapour and gases, including carbon dioxide, carbon monoxide, nitrogen oxides and VOCs. When the nitrogen oxides and hydrocarbons react with sunlight, ozone is formed, creating further air pollution problems.[100]

2.88 The *SOE 2003* Report suggests that peak concentrations of ambient levels of fine particle concentrations, such as PM_{10}, are largely dominated by bushfires.[101]

2.89 The Committee acknowledges that bushfires are an unavoidable consequence of Sydney's geographical location and climate, and hazard reduction burning is a necessary tool to minimise the damage that bushfires can cause.

94 Submission 24, p3; Submission 25, p5

95 Submission 25, Appendix 3, p5

96 Submission 28, p5

97 NSW Government, *Action for Air: 2006 Update*, p20

98 Submission 34, p4

99 Submission 24, p4; NSW Government, *Action for Air: 2006 Update*, p22

100 Submission 29, p9

101 Submission 24, p4

Domestic sources

2.90 Homes are a significant source of VOCs and fine particle emissions. Solid fuel heaters, particularly wood heaters, contribute 50% of particulate matter in Sydney during an average winter weekend.[102] This can be two to three times as much particle pollution as produced by motor vehicles.[103] Following a review of the *POEO Act* in 2005 (discussed in Chapter 4), the NSW Government has tightened emission standards on home wood heaters and has been working with local councils on the reduction and correct usage of solid fuel heaters.[104]

2.91 Air pollution is also caused from a range of other domestic pollution sources such as gas-fired stoves and unflued gas heaters (a heater without a chimney), public and private barbeques, petrol lawnmowers and garden tools and household chemicals and paints. The 1996 *MAQS* estimated that lawnmowers generated approximately 10% of the total VOCs and 9% of the total benzene emissions in the Greater Metropolitan Region over a summer weekend.[105]

2.92 In evidence to the Committee, Mr Jeff Mann, Air Quality Practice Leader, Clean Air Society of Australia and New Zealand, stated that gas-fired stoves and unflued gas heaters were the two common sources of nitrogen dioxide in the home, particularly in the winter months when the house is sealed up and the pollutants are trapped indoors:

> In winter most people try and ensure that when they warm up the house they close it up or button up their house. This buttoning up of the house means that ventilation is minimised and pollutants which have built up inside the house stay inside the house.[106]

2.93 Mr Mann further advised that unflued gas heaters can result in 'multiple exposures to nitrogen dioxide well in excess of national ambient air quality goals and World Heath Organisation guidelines' and that, while the health impacts are known, they are not quantified.[107]

2.94 Issues regarding unflued gas heaters and solid fuel heaters are further examined in Chapter 6.

Tobacco smoke

2.95 Environmental Tobacco Smoke (ETS) is a major source of indoor air pollution, and it affects smokers and non-smokers. The Commonwealth Department of Health and Ageing stated that 'the particles in the unfiltered smoke from a burning cigarette tip can be finer and more concentrated, meaning that they can be inhaled deeper into the lungs and stay longer in the

102 NSW Government, *Action for Air*, p12

103 Submission 29, p10

104 NSW Government, *Action for Air*, p12, p21

105 Submission 28, p5; NSW Government, *Action for Air: 2006 Update*, p21

106 Mr Jeff Mann, Clean Air Society of Australia and New Zealand, Evidence, 16 August 2006, p60

107 Mr Mann, Evidence, 16 August 2006, p60

body of the passive smoker'.[108] Tobacco smoke contains a number of pollutants, including benzene, PAHs, toluene and 1,3-butadiene.[109]

2.96 The health impacts of tobacco and the steps that have been taken to reduce exposure to ETS are examined in Chapters 3 and 4.

Committee comment

2.97 The Committee notes that there has been an overall improvement in air quality over the last three decades, particularly in the reduction of four out of six of the National Environment Protection Measures for Ambient Air Quality (discussed in Chapter 5). However, there remain significant challenges in reducing the impact of two of the National Environment Protection Measures for Ambient Air Quality pollutants – photochemical smog and particle pollution.

2.98 The Committee notes with concern that the proposed future development for Sydney, as described in strategic planning documents such as the Metropolitan Strategy, involves expansion of those urban areas that are already considered air pollution 'hot-spots'. The Committee notes that the Metropolitan Strategy *Planning Report for the South West Growth Centre* does not adequately address the issue of air pollution 'hot-spots' in the south west growth area, either in identification of the extent of the air pollution issue or in identifying mechanisms for mitigating the negative impact of development of the growth sector on air pollution levels.[110]

2.99 The Committee believes that the NSW Government has a responsibility to explicitly address this issue and to ensure that future development does not contribute adversely to air pollution 'hot-spots'.

Recommendation 1

That the Department of Planning develop and implement a strategy to address the impact of the location of future urban development in existing air pollution 'hot-spots'. The strategy should also include detail on providing information to residents of these areas on ways to minimise the health impacts of the increased air pollution.

108 NSW Health, *The dangers of passive smoking*, accessed 18 October 2006, <www.health.gov.au /internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-drugs-tobacco-resources.htm/ $FILE/tobcfacts_passive.pdf>

109 Department of Environment and Conservation, *Air Pollution Economics*, pp16-18

110 NSW Government, *Planning Report for the South West Growth Centre*, Department of Planning, Sydney, 2005, accessed 9 November 2006, <www.metrostrategy.nsw.gov.au/dev/ViewPage.action? siteNodeId=33&languageId=1&contentId=382>

Recommendation 2

That the Department of Environment and Conservation develop and implement a targeted strategy to reduce air pollution in the 'hot spots' identified in south and western Sydney.

2.100 This chapter has described the various air pollutants and their sources. Subsequent chapters will examine in greater detail the health impacts of those pollutants and the effectiveness of the current regulatory framework in maintaining and improving air quality.

Chapter 3 Impacts of air pollution

The Committee received evidence from a wide section of the community in relation to the significant health and financial costs of air pollution. A recent NSW report concluded that air pollution caused between 643 – 1,446 deaths annually in the Sydney region, and that a 'conservative estimate' of the health related financial costs due to air pollution was between $706 million and $5,994 million per annum.[111] In this chapter, the Committee will outline the health impacts of air pollution, and the associated financial impacts on the NSW health system. The susceptibility of certain 'groups at risk' from air pollution is also considered.

Health impacts of air pollution

3.1 Dr Denise Robinson, Chief Health Officer, NSW Health, advised the Committee that air pollution was a contributor to between 600 to 1,400 deaths per year of people who suffered diseases such as asthma, chronic airways diseases and cardiovascular diseases.[112] Dr Robinson drew this estimate from the Department of Environment and Conservation's 2005 report titled *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region* (*Air Pollution Economics*).

3.2 NSW Health advised the Committee that these estimates are derived from 'observed associations between concentrations of particulate matter pollution and mortality'.[113] However, NSW Health also states that 'individuals whose deaths are caused solely by air pollution are unlikely to be identifiable'.[114]

3.3 The Committee received extensive evidence, both at its hearing and in written submissions, relating to the considerable health impacts on the community due to air pollution. In evidence to the Committee Dr Michael Staff, Director of Environmental Health, NSW Health, agreed that air pollution does have health impacts on the population:

> … we would agree that air pollution does have health effects … What we would expect is that efforts would be taken to minimise those impacts.[115]

3.4 Dr Staff explained to the Committee that it can be difficult to determine what role air pollution has in exacerbating a particular health condition, and that there may be a number of factors involved:

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111 NSW Government, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region*, Department of Environment and Conservation, 2005, p43, p56, accessed 28 September 2006, <www.environment.nsw.gov.au/publications/epa/air.htm> (*Air Pollution Economics*)

112 Dr Denise Robinson, Chief Health Officer, NSW Health, Evidence, 11 September 2006, p16

113 Answers to questions taken on notice during evidence 11 September 2006, NSW Health, Question 2, p1

114 Answers to questions taken on notice during evidence 11 September 2006, NSW Health, Question 2, p1

115 Dr Michael Staff, Director of Environmental Health, NSW Health, Evidence, 11 September 2006, p13

> The issue is that with most health conditions there are multiple factors that cause that, and particularly in environmental health it is hard to sort out exactly what is the attributable portion of different parts. So traditionally in environmental health we rely more on looking at the exposure that people have … then we use our health-based research … looking at the relationships between exposures to those levels and the health outcomes, and then bringing those two bits together to predict the actual health impacts.[116]

3.5 Dr Staff also noted that looking back over the past century, due to a reduction in the number of deaths caused by infectious diseases, people are living longer and are more exposed to air pollution. In this regard, people are more likely to experience general heart or lung problems, chronic diseases, diabetes or ischaemic heart diseases.[117]

3.6 General health impacts caused by air pollution include respiratory disease, asthma, heart disease, personal irritations and learning difficulties in children.[118]

3.7 In its submission to the Inquiry, the Lane Cove Tunnel Action Group Inc (LCTAG) advised that air pollution has a two-fold health impact, in that exposure affects the respiratory tract and exacerbates existing conditions:

> Airborne pollutants not only have the effect of sensitizing the respiratory tract directly but will augment the specific hypersensitivity response to known allergens.[119]

3.8 The NSW Government submission to the Inquiry advised that research in Sydney is consistent with overseas research in demonstrating increased mortality, hospital admissions and attendances, increased blood levels, and reduced birth weight associated with air pollution.[120]

3.9 In its submission the Asthma Foundation New South Wales cited a study by the Australian Bureau of Transport and Regional Economics which found that, in 2000, car-related air pollution caused between 900 and 2000 early deaths, and contributed to between 700 to 2,050 asthma attacks in Australia.[121]

3.10 The Asthma Foundation New South Wales also cited a recent NSW Government report confirming that more people are dying from Sydney roads' air pollution than are killed in car accidents, stating that in 2000 there were 267 deaths from car accidents, and between 339 and 762 vehicle-generated air pollution deaths.[122]

3.11 While national standards have been set for levels of key air pollutants (the Air NEPM, detailed in Chapter 5), it is important to note that the standards do not necessarily signify a 'safe' level

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116 Dr Staff, Evidence, 16 August 2006, pp12-13

117 Dr Staff, Evidence, 11 September 2006, p23

118 Department of Environment and Conservation, *Air Pollution Economics*, p7

119 Submission 19, Lane Cove Tunnel Action Group Inc., p105

120 Submission 25, NSW Government, p13

121 Bureau of Transport and Regional Economics, *Health impacts of transport emissions in Australia: Economic Costs*, cited in Submission 29, Asthma Foundation New South Wales, p6

122 Submission 29, p6

of pollution. *Action for Air*, the NSW Government's principal policy document on air pollution, stated that:

> … there is no obvious threshold level of fine particles below which there are no effects on health.[123]

3.12 The Environmental Defender's Office (NSW) (EDO), in its submission to the Inquiry also noted that there is no evidence to suggest that there is a safe threshold in relation to exposure to certain air pollutants, stating:

> This means that the most desirable situation in terms of human health might be to prohibit and eliminate these chemicals completely, as there may not be a safe level of exposure.[124]

3.13 The NSW Government's submission stated that, based on both Australian and overseas research, there is growing evidence to suggest that some groups are more sensitive to pollution than others, and may subsequently develop adverse health effects at lower exposure levels.[125]

3.14 In the 2005 review of the Air National Environment Protection Measure (Air NEPM), the National Environment Protection Council (NEPC) acknowledged that an assessment should be carried out to determine whether certain groups in the community are more sensitive to the effects of air pollution than others.[126]

Health impacts of specific pollutants

3.15 A summary of health effects associated with the six main air pollutants is provided in the following table:

123 NSW Government, *Action for Air*, Environment Protection Authority, 1998, p13, accessed 9 October 2006, < http://www.environment.nsw.gov.au/resources/actionair.pdf> (*Action for Air*)

124 Submission 10, Environmental Defender's Office (NSW), p7

125 Submission 25, p13

126 Submission 10, p7

Table 3.1 Summary of health impacts[127]

Particulates	Nitrogen Dioxide	Carbon Monoxide	Ozone	Air Toxics	Air Toxics (PAHs)
• Increase in cardiac and respiratory mortality • Admissions to respiratory and cardiovascular casualty room and hospital • Increased incidence of acute bronchitis in adults and children. • Increased prevalence and exacerbations of chronic obstructive pulmonary disease in adults and children • Asthma attacks in adults and children • Cough • Restricted activity days • Reduced lung function	• Increased mortality • Impaired lung function • Impaired respiratory defence mechanisms leading to increased susceptibility to infections • Increased respiratory disease in children	• Mortality, especially those with cardiovascular disease • Aggravation of cardiovascular disease and chest pain • Nausea • Headache • Fatigue	• Mortality • Acute respiratory problems • Chest constriction and pain • Increase in incidence and severity of asthma attacks • Increase in asthma and respiratory related casualty room visits and hospitalisations • Coughing and wheezing • Eye irritation • Headache	Benzene: • Leukaemia • Long-term harm to immune system • Skin and eye irritations • Drowsiness • Dizziness • Headaches Toluene: • CNS dysfunction (often reversible) • Narcosis • Light-headedness Xylene: • Irritation of respiratory tract • Eye irritation • Headaches, dizziness, fatigue, tremors, coordination difficulties • Impaired pulmonary function 1,3-butadiene • Cancer • Eye, nose, throat irritation	• Cancer • Kidney and liver damage • Respiratory irritation • Exacerbation of asthma • Chronic bronchitis • Coughing and throat irritation

Source: Department of Environment and Conservation, *Air Pollution Economics Health Costs of Air Pollution in the Greater Sydney Metropolitan Region,* 2005 p20

[127] Department of Environment and Conservation, *Air Pollution Economics*, p20

Particulate matter

3.16 DEC, in *Action for Air*, advised that under normal conditions people in good health are able to deal with most particles without adverse effect. However, particles below the size of PM_{10} can be inhaled into the lower airways and are closely associated with health effects. Recent research has focused on $PM_{2.5}$, which can penetrate deep into the lungs.[128]

3.17 *Air Pollution Economics* states that smaller (fine) particles may have greater health impacts than the larger particles:

> Statistical evidence suggests that the health effects of particulates can occur independently of the presence of other pollutants such as ozone, NO_2 and SO_2. There is also increasing evidence that the adverse health effects of particulates are more closely associated with the $PM_{2.5}$ size fraction than with larger fractions.[129]

3.18 Health studies of fine particles have shown that they can:

- increase mortality from cardiovascular and respiratory diseases
- increase hospital admissions for chronic obstructive pulmonary disease and heart disease
- reduce lung function in children with asthma
- increase respiratory symptoms in school age children.[130]

3.19 In his submission to the Inquiry, Associate Professor Winder stated that long term exposure to particulate matter is associated with increased total, cardiovascular and infant mortality, and effects on the respiratory and immune system.[131]

3.20 In her submission to the Inquiry, Ms Janette Baros, a concerned citizen, stated that fine particles such as $PM_{2.5}$ can stay suspended for even longer periods of time than PM_{10}, and can reach most parts of the respiratory system if inhaled. Ms Baros claimed that, due to their size, these smaller particles are more dangerous than PM_{10}:

> Of particular relevance and concern is that $PM_{2.5}$ particles which pass through a polluted urban air column may carry or 'piggyback' carcinogens deep into human lung tissue, beyond the lung's natural ability to expel them, thus becoming potential sites for future tumours.[132]

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128 NSW Government, *Action for Air*, pp12-13

129 Department of Environment and Conservation, *Air Pollution Economics*, p10

130 Submission 25, Appendix 2, pp12-13

131 Submission 35, Associate Professor Chris Winder, Applied Toxicology, School of Safety Science, University of New South Wales, p22

132 Submission 34, Ms Janette Baros, p4

3.21 LCTAG, in its submission to the Inquiry, also highlighted the increased health effects of ultra fine particles, advising that 'experimental animal and limited human studies indicate that the smaller particles (<0.1μm) cause more inflammation in the lung than do larger particles'.[133]

Ozone

3.22 In its submission to the Inquiry, the NSW Government noted that the most commonly monitored air pollutants show an association with health impacts in Sydney. The NSW Government also stated that it can be difficult to determine if observed health effects are due to particular pollutants or whether it is a particular mix of pollutants that cause the health effects. One exception to this is ozone, which is consistently associated with increased adverse respiratory effects in summer in Sydney.[134]

3.23 As described in Chapter 2, ozone is a highly irritating gas that affects the respiratory tract, and short term acute effects include respiratory symptoms, increased respiratory rates, pulmonary function changes, increased airway hyper-responsiveness and increased airway inflammation.[135]

Effects of nitrogen dioxide, sulphur dioxide and lead

3.24 Nitrogen dioxide irritates the mucous membranes in the respiratory tract and therefore impairs lung immunity mechanisms, increasing susceptibility to respiratory infections, especially in children and asthmatics, and reduces lung function at high levels. Asthmatics exposed either simultaneously or sequentially to nitrogen dioxide and an aeroallergen have an increased risk of an exaggerated response to the allergen. Nitrogen dioxide also enhances the effects of exposure to other known irritants, such as ozone, sulphur dioxide and particulates.[136]

3.25 Exposure to ambient levels of sulphur dioxide has been associated with reduced lung function, increased incidence of respiratory systems and diseases, irritation of the eyes, nose and throat, and premature mortality. Children, the elderly and those suffering respiratory ailments are particularly susceptible to sulphur dioxide.[137]

3.26 Lead is an established neuro-developmental toxicant to humans, and recent studies on the effects of lead in humans suggest that a 'safe' exposure level currently cannot be established.[138] According to the US EPA, cited in *Air Pollution Economics*, exposure to lead can cause brain damage, kidney damage, and gastrointestinal distress from acute (short-term) exposure to high levels of lead. Chronic (long-term) exposure results in effects on the blood, central nervous system, blood pressure, kidneys and vitamin D metabolism. Children are particularly sensitive

133 Submission 19, p70

134 Submission 25, p13

135 Department of Environment and Conservation, *Air Pollution Economics*, p12

136 Department of Environment and Conservation, *Air Pollution Economics*, p13

137 Department of Environment and Conservation, *Air Pollution Economics*, p14

138 Submission 35, p22

to the chronic effects of lead, with slowed cognitive development, reduced growth and other effects reported.[139]

Tobacco smoke

3.27 Environmental Tobacco Smoke (ETS) is a major source of indoor air pollution, and it affects smokers and non-smokers. ETS is a combination of exhaled mainstream smoke (smoke breathed out by the smoker) and side stream smoke (smoke that drifts from the burning end of a cigarette). According to the National Tobacco Strategy Fact Sheet, cited by the Asthma Foundation New South Wales, ETS can have a worse effect than the smoke inhaled by the smoker:

> … the particles in the unfiltered smoke that drifts from burning cigarette tips can be finer and more concentrated, meaning that they can be inhaled deeper into the lungs and stay longer in the body of the passive smoker.[140]

3.28 ETS is made up of over 4,000 chemicals and more than 60 of these are known to cause cancer in humans. NSW Health states that research indicates that there is no safe level of exposure to environmental tobacco smoke. Prolonged ETS exposure is known to increase the risks of lung cancer and heart disease, as well as the incidence of sore throats, nasal symptoms, asthma attacks and other chest illnesses.[141]

3.29 In its submission to the Inquiry, the Asthma Foundation New South Wales stated that Australian and international research has also shown links between asthma and smoking, despite the absence of scientific proof. The Foundation also asserted that ETS has a negative impact on asthma sufferers in the form of an increased likelihood of asthma developing and worsening of existing asthma symptoms, as well as an increased number of asthmatic attacks.[142]

3.30 In *Air Pollution Economics*, DEC stated that inhalation via tobacco smoke is the dominant form of exposure to benzene. Benzene is carcinogenic, and long-term exposure can affect blood production and harm the immune system. Acute effects of benzene include skin and eye irritations, drowsiness, dizziness, headaches and vomiting. However, it is thought that at levels occurring in the ambient atmosphere, benzene does not have short-term or acute effects.[143]

3.31 Whilst DEC stated that the mechanisms of benzene toxicity are not well understood, the health effects of chronic exposure to benzene include central nervous system depression, chromosomal aberrations, bone marrow toxicity, leukaemia and diminished immune function. DEC advised that all members of the population are susceptible to the adverse health effects of benzene.[144]

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139 Department of Environment and Conservation, *Air Pollution Economics*, p15

140 Submission 29, p12

141 NSW Health, <www.health.nsw.gov.au/health-public-affairs/smokefree/passivesmoking.pdf> (accessed 13 October 2006)

142 Submission 29, p11

143 Department of Environment and Conservation, *Air Pollution Economics*, p16

144 Department of Environment and Conservation, *Air Pollution Economics*, p17

Groups 'at risk'

3.32 Within the general population certain groups are more at risk from air pollution than others. Groups 'at risk' can broadly be identified according to demographic factors or according to specific health determinants.

3.33 Demographic factors include age and geographic location. Specific groups 'at risk' due to demographic factors include

- the elderly
- unborn babies
- infants
- children
- people living/working/going to school near emission sources or 'hot-spots'
- people whose work/recreation is outdoors during ozone events.[145]

3.34 The Western Sydney Regional Organisation of Councils (WSROC), in its submission to the Inquiry, asserted that people from a lower socio-economic background constitute a group 'at risk'.[146]

3.35 In evidence to the Committee, Mr Mark Curran, President of Residents Against Polluting Stacks, also noted that 'at risk' groups include geographic groups:

> … maps of the incidence of respiratory illness in cities seem to show strong correlations with high concentrations of vehicle and industrial pollutants.[147]

3.36 Health determinants of groups at risk include a range of respiratory and cardiovascular conditions. Specific health determinants are:

- people with asthma
- people with chronic obstructive pulmonary disease (COPD) such as or chronic bronchitis, emphysema and bronchiectasis
- people with cardiovascular disease
- possibly people with diabetes
- possible genetic susceptibility.[148]

3.37 However, it is not only people who suffer from pre-existing conditions that are at risk from the effects of air pollution but also the general population that is at risk. NSW Health and the Department of Environment and Conservation (DEC) advised that healthy adults who

145 Submission 25, p13

146 Submission 32, Western Sydney Regional Organisation of Councils, p8

147 Mr Mark Curran, President, Residents Against Polluting Stacks, Evidence, 16 August 2006, p52

148 Submission 25, p13

exercise on high ozone days may have significant reductions in FEV_1[149] or pain on deep inspiration, and reduced exercise capacity.[150]

Asthma sufferers

3.38 Asthma can be exacerbated by any of the three main pollutants in Sydney – ozone, fine particles or nitrogen dioxide – and can increase asthma symptoms such as reduced exercise tolerance, coughing, wheezing, shortness of breath and the need for reliever medication.[151] A review study by the American Thoracic Society, cited by the Asthma Foundation New South Wales in its submission, states that the respiratory health effects of air pollution are not limited to clinical outcomes such as hospital admissions, loss of lung function and mortality, but also include diminished quality of life and are the cause of symptoms which interfere with daily activities.[152]

3.39 In evidence to the Committee, Mr Nicolas Bleszynski, Media Coordinator, Asthma Foundation New South Wales advised that a wide range of pollutants could trigger asthma, including pollen, dust, bushfires, ozone and nitrogen dioxide from car emissions, wood burning stoves and passive smoking.[153]

3.40 In its submission to the Inquiry, LCTAG states that the association between air pollution and the prevalence of asthma has been proven by the 'significantly higher episodes of coughing and wheezing among children who have lived within 100m of a heavily trafficked freeway'.[154]

Chronic obstructive pulmonary disease

3.41 The NSW Government's submission to the Inquiry advised that individuals with chronic obstructive pulmonary disease (COPD) such as emphysema or chronic bronchitis are most likely to be affected on days with high levels or particles, but are also susceptible to high levels of ozone and nitrogen dioxide. Symptoms include coughing, increased dyspnoea (laboured breath, or shortness of breath), and, in the long term, accelerated decline in lung function.[155]

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149 FEV_1: *Forced Expiratory Volume in 1 Second* - the amount of air that can be forcibly blown out in one second, measured in litres. Along with FVC (*Forced Vital Capacity*), it is considered one of the primary indicators of lung function.

150 Submission 25, Appendix 11

151 Submission 25, Appendix 11; Submission 29, p3

152 American Thoracic Society, *What constitutes an adverse health effect of air pollution*? Cited in Submission 29, p3

153 Mr Nicolas Bleszynski, Media Coordinator, Asthma Foundation New South Wales, Evidence, 16 August 2006, p26

154 Submission 19, p91

155 Submission 25, Appendix 11

Children and unborn babies

3.42 A number of pollutants have been found to be harmful to pregnant women and unborn babies. For example, some persistent organic chemicals have been proved to have neuro-developmental effects during prenatal and postnatal life in humans. Prenatal exposure to polychlorinated biphenyls (PCBs - a mixture of chlorinated compounds no longer manufactured in Australia) has been associated with negative effects on cognitive processes, motor development and reflexes in children,[156] an adverse impact on birth weights and an increased risk of pre-term births.[157]

3.43 High lead exposure has reproductive effects, such as decreased sperm count in men and spontaneous abortions in women. The developing foetus is at particular risk from lead exposure, with low birth weight and slowed postnatal neurobehavioral development noted.[158]

3.44 Both LCTAG and WSROC highlighted their particular concern regarding the effects of air pollution on children, stating that children are more susceptible than adults (except the elderly) to the adverse effects of air pollution because:

- they are more active and breath more rapidly
- they have more lung surface area compared to their body weight and inhale more air kilogram-for kilogram than adults
- they have higher lung volume to body size, higher respiration rates and spend more active time in the polluted outdoor environment
- when exposed to fine particles, children have slowed lung function growth, and increased emergency visits and incidence of asthma and bronchitis.[159]

3.45 LCTAG also commented that lung growth in children between the ages of 10-18 is affected by air pollution, leading to clinically significant deficits in attained FEV_1 (a measure of lung capacity) as children reach adulthood:

> … during teen years of development, the rate of lung function grown can be altered by a change in exposure to air pollution. Such changes may be reversible during periods of rapid lung growth accompanying physical development during the teen years.[160]

3.46 WSROC, in its submission to the Inquiry, asserted that air pollution levels in Sydney are also related to the increased incidence of, and hospital admissions for, childhood asthma and other respiratory diseases among children.[161]

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156 Submission 35, p22

157 T Mannes, B Jalaludin, G Morgan, D Lincoln, V Sheppeard an S Corbett, *Impact of ambient air pollution on birth weight in Sydney, Australia*, accessed 23 October 2006, <http://oem.bmjjournals.com /cgi/content/abstract/62/8/524>; Submission 32, p17

158 Department of Environment and Conservation, *Air Pollution Economics*, p15

159 Submission 19, p43; Submission 32, p17

160 Submission 19, p91

161 Submission 32, p17

Lower socio-economic groups

3.47 In its submission to the Inquiry, WSROC claimed that people of lower socio-economic status are more likely to have lower health status and a higher number of existing health conditions that predispose them to be more affected by air pollution.[162]

3.48 WSROC also claimed that rates of cardio-vascular disease are higher in areas of Sydney where there is a higher population of disadvantaged people, and that there is evidence that lower socio-economic groups in some parts of the western Sydney region have a higher incidence of more serious conditions requiring more intensive, longer term treatment and a greater impact on quality of life.[163]

3.49 In addition, WSROC argued that lower socio-economic groups, on average, suffer higher rates of respiratory disease and other conditions exacerbated by, or which make them more susceptible to, the effects of air pollution (that is, diabetes, cardio-vascular disease, etc). Also, on average, they experience higher levels of exposure to pollutants, as a result of proximity of their housing to major transport routes, where concentrations of pollution can occur.[164]

The elderly

3.50 As people live longer they are more likely to experience general respiratory and cardiovascular illnesses, which are exacerbated by air pollution.

3.51 In evidence to the Committee, Associate Professor Winder suggested that the elderly are a group at risk from the effects of air pollution:

> … the ability of people to biologically respond to chemical exposures both decrease with age and decease with increasing body burden of chemicals bioaccumulated in life… [165]

3.52 In its submission to the inquiry, WSROC also claimed that air pollution has been linked to increased hospital admissions for respiratory diseases in the elderly.[166]

Community concern regarding the health impacts of air pollution

3.53 Submissions received by the Committee indicate a widespread community concern over the health impacts of air pollution. The Committee received submissions from a diverse cross-section of the community, including councils, community organisations and private citizens.

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162 Submission 32, p17

163 Submission 32, p17

164 Submission 32, p17

165 Answers to questions taken on notice during evidence 16 August 2006, Associate Professor Chris Winder, Applied Toxicology, School of Safety Science, University of New South Wales, Question 4, p4

166 Submission 32, p17

3.54 Consultant Thoracic Physician, Dr Christopher Clarke, expressed the signs and effects of air pollution to the individual in a way that everyone could relate to:

> Anyone who looks at or washes their curtains will understand that there is air pollution in Sydney. Look at the curtains or the colour of the water at the end of the wash. This is what the lungs have to cope with, breath after breath ad infinitum. The upper respiratory tract does a great job filtering out the large particles. Unfortunately, the smaller invisible particles escape this protective mechanism and get down into the actual lungs.[167]

3.55 In its submission to the Inquiry, the Western Sydney Alliance, comprising the mayors, councils and communities of eight western and south western Sydney councils, highlighted the significance of air pollution to their community:

> The contamination of urban air by pollutants, in particular those generated by motor vehicles, has been demonstrated beyond any doubt to increase the incidence, and the very significant cost to the community, of a number of harmful medical conditions.[168]

3.56 The Baulkham Hills Shire Council, in its submission to the Inquiry, stated that declining air quality is of particular concern to the Shire residents, due to 'the lack of transport infrastructure and effects of motor vehicle emissions on clogged road networks.'[169]

3.57 In its submission, Residents Against Polluting Stacks advised that there have been 'persistent complaints about adverse impacts of residents close to the stacks and especially those close to the portals of the M5 and Eastern Distributor tunnel'.[170]

3.58 WSROC, in its submission to the Inquiry, highlighted the fact that not only are western Sydney residents exposed to higher levels of air pollution than residents in other areas but that this is compounded by the increasing population in the area and physical surrounds:

> WSROC and local governments in Greater Western Sydney are concerned that the health impacts of air pollution in the Sydney metropolitan area are disproportionately felt by residents of the region, and that this unequal impact will worsen with continued urban expansion in the Metropolitan area and deterioration of physical environments in the region.[171]

Strategies to minimise health impacts

3.59 The NSW Government currently has a number of strategies for minimising the health impacts of air pollution on the community.

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167 Submission 7, Dr Christopher Clarke, p1

168 Submission 17, Western Sydney Alliance, p1

169 Submission 33, Baulkham Hills Shire Council, p1

170 Submission 27, Residents Against Polluting Stacks, p7

171 Submission 32, p17

The Air Pollution Health Alert System

3.60 NSW Health and DEC maintain a joint system of advisory notices that are intended to provide advance warning to health care providers and people who are particularly susceptible to the adverse health effects of air pollution.

3.61 The system, which commenced in November 2004, contains the following elements:

- The DEC webpage which provides twice daily reports of the Regional Pollutant Index, and gives notice when air pollution alerts are in place.
- The NSW Health webpage which provides information about air pollution and health, a description of health alerts and the steps to take when alerts are in place, and a link to the DEC page for current reports and alerts.
- Information brochures for community and health professionals are distributed via community health centres and divisions of general practice, and are also available on the NSW Health webpage.
- Routine pollution reporting and health alerts (when applicable) are distributed to electronic and print media outlets twice daily.
- Routine pollution reporting and health alerts are available via a free call line, updated twice daily.[172]

3.62 In certain weather conditions, NSW Health also issues media releases to inform the community and, in particular, 'at-risk' groups, of particular levels of air pollution. These media alerts provide information such as who might be most affected by the weather conditions, what the symptoms might be and how to minimise the effects.[173]

3.63 In its submission to the Inquiry, the NSW Government stated that the health alert information is disseminated via conferences, journals, the media and the Asthma Foundation New South Wales, and that NSW Health and DEC review this system annually.[174]

Educating the public

3.64 The Committee received a number of submissions recognising that a number of strategies are already underway to reduce exposure to air pollution. However, evidence suggests that further measures can be taken to educate the community on the effects of air pollution and how individuals can minimise not only their exposure to air pollution, but also their own contribution to the air pollution problem.[175]

3.65 In its submission to the Inquiry, the EDO acknowledged that the introduction of the building sustainability index (BASIX) is a good step in reducing emissions from domestic houses, but

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172 Submission 25, p19

173 For example, NSW Health, 'Air pollution and heat warnings – high ozone days', *Media Release*, 13 October 2006

174 Submission 25, p19

175 Submission 10, p9; Submission 29, p17

claim that these measures do not go far enough. The EDO suggested that further education of the community is required:

> Maximum gains will only be made in this sector if individual responsibility and self-regulation to curb domestic emissions is encouraged.
>
> …
>
> This will involve engagement with the community to highlight the health risks of air pollutants and to provide mechanisms for pollutant reduction in the home.[176]

3.66 In its submission to the Inquiry, the Asthma Foundation New South Wales stated that there are two key strategies for minimising the health impacts of air pollution, both of which can be achieved through greater public education:

- to reduce the level of pollutants in the air as a primary aim
- where pollutants still exist, health outcomes could be improved through pollution avoidance measures.[177]

3.67 The Asthma Foundation New South Wales claimed that this two-pronged approach will be more effectively implemented with the assistance of successful public campaigns:

> The public needs to be informed through health promotion campaigns just how much they can do to help reduce air pollution.
>
> …
>
> Air pollution avoidance measures also need to be disseminated through health promotion campaigns in conjunction with community organisations such as the Asthma Foundation NSW.[178]

Financial impacts of air pollution on the NSW health system

Overall financial costs of health impacts

3.68 DEC, in *Air Pollution Economics,* highlighted the fact that the correlation of common pollutants such as fine particles, nitrogen dioxide and carbon monoxide makes it difficult to 'accurately determine the independent effects of specific pollutants'.[179]

3.69 When looking at the overall annual health cost of air pollution in Sydney, not just the cost on the NSW health system, *Air Pollution Economics* provided total costs at mean ambient level and cost per tonne of PM_{10}, with and without a tolerance threshold level of 7.5μg/m^3. The estimated costs of the health impacts of air pollution are based on a range of American

176 Submission 10, p9 and p14

177 Submission 29, p16

178 Submission 29, pp16-17

179 Department of Environment and Conservation, *Air Pollution Economics,* Summary, p1

research, providing two means of calculating costs: the actual cost of the illness (COI) and the willingness to pay to avoid health risks (WTP).

3.70 Using the COI methodology, costs include diagnosis, treatment and lost productivity costs (such as time off work) whereas using the WTP methodology, costs also include pain and suffering, perceived quality of life and lost productivity.[180]

3.71 The annual cost of air pollution in Sydney, with a PM_{10} tolerance threshold level of 7.5μg/m^3 is between $706 million and $3,350 million.[181]

3.72 The annual cost of air pollution in Sydney without a PM_{10} tolerance threshold level of 7.5μg/m^3 is between $1,153 million and $6,012 million.[182]

3.73 These costs, which primarily utilise the WTP method (using the COI method only when the WTP was not available or applicable) are outlined in the two tables below:

Table 3.2 Annual health costs of air pollution – with a PM_{10} threshold[183]

Region	Low estimate	High estimate	Midpoint
Total cost at mean ambient level ($ million)			
Sydney	706	5,994	3,350
Hunter	226	1,765	996
Illawarra	81	638	360
Total Greater Metropolitan Region	1,013	8,397	4,705
Cost per tonne of PM_{10} ($ '000)			
Sydney	28	235	132
Hunter	8	63	35
Illawarra	6	46	26

Source: Department of Environment and Conservation, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region,* 2005, p43

180 Department of Environment and Conservation, *Air Pollution Economics*, p26

181 Department of Environment and Conservation, *Air Pollution Economics*, p43

182 Department of Environment and Conservation, *Air Pollution Economics*, p44

183 Department of Environment and Conservation, *Air Pollution Economics*, p43

Table 3.3 Annual health costs of air pollution – without a PM_{10} threshold[184]

Region	Low estimate	High estimate	Midpoint
Total cost at mean ambient level ($ million)			
Sydney	1,153	10,873	6,012
Hunter	368	3,163	1,766
Illawarra	137	1,179	658
Total Greater Metropolitan Region	1,658	15,214	8,436
Cost per tonne of PM_{10} ($ '000)			
Sydney	45	427	236
Hunter	13	112	63
Illawarra	10	85	47

Source: Department of Environment and Conservation, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region,* 2005, p44

Estimating costs of air pollution on the NSW heath system

3.74 In its submission to the Inquiry, the NSW Government states that the financial impacts of air pollution on the NSW health system can be difficult to estimate due to the inability to accurately determine the extent to which air pollution affects any specific episode:

> The health costs of air pollution are derived from statistical estimates of the observed association between air pollution and health outcomes. For any individual health event it is rarely possible to determine whether, or to what extent, air pollution may have played a role in its development.[185]

3.75 Nevertheless, the NSW Government includes an estimated annual cost of air pollution on the NSW health system for the five common air pollution-related health outcomes in their submission to the inquiry, as outlined in table 3.4.

3.76 It is estimated that the total cost of air pollution-related illnesses on the NSW health system for admissions and attendances could be between $6.7 and $13.5 million per annum.

184 Department of Environment and Conservation, *Air Pollution Economics*, p44

185 Submission 25, p14

Table 3.4 Estimated annual cost of air pollution on the NSW health system[186]

Health outcome	Cost estimate per episode ($)	Estimated increased annual cost due to air pollution ($ '000)
Cardiovascular admissions	7,099	3,982-8,561
Respiratory admissions	5,336	1,917-4,185
ED attendances – cardiac 65+	359	94
ED attendances – respiratory 65+	359	150
ED attendances – asthma 1-14 years	359	541
	Total	**6,685-13,533**

Source: Submission 25, NSW Government, p14

3.77 The NSW Government stated that these figures relating to the financial impact of air pollution are roughly extrapolated using some of the estimates from *Air Pollution Economics* and that they derive similar estimates for hospital attendances related to air pollution.[187]

3.78 The Government further stated that although the methodology employed in deriving the above estimate is an accepted approach to estimating health costs of air pollution, and local estimates of effect and cost are used where available, the true cost of air pollution on the health system cannot be ascertained.[188]

3.79 Evidence was provided explaining the difficulties in establishing the extent of the role that air pollution has in any individual heath incidence. The NSW Government stated that only estimates in quantifying the financial costs on the NSW health system can be provided:

> For any individual health event it is rarely possible to determine whether or to what extent, air pollution may have played a role in its development.[189]

While the Committee accepts this view for any one episode, it is, however, not relevant when calculating the total cost of air pollution on the health of the population.

Other financial costs

3.80 The Committee received several other comments from Inquiry participants regarding the financial costs of air pollution.

3.81 International research into mortality and lung cancer related to air pollution is based on a WTP methodology, or 'value of statistical life' (a measure of a community's willingness to pay

186 Submission 25, p14

187 Submission 25, p14

188 Submission 25, p15

189 Submission 25, p14

to reduce the risk of premature mortality[190]), rather than the true cost of air pollution on the health system, as indicated by the NSW Government in its submission to the Inquiry:

> Long term exposure to air pollution has been associated with increased mortality and lung cancer in North American and European research. Mortality costs are accounted for in economic analyses by Value of Statistical Life, or other similar measures. These costs are not borne by the health system specifically. To our knowledge, health cost analyses have not been able to account for the increased cost on the health system for outcomes such as increased cases of lung cancer due to air pollution.[191]

3.82 LCTAG, in its submission to the Inquiry, stated that the cost of health impacts of air pollution varies depending on the value placed on a human life, which in Australia, is claimed to range between $1.3 million and $7 million.[192]

3.83 For the Sydney region, LCTAG claimed that the cost varies according to a range of factors, including population density, and that the total cost of air pollution in the Sydney central business district is in excess of $8 billion. It is further claimed that between $2-$3 billion is attributed to the impacts of vehicle pollution in Sydney.[193]

3.84 Solid fuel/wood heaters were mentioned in Chapter 2 as a cause of fine particle emissions in the Sydney basin. DEC advises that, in winter, a wood heater can produce 'two to three times as much particle pollution as cars'.[194] Based on the estimate that the health costs for $PM_{2.5}$ emissions range from $100 to $300 per kilogram of particles, the Asthma Foundation New South Wales claimed that a typical wood heater emitting 20kg of particles every winter would generate $2,000 to $6,000 in health costs. This figure does not factor in the additional emissions from wood heaters, such as carbon monoxide, nitrogen oxides and a range of organic compounds, some of which are toxic or carcinogenic.[195]

Committee comment

3.85 The Inquiry's terms of reference (d) and (e) relate to 'the health impacts of air pollution on any 'at risk' groups' and 'the financial impacts of air pollution on the NSW health system'.

3.86 The Committee notes with concern the lack of recognition of the hazards of air pollution in the Sydney basin and the lack of attention given to the deaths due to air pollution as reported in *Air Pollution Economics*.

3.87 The Committee notes that it is clear from the range of evidence received during the inquiry that air pollution has an impact on the health of the population of the Sydney basin, exacerbated by a number of factors, including the unique topography of the region.

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190 Department of Environment and Conservation, *Air Pollution Economics*, p30

191 Submission 25, p15

192 Submission 19, pp4-5

193 Submission 19, p5

194 Submission 29, p10

195 Submission 29, pp10-11

3.88 The Committee also acknowledges the difficulty in determining what role air pollution may play as a cause or factor in any specific health event.

3.89 Several Inquiry submissions provided evidence explaining the difficulty in estimating the costs of air pollution on the NSW health system. These include the inability to separate the effects of various pollutants from the associated health effects, as well as the role the health effects that air pollution may have on a specific health condition.

3.90 Accordingly, the Committee understands the difficulty in gaining a full appreciation of the financial cost of the health impacts of air pollution on the NSW health system.

3.91 A more accurate estimate of air pollution costs on the NSW health system would make incorporating air pollution into development and strategic planning easier. It must be costed so it can be compared to the likely expense associated with it. It is clear that the health impacts of air pollution are significant, and action should be taken to reduce air pollution and limit exposure for not only 'at-risk' groups identified in this chapter, but also for the population at large.

3.92 In recognising the difficulty in determining the role that air pollution may play in any specific health event, and in view of the evidence received, the Committee has focussed on specific groups at risk of the health impacts of air pollution, but believes that the conclusions must relate to the effect on the general population.

3.93 In this regard, the Committee recommends that NSW Health conduct or be involved in further research to identify groups that are at a health risk due to the effects of air pollution in the Sydney basin, either due to topographical, demographical, epidemiological, social or physical factors.

Recommendation 3

That NSW Health conduct or oversight further research to identify groups 'at risk' from air pollution in the Sydney basin, as part of the ongoing development of strategies to minimise the health impacts for those groups. Any research conducted should examine the influence of air pollution 'hot spots' on 'at risk' groups and the population at large.

3.94 The Committee acknowledges that the Regional Pollutant Index and the Air Pollution Health Alert System are two useful strategies for minimising the health effects of air pollution on the community, but believes that more can be done to expand these programs to further target groups that are at risk, or individuals who may not realise that they are at risk.

3.95 The Committee notes the comments of the Asthma Foundation New South Wales and the EDO in relation to the need to better inform the community of ways to limit their exposure to air pollution, and to identify the contribution that individuals make to the problem, in an attempt to bring about behavioural change.

3.96 While the steps taken by NSW Health and DEC to provide health related information to the community are acknowledged, the Committee believes that more can be done to raise the profile of air pollution and to target health information to particular groups.

3.97 Whilst issues regarding the Regional Pollutant Index are further examined in Chapter 5 where additional recommendations are made, the Committee believes that the Health Alert System could be improved by the NSW Government's use of new technology as a means of distributing health information.

Recommendation 4

That the NSW Government improve the effectiveness of the existing advisory services for groups 'at risk' from air pollution, by providing targeted information through a range of media, including email and SMS services. The advisory service should be linked to the existing air pollution monitoring network and should provide advance warning of high concentrations of relevant air pollutants to groups 'at risk'.

Recommendation 5

That the Department of Environment and Conservation's policy on air quality, *Action for Air*, should take the health costs and consequences of air pollution into account in the planning and approval process as well as considering overseas standards.

3.98 While this chapter has discussed the health and financial impacts of air pollution, and provides some recommendations in relation to ongoing research into the health risks, subsequent chapters further explore issues, and make recommendations, regarding the reduction of the level of air pollution in Sydney and raising the profile of the air pollution problem within the community.

3.99 In Chapter 4, the Committee examines the regulatory and policy framework for the management of air quality in New South Wales and considers how this can be improved.

3.100 In Chapter 5, the Committee examines state and national measurement and reporting levels and standards of air pollution, including current reporting systems such as the Regional Pollutant Index. Recommendations on raising awareness of air pollution as an issue are also made in Chapter 5.

3.101 In Chapter 6, the Committee examines specific sources of pollution, such as motor vehicles, road tunnels and domestic heating, and puts forward a number of recommendations in an attempt to reduce the emissions of these pollutants.

Chapter 4 Regulatory and policy framework for the management of air quality

In this chapter the Committee examines the regulatory and policy framework for the management of air quality in the Sydney basin. The impact and effectiveness of laws and regulations on air quality over the last three decades are considered, and suggestions for change made.

Policy framework

4.1 The principal policy document for managing air quality in New South Wales is *Action for Air*, a 25 year air quality management plan released by the NSW Environment Protection Authority in 1998. As mentioned in paragraphs 1.10-1.12, the plan focuses on the Greater Metropolitan Region, which includes Sydney, Wollongong and Newcastle and contains approximately 70% of the population of NSW.[196] The Sydney basin lies within the Greater Metropolitan Region.

4.2 *Action for Air* outlines seven 'key objectives for total air quality management':

- Objective 1 - Integrate air quality goals and urban transport planning
- Objective 2 - Provide more and better public transport choices
- Objective 3 - Make cars, trucks and buses cleaner
- Objective 4 - Promote cleaner business
- Objective 5 - Promote cleaner homes
- Objective 6 - Manage the impact of open burning
- Objective 7 - Monitor, report on and review air quality.[197]

4.3 As part of the ongoing evolution of *Action for Air*, public Clean Air Forums are held every three years. An update has been publicly released following each of the two Clean Air Forums held to date, in 2001 and 2004. The updates report on progress against the plan's objectives. The most recent *Action for Air* update was released in 2006.[198]

4.4 *Action for Air* identified emissions from motor vehicles as a current and future challenge to meeting the objectives and goals of the 25 year plan, given the link of motor vehicle emissions to photochemical smog:

> Reducing emissions from motor vehicles is the highest priority if we are to meet the goals in the long term.[199]

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196 NSW Government, *Action for Air*, Environment Protection Authority, 1998, p5, accessed 9 October 2006, < http://www.environment.nsw.gov.au/resources/actionair.pdf> (*Action for Air*)

197 NSW Government, *Action for Air*, pp6, 7

198 NSW Government, *Action for Air: 2006 Update*, Department of Environment and Conservation, 2006, accessed 9 October 2006, <www.environment.nsw.gov.au/resources/actionforair06465.pdf>

199 NSW Government, *Action for Air*, p6

4.5 The 2006 update of *Action for Air* (*Action for Air: 2006 Update*) re-iterated that the two main air pollutants of concern in the Greater Metropolitan Region are fine particles and photochemical smog.[200]

4.6 *Action for Air* identified the successful protection and improvement of air quality as requiring a whole of government approach. The policy is linked to other NSW government strategies such as *Action for Transport 2010* (now incorporated into other strategic policy documents), the Metropolitan Strategy (*City of Cities: A plan for Sydney's future),* and the *State Infrastructure Strategy New South Wales 2006-07 to 2015-16*. The draft *NSW State Plan,* although not yet finalised, can be included in this list. In relation to the need for better co-operation and co-ordination of government responses to air pollution challenges, the *Action for Air: 2006 Update* states:

> While there has been consultation among relevant government agencies to date, there will need to be further close liaison, particularly between the Department of Environment and Conservation (DEC) and other relevant agencies, to ensure a consistent approach to urban transport planning and air quality management policies.[201]

Role of NSW Government agencies and local councils

Department of Environment and Conservation

4.7 The Department of Environment and Conservation (DEC) has the primary role in regulating air quality management in New South Wales. Other agencies and local councils have secondary roles in specific or local areas. The Environment Protection Authority (EPA) is now a branch of DEC, having been an independent authority up until September 2003, and is responsible for administering the *Protection of the Environment Operations Act 1997 (POEO Act).* The EPA licences industries that conduct activities listed in Schedule 1 to the Protection of the Environment Operations (General) Regulation 1998 (discussed in more detail later in this chapter).

4.8 The EPA was established in 1991 by the *Protection of the Environment Administration Act 1991* (NSW) *(POEA Act)*, replacing the State Pollution Control Commission (SPCC), which had been responsible for overseeing, investigating and resolving environmental issues since its establishment in 1970.[202]

4.9 DEC, in addition to its regulatory role within New South Wales, also collaborates with other Australian jurisdictions, particularly in relation to refining the National Environment Protection Measures (NEPM) defined through the National Environment Protection Council (NEPC). The Air NEPM standards and the process for reviewing those standards are addressed at Chapter 5.

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200 NSW Government, *Action for Air: 2006 Update*, p1

201 NSW Government, *Action for Air: 2006 Update*, pp1, 2

202 Submission 25, NSW Government, p9 and Appendix 4

NSW Roads and Traffic Authority

4.10 A number of other NSW Government agencies have a less direct role in maintaining air quality. The NSW Roads and Traffic Authority (RTA), while having no direct regulatory role, has a 'significant' role to play in maintaining air quality on three fronts, identified by the Chief Executive, Mr Les Wielinga, in evidence to the Committee:

- observing and adhering closely to all relevant air quality regulations and conditions of approval
- promoting clean air technology in cars and heavy vehicles
- participating in planning anti-congestion measures to obtain obvious air quality benefits.[203]

4.11 The RTA's actions in relation to these three areas are further examined in Chapter 6.

Department of Planning

4.12 The Department of Planning's role in regulating air quality relates to the planning approval process for major infrastructure projects. Under the *Environmental Planning and Assessment Act 1979* (NSW), the Department of Planning advises the Minister for Planning on the setting of conditions of approval for major infrastructure projects, which can include those relating to air quality.

4.13 In the case of major road tunnel infrastructure, for example, the Department of Planning receives advice from DEC and sets air quality standards for the ongoing operation of the tunnel. The EPA has responsibility for regulating air quality during the construction of freeways or tollways, as a scheduled activity under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998. The issue of the regulation of emissions in and from road tunnels is examined further in Chapter 6.

Local councils

4.14 Local councils are the regulatory authorities for 'non-scheduled' activities – those activities for which the EPA does not have regulatory responsibility. Authorised officers of local councils have the power to issue Smoke Abatement Notices where chimneys are emitting excessive smoke, and may also issue fines to owners of motor vehicles emitting excessive smoke. Local councils are responsible for approving open burning within their local government area. Additionally, the Committee has received submissions from councils detailing a variety of local policies and programs to alleviate air pollution.[204]

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203 Mr Les Wielinga, Chief Executive, NSW Roads and Traffic Authority, Evidence, 16 August 2006, p29

204 See, for example: Submission 28, Southern Sydney Regional Organisation of Councils, pp7-10; Submission 32, Western Sydney Regional Organisation of Councils, p11

Other government agencies

4.15 Other government agencies, as a result of their key activity or size, have an indirect role in relation to air quality management. The State Transit Authority (STA), for example, has an important role as a provider of an alternative transport mode to private transport and as a producer of vehicle emissions through its bus transport fleet. In its submission, an appendix to the NSW Government submission to this Inquiry, the STA identified its role in bringing about improvements in air quality:

> As a public transport service provider State Transit is in a unique position to improve the Transport sector's contributions to overall urban air quality through a greater intermodal share of the transport task and through improved emissions performance of its fleet.[205]

4.16 The contribution of the State Transit Authority to improving air quality is examined further in Chapter 6.

Coordination of government agencies and strategic policy for managing air quality

4.17 The NSW Auditor General, Mr Bob Sendt, told the Committee that the NSW Audit Office 2005 performance audit report *Managing Air Quality* found that no single agency had responsibility for air quality and that:

> … greater coordination was needed between the various agencies that either have responsibility for health or environmental issues but also between those agencies that were involved, for example, in transport and planning.[206]

4.18 In DEC's response to *Managing Air Quality*, contained within the performance audit report, the Director General, Ms Lisa Corbyn, commented that the 2005 revision of *Action for Air* would be:

> … aligned with other Government strategic policy documents concerning metropolitan land use and transport planning, energy use and climate change.[207]

4.19 A key observation of the Auditor General's performance audit *Managing Air Quality* in relation to *Action for Air* was that it was not possible to assess the overall progress of the plan because many of the strategies 'have no targets or timeframe, and monitoring and reporting processes need improvement'.[208] Accordingly, the performance audit report recommended that targets and timeframes be set for all component strategies, and a status report prepared annually.[209]

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205 Submission 25, Appendix 9, p1

206 Mr Bob Sendt, NSW Auditor General, Evidence, 16 August 2006, p45

207 Audit Office of New South Wales, Auditor-General's Report Performance Audit, *Managing Air Quality: The Department of Environment and Conservation*, 2005, p66, accessed 10 October 2006, <www.audit.nsw.gov.au/publications/reports/performance/2005/air_quality/Airquality-contents.html> (*Managing Air Quality)*

208 Audit Office of New South Wales, *Managing Air Quality*, pp 3-4

209 Audit Office of New South Wales, *Managing Air Quality*, pp 3-4

Mr Sean Crumlin, Director, Performance Audit, for the NSW Audit Office in evidence to the Committee further stated that there were 'gaps in the framework of targets and timeframes'.[210]

4.20 Ms Corbyn responded to the Audit Office recommendations by commenting that *Action for Air* is a 'strategic framework document' with timeframes included 'where appropriate'. DEC considered that the current triennial review of the policy was sufficient to comprehensively review and update the policy, and the meetings of Senior Officer Groups (representatives of relevant government departments) provided opportunities for regular implementation updates.[211] In the most recent update of *Action for Air*, the Department stated that *Action for Air*:

> … is not meant to be a static plan but to be adapted as new information and issues emerge, technological advances are made, and changes occur to Government priorities, policies and portfolios. Regular review of *Action for Air* is therefore necessary to direct efforts to where they are most needed.[212]

4.21 *Action for Air: 2006 Update* referred to a 'comprehensive review of *Action for Air* in 2007' which would foreshadow new issues and directions in air quality management, including 'climate change, energy supply, health and liveability, and the health costs of air pollution, and a renewed focus on transport-related air pollution'. The importance of making links between *Action for Air* and other NSW Government strategic plans was also acknowledged.[213]

Committee comment

4.22 The Committee endorses the Auditor General's recommendations in relation to the need for targets, timeframes and annual status reports to assess the overall performance of *Action for Air*. The Committee believes that there is a strong need to increase the profile of air pollution in the community, and to demonstrate progress towards clearly defined objectives.

4.23 The Committee notes the comments of Ms Corbyn regarding meetings of Senior Officer Groups of relevant departments and the opportunities these meetings provide for regular implementation updates. The Committee believes the annual status reports should include a summary of these meetings and their outcomes.

Recommendation 6

That the Department of Environment and Conservation prepare and release an annual status report on progress against defined targets associated with *Action for Air*. The status report should identify progress towards targets against clearly defined timeframes for the achievement of the *Action for Air* objectives, and should include a summary of any outcomes of meetings of the relevant Senior Officers Group.

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210 Mr Sean Crumlin, Director, Performance Audit, NSW Audit Office, Evidence, 16 August 2006, p45

211 Audit Office of New South Wales, *Managing Air Quality*, p67

212 NSW Government, *Action for Air: 2006 Update*, p2

213 NSW Government, *Action for Air: 2006 Update*, p2

4.24 The Committee believes that changes to existing strategies and policies should be clearly identified in the annual *Action for Air* updates, and an appendix of the updates should identify redundant strategies in order to provide an overview of changes in policy direction over time.

Recommendation 7

That the Department of Environment and Conservation incorporate an appendix to the recommended annual *Action for Air* updates identifying changed or removed strategies. The appendix should include an explanation for the change or removal.

4.25 While *Action for Air* is a whole of government policy, the Committee agrees with the Auditor General that there is a need to define responsibilities among departments for specific elements of the policy, and determine protocols for the interaction between government departments. The specific issue of responsibility for air quality standards in relation to road tunnels is examined in Chapter 6, and is an illustration of a situation where the existing cooperation and coordination mechanisms between government departments are not adequate. As the lead agency for *Action for Air*, DEC should have greater power to monitor the actions of other government agencies in achieving the objectives of *Action for Air*.

4.26 Additionally, the Committee believes that DEC has a key role to play at the early stages of strategic planning for the Sydney basin. Transport infrastructure planning and urban planning, in particular, are areas which have the potential to impact upon air quality, and are areas where the Department should have a key role that reflects the importance of minimising air pollution in the Sydney basin.

4.27 The Committee acknowledges that DEC is already involved, to some extent, in strategic planning issues but believes this role could be enhanced and formalised to ensure that the weighting given to that role reflects the seriousness of air pollution as an issue.

Recommendation 8

That the NSW Government improve coordination between key government departments in relation to air pollution, to ensure that in those situations where air quality can be significantly affected (for example, transport and strategic planning, development of major infrastructure), the Department of Environment and Conservation must be consulted and satisfied that reasonable steps are being taken to minimise the impact on air quality.

Recommendation 9

That the NSW Government require NSW Health and the Department of Environment and Conservation to be an integral part of the Department of Planning's environmental assessment processes for major projects.

Recommendation 10

That the Department of Environment and Conservation's importance as a key stakeholder in the development of strategic planning policy be recognised by the New South Wales Government. The current advisory role of the Department in relation to strategic planning for Sydney should be reviewed and upgraded to a more central strategic role with the intention of ensuring that air quality issues are given a higher priority.

Recommendation 11

That the NSW Government require the Department of Environment and Conservation to work co-operatively with NSW Health in the setting of evidence based policy and standards, regular reporting and long term data analysis in relation to air pollution.

Regulatory framework for managing air quality

4.28 In this section, the current NSW regulatory and legislative framework governing air quality is detailed. An overview of the framework is provided initially, with a more detailed examination of relevant sections of the framework and associated issues provided later in the section.

Overview of the regulatory framework

4.29 Legislation and regulations have existed in relation to air pollution since the enactment of the *Clean Air Act 1961* (NSW) *(CA Act)*, which was administered by the then Department of Public Health. As indicated in Chapter 2, the *CA Act* arose out of concern over smoke pollution in inner Sydney in the 1950s, in the context of high profile pollution events overseas such as the London 'pea-soup' smogs.[214]

4.30 The *CA Act* was superseded by the 1997 *POEO Act*, which integrated pollution control across air, water, noise and waste, and provided for an increased range of offences and penalties for polluting.[215] The *POEO Act*, last amended in 2005, and the following associated Regulations constitute the present regulatory framework:

214 Submission 25, p9 and Appendix 4

215 Submission 25, p9

- Protection of the Environment Operations (Clean Air) Regulation 2002(POEO (Clean Air) Regulation 2002)
- Protection of the Environment Operations (General) Regulation 1998 (POEO (General) Regulation 1998)
- Protection of the Environment Operations (Control of Burning) Regulation 2000 (the relevant sections of this Regulation have been absorbed into the POEO (Clean Air) Regulation 2002)

4.31 In the NSW Government submission to this Inquiry, the update of the *POEO Act* in 2005 was described as having 'revolutionised the regulatory framework for controlling and reducing air emissions in NSW'. Highlights of the update include increased penalties for pollution offences and more strictly regulated industrial emissions.[216]

4.32 DEC has a range of regulatory tools at its disposal to implement air quality improvement measures. These include licensing of polluting premises, environmental audits or inspections and associated licence conditions, variation notices, Pollution Reduction Programs (PRP), and enforcement programs.

4.33 The 2005 amendments to the *POEO Act* include increased penalties for pollution offences with a clearer distinction between wilful and negligent conduct, the introduction of green offsets for Environment Protection Licence holders, and the conferral of authority to local councils to issue Smoke Abatement Notices relating to domestic solid fuel heaters.[217]

4.34 Ms Sally Barnes, then Acting Director General, DEC, summarised the effect of these amendments, telling the Committee that the current *POEO Act* strengthens the assessment of air pollution and the associated penalties and, in the case of industry, introduced Load Based Licensing (LBL), linking Environment Protection Licence fees to the amount of pollution emitted. Ms Barnes told the Committee that the introduction of LBL:

> … was an incentive for industry to update and improve their performance, and it means that their licence fees are linked to the amount of pollution that is emitted, which is an incentive to keep reducing the pollution.[218]

Environment Protection Licences and Load Based Licensing

4.35 94 different industrial and commercial activities, outlined in Schedule 1 to the POEO (General) Regulation 1998*,* require Environment Protection Licences.[219] There are currently 123 licensed premises in the Sydney basin carrying out a range of activities, including 'ceramic

216 Submission 25, p10

217 Submission 25, p9 and Appendix 4

218 Ms Sally Barnes, then Acting Director General, Department of Environment and Conservation, Evidence, 16 August 2006, p3

219 Protection of the Environment Operations (General) Regulation 1998, Schedule 1, <www.austlii.edu.au/au/legis/nsw/consol_reg/poteor1998601/sch1.html> (accessed 16 October 2006)

works, sewage treatment works, waste activities, petroleum works, chemical industries and contaminated soil treatment works'.[220]

4.36 The POEO (General) Regulation 1998 sets out the mechanism for determining Environment Protection Licence fees. Fees are based on the impact of the pollutant on the environment – 'the *amount* of pollution, how *harmful* it is and *where* it is emitted'.[221]

4.37 An administrative fee is associated with each activity, graded according to the quantity of the output produced by the activity. Additionally, if the activity produces one or more assessable pollutants identified in Schedule 1, POEO (General) Regulation 1998, then pollutant fees apply. These LBL fees are calculated through the consideration of a range of factors, including:

- a pollutant weighting that reflects the potential of the pollutant to damage the environment
- a critical zone weighting that reflects the sensitivity of the particular environment within which the pollutant is emitted
- a fee rate threshold which sets an emission threshold that can 'reasonably be achieved with modern technology' and beyond which the load fee increases.[222]

4.38 In its submission to the Inquiry, the NSW Government stated that LBL 'seeks to manage the cumulative impacts of the pollutants loads by applying the 'polluter pays' principle'. In 2004, the pollutant weightings were increased by 45% to provide 'greater incentive for licensees to reduce the environmental impact of their air emissions'. [223]

4.39 LBL acts to encourage industry to adopt air pollution abatement measures by providing an economic incentive – as the licensing fees increase it becomes more cost-effective to invest in pollution abatement equipment than to pay the fees incurred from applying the LBL scheme.[224]

4.40 Mr Garbis Simonian, Managing Director, Weston Aluminium Pty Ltd, in a submission to the Inquiry, outlined the different assessable pollutant load limits for two aluminium waste processing plants in New South Wales, as an illustration of the 'difficulty in understanding the licensing approach taken' by the EPA.[225] Mr Simonian explained that the case study highlighted the inconsistency in the treatment of the two plants by the EPA.

4.41 Both plants operate under Environment Protection Licences issued by the EPA. Ms Angelika Lange, member of the Western Sydney Clean Air and Water Action Group and Concerned

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220 Answers to questions taken on notice during evidence 11 September 2006, Department of Environment and Conservation, p1

221 Submission 25, Appendix 5, p2

222 Submission 25, Appendix 5, p3

223 Submission 25, Appendix 5, pp2-3

224 Submission 25, Appendix 5, p3

225 Submission 6, Weston Aluminium Pty Ltd, p5

Residents of Guildford, in evidence to the Committee, also expressed concern over the differing pollutant loads permitted at each facility.[226]

4.42 Mr Ross Carter, Director, Metropolitan Branch, Environment Protection and Regulation Division, Department of Environment and Conservation told the Committee that the different pollutant loads emitted related to the different scale of the two plants, with the Yennora plant of Alcoa Australia Rolled Products being larger than the Weston Aluminium plant:

> When we examine the loads per tonne of product produced there is some variation between the two plants but overall Alcoa is equivalent or slightly tighter in some areas, and Weston's is tighter is some other areas and that relates to both the technology and the local issues involved.[227]

4.43 The Committee heard considerable evidence from Mr Simonian, the Western Sydney Clean Air and Water Action Group and Concerned Residents of Guildford, and from Mr Mike McKinstry, Managing Director, Alcoa Australia Rolled Products in relation to these issues. The Committee is satisfied that the Alcoa Australia Rolled Products facility at Yennora is operating within the limits set by its Environment Protection Licence, noting the recent finding of the Supreme Court of New South Wales in relation to legal action between Alcoa Australia Rolled Products Ltd and Weston Aluminium Pty Ltd to that effect.[228] The Committee also notes that Weston Aluminium Pty Ltd has appealed this decision to the High Court.

Industry self-regulation

4.44 Mr Ross Carter, Director, Metropolitan Branch, Environment Protection and Regulation Division, DEC, told the Committee that industries that operate under an Environment Protection Licence are required to undertake monitoring of their air pollution emissions (using approved monitoring methods specified by DEC) and provide an annual return to DEC, approved by the chief executive officer (CEO) of the organisation. Mr Carter commented that the sign-off by the CEO signifies that 'they are taking direct accountability for the factual nature of their reporting to us'.[229]

4.45 Mr Carter went on to detail the way in which the material that is provided to DEC is examined, explaining that DEC, as a regulatory authority, has a regulatory relationship with industry which includes examining the status of the laboratories used to produce the information and the nature of the process they go through. Mr Carter told the Committee that it would be very difficult to 'fudge' the air quality data:

> [I]t is extremely difficult for someone to put all of the effort into all of the calculations and processes that involve other parties and quite strictly set-out procedures to come

226 Ms Angelika Lange, Member, Western Clean Air & Water Action Group, Evidence, 16 August 2006, p80

227 Mr Ross Carter, Director, Metropolitan Branch, Environment Protection and Regulation Division, Department of Environment and Conservation, Evidence, 11 September 2006, p28

228 'Alcoa plant cleared', *Parramatta Advertiser*, 11 October 2006, p9

229 Mr Carter, Evidence, 11 September 2006, p36

> up with a set of results that would stand up to scrutiny … we also satisfy ourselves by doing unannounced inspections and audits to see that what is occurring on the site correlates with what is being recorded. [230]

4.46 However, industry self-regulation was criticised by some inquiry participants. For example, Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, in evidence to the Committee explained his scepticism of the effectiveness of industry self-regulation in relation to pollution:

> If you investigate whether or not industry controls or appropriately manages its environmental releases you often find that the practices are dubious – whether they comply with previous regulations or not.[231]

4.47 Associate Professor Winder further commented that the current system of LBL is 'a long way down the hierarchy of waste minimisation' and sends a message to polluters that 'it is acceptable to pollute as long as you pay for it'. He recommended the development of due diligence systems to identify, assess and control releases of pollutants to the lowest practicable level using the hierarchy of waste management.[232]

4.48 In evidence to the Committee, Mr Sendt, NSW Auditor General, commented that the Audit Office had difficulties with a self-regulation approach to pollution generally. Mr Sendt referred to an early Audit Office report on all forms of pollution but commented that he did 'not think anybody would argue that self-regulation is necessarily or inherently a perfect system'.[233]

4.49 Mr Nigel Routh, Manager of the Air Policy Section, DEC, in responding to suggestions that the Victorian system of monitoring compliance against licence conditions was a better model than that used in NSW, told the Committee that the approach to self-monitoring by industry was essentially the same as that undertaken in Victoria:

> [T]heir approach is essentially the same as ours in that the industries themselves are required to do that monitoring of emissions. They are then required to report that back to the regulatory authority – ourselves here, or the Victorian EPA in Victoria – and that information can be analysed and assessed by the regulatory authority.[234]

4.50 Mr Routh added that the cost of monitoring the emissions is borne by the industry and is conducted 'in accordance with our prescribed methods for monitoring of air pollution'. The methods are outlined in a 'very detailed' way.[235]

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230 Mr Carter, Evidence, 11 September 2006, p38

231 Associate Professor Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, Evidence, 16 August 2006, p65

232 Answers to questions taken on notice during evidence 16 August 2006, Associate Professor Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, Question 5, pp4-5

233 Mr Sendt, Evidence, 16 August 2006, p46

234 Mr Nigel Routh, Manager, Air Policy Section, Department of Environment and Conservation, Evidence, 11 September 2006, p35

235 Mr Routh, Evidence, 11 September 2006, p35

Lowering of emission limits over time

4.51 The current regulatory framework groups industrial emissions according to the date in which the polluting activity commenced at a premises (Part 4 of the POEO (Clean Air) Regulation 2002).

- Group 1 refers to industries where the polluting activity commenced prior to 1972
- Group 2 to industries where the polluting activity commenced prior to 1979
- Group 3 to industries where the polluting activity commenced prior to 1986
- Group 4 to industries where the polluting activity commenced prior to 1997
- Group 5 to industries where the polluting activity commenced prior to 2005
- Group 6 to industries where the polluting activity commenced after 2005.[236]

4.52 The emission standards for the various groups differ, with greater emissions allowed for industries in lower groups. Over time, the lower groups will be phased out and the industries will be required to meet the more exacting standards of the higher groups.[237] Group 1 industries, for example, have until January 2008 to operate at the higher emission limits of their group, at which time they are required to meet the emission standards of Group 2, which will in turn be required to meet the emission standards of Group 5 by January 2012.[238]

4.53 The NSW Government submission to the Inquiry predicted that this process would result in older industries either justifying 'staying at existing emission limits (in terms of meeting and addressing health and environmental impacts) or else mov[ing] to more modern emission limits'.[239]

Environmental audits and inspections of licensed premises

4.54 As noted above, Environment Protection Licence holders are required to monitor and report on their emissions according to the conditions of their licence. DEC has the authority to investigate and audit those reports and the premises to which they relate.

4.55 In relation to the Environment Protection Licences issued to industries engaged in activities listed in Schedule 1, Protection of the Environment (General) Regulation 1998, DEC conducted a total of 162 inspections at 53 premises during 2005-2006. DEC has the power to issue variation notices to holders of Environment Protection Licences to vary or add licence conditions 'to ensure environmental compliance.' As a result of the 162 inspections, 44 variation notices were issued to licence holders.[240]

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236 Protection of the Environment Operations (Clean Air) Regulation 2002, Part 4, Regulation 21

237 Protection of the Environment Operations (Clean Air) Regulation 2002, Part 4, Regulation 21

238 Protection of the Environment Operations (Clean Air) Regulation 2002, Part 4, Regulations 23, 24.

239 Submission 25, p15

240 Answers to questions taken on notice during evidence 11 September 2006, Department of Environment and Conservation, p1

Pollution Reduction Programs

4.56 Pollution Reduction Programs (PRP) can be attached to Environment Protection Licences to require 'improvements to works, methods or management practices to bring about environmental improvement'.[241] PRPs are negotiated and agreed between DEC and the licensee. A PRP is a legally enforceable condition of the licence.

4.57 In addition to the 44 variation notices issued to licence holders over the 2005-2006 year, a further 14 PRPs were added to licences (10 specific to air emissions) 'totalling over $19 million approximately of additional works to protect the environment'.[242]

Enforcement programs

4.58 Under the regulatory framework, DEC and the EPA have a number of enforcement programs. The programs include those in relation to controlling burning in open areas and in relation to smoky chimneys.

4.59 One example of an enforcement program is the Smoky Vehicle Compliance Program, regulated by DEC under the POEO Act and POEO (Clean Air) Regulation. Trained DEC officers, RTA officials, local council officers and police officers enforce the Smoky Vehicle Compliance Program by observing and reporting smoky vehicles. Different penalties apply for commercial vehicles and private motor vehicles, with owners of the latter issued with a warning letter requiring repair of the vehicle within 21 days, following which time a $200 fine can be issued if the owner has not repaired the fault. For commercial vehicles an on-the-spot fine of $400 can be issued. Multiple observed breaches can result in the issue of a Defective Vehicle Notice and possible court action.[243]

4.60 A pollution hotline (131 555) allows members of the public to report smoky vehicles (and other pollution events) to the EPA directly. While the EPA can only fine the owner of a smoky vehicle if an authorised officer witnesses an offence, they can write to the owner to suggest a vehicle check.[244]

Regulations for Environmental Tobacco Smoke

4.61 In recognition of the dangers of Environmental Tobacco Smoke (ETS), in 2004 the NSW Government announced that smoking in indoor areas of licensed premises would be phased out by July 2007. NSW Health advises that there are clear health benefits and legal reasons for smoke-free indoor areas, and that there is strong community support.[245]

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241 Submission 25, Appendix 5, p2

242 Answers to questions taken on notice during evidence 11 September 2006, Department of Environment and Conservation, p1

243 Submission 25, Appendix 5, p4

244 Department of Environment and Conservation, <www.epa.nsw.gov.au/pollution/index.htm> (accessed 19 October 2006)

245 NSW Health, <www.health.nsw.gov.au/public-health/health-promotion/tobacco/faqs.html> (accessed 12 October 2006)

4.62 The *Smoke-free Environment Amendment Act 2004,* Smoke-free Environment Amendment Regulation 2005 and Smoke-free Environment Amendment (Enclosed Places) Regulation 2006 provide for three incremental stages in the lead up to the total smoking ban in enclosed public areas of licensed premises and define what constitutes an enclosed outdoor area.[246]

4.63 Since 3 July 2006 (stage 2), in a multi-room venue smoking is allowed in a maximum of one room, whether it is a bar, gaming or recreation room. This smoking room must not exceed 25% of the total combined area of bar/gaming/recreation area. In a single room venue, if a venue consists of a single room (that is, a single undivided enclosed space comprising bar/gaming/recreation area), then smoking is permitted in up to 25% of that bar/gaming/recreation area.

4.64 Earlier in 2006, the Smoke-free Environment Amendment (Enclosed Places) Regulation 2006 was introduced to determine what is an enclosed public place and when a covered outside area is considered to be substantially enclosed. A public place is considered to be substantially enclosed if the total area of the ceiling and wall surfaces of the public place is more than 75% of its total notional ceiling and wall area.

4.65 However, in its submission to the Inquiry, the Asthma Foundation New South Wales stated that it believes that this '25/75 legislation' is flawed in that it effectively defines largely indoor areas as outdoors as 75% of the room will be essentially enclosed.[247]

4.66 The Asthma Foundation therefore recommended that pubs and clubs be made smoke-free, helping to remove the association between smoking and socialising, and reducing the exposure to ETS.[248]

4.67 The Committee notes the recent Report of the NSW Parliament Joint Select Committee on Tobacco Smoking, *Tobacco smoking in New South Wales*, which in Chapter 6 examined issues relating to the existing legislation in detail and provided recommendations for future action.[249]

Recommendation 12

That the NSW Government implement the recommendations of the Joint Select Committee on Tobacco Smoking that relate to reducing Environmental Tobacco Smoke.

246 NSW Health, <www.health.nsw.gov.au/public-health/health-promotion/tobacco/legislation/index.html> (accessed 12 October 2006)

247 Submission 29, p13

248 Submission 29, p13

249 NSW Legislative Council, Joint Select Committee on Tobacco Smoking, *Tobacco smoking in New South Wales*, June 2006

Effectiveness of the regulatory framework

4.68 In the following section, the effectiveness of the regulatory framework is examined. Overall, submissions to the Inquiry commented that the regulatory framework had been effective in reducing air pollution, particularly from industrial sources. A number of participants in the Inquiry had comments on and suggestions for improvements to particular aspects of the regulatory framework, which are also detailed in this section.

Improvements in air quality

4.69 In evidence to the Committee, the then Acting Director General, DEC, Ms Sally Barnes, claimed that improvements in air quality over the last '20 or so years' were attributable to:

> … strong programs to reduce air pollution from industry, through reduction of emissions in motor vehicles and through tackling a range of other sources from wood heaters through to backyard burning.[250]

4.70 DEC, in answer to questions taken on notice during the Committee's public hearing of 16 August 2006, commented that the *POEO Act* and associated Regulations had been 'extremely effective in improving air quality' through increases to offences and penalties available to control air pollution and prosecute offenders, and through the use of market-based mechanisms to more effectively reduce air pollution.[251]

4.71 The Auditor General's 2001 Performance Audit Report, *The Environment Protection Authority: Controlling and Reducing Pollution from Industry,* praised the regulatory framework for managing pollution generally:

> … the introduction of the Protection of the Environment Operations Act 1997 … restructured, streamlined and strengthened pollution legislation and established a regulatory framework consistent with international best practice.[252]

4.72 Mr Simonian, Managing Director, Weston Aluminium Pty Ltd, in a submission to the Committee commented that there was 'no doubt' that the regulatory framework for air pollution had been tightened over the past three decades, and described the tightening as being a 'shift towards a more legalistic (litigious) approach to compliance'.[253]

4.73 However, Mr Simonian, described the move toward a more legalistic approach to compliance as being a 'substantial shift' in the EPA's role, with negative implications:

> As the EPA has evolved, there has been a substantial shift in the organisation's role from one of having the technical competence and expertise enabling them to work

250 Ms Barnes, Evidence, 16 August 2006, p1

251 Answers to questions taken on notice during evidence 16 August 2006, Department of Environment and Conservation, Question 7, p3

252 Audit Office of New South Wales, Auditor-General's Report Performance Audit, *The Environment Protection Authority: Controlling and Reducing Pollution from Industry*, p12, cited in Submission 25, NSW Government, p9

253 Submission 6, Weston Aluminium Pty Ltd, p5

> with polluters to reduce emissions and or provide advice and guidance, to a situation where the EPA has limited ability to provide anything more than an application of the relevant Act or regulation.[254]

4.74 In its submission to the Inquiry, the Environmental Defender's Office (NSW) (EDO) commented that the regulatory regime had contributed to an improvement in air quality in the Sydney basin over the past 30 years.[255]

4.75 The EDO specifically supported the LBL scheme, approving of the recent changes to the toxicity weighting for many air pollutants that will require participants to effectively halve their emissions to meet their agreement targets.[256]

4.76 However, the EDO considers that the *POEO Act* 'does not go far enough in regulating emissions from industry' and does not take into account the 'sensitive subsets of the community for whom the tolerance threshold is much lower than the average standards … such as children and the elderly'.[257]

4.77 The EDO describes the timelines for the phasing out of the older (lower numeral) groups in the current emissions framework (described at paragraphs 4.51-4.53) as 'extremely generous', given the high levels of pollutants from industries in older groups.[258]

4.78 In addition, the EDO also commented that there are no future emissions standards for industries after 2005, which they suggested would fail to stimulate research into new forms of energy and halt 'better developmental practices'.[259]

4.79 The EDO argued that emissions standards were 'developed based on the ability of industry to meet the expectations, rather than on health considerations. The focus of the regulation must shift to the protection of health, and progressive adjustments to the standard need to be pursued and instituted accordingly'.[260] Similarly, the *POEO Act* refers to reducing to harmless levels the discharge of substances likely to cause harm to the environment, but the EDO highlight that the *POEO Act* does not set future standards for the phasing out of chemicals that are known to be carcinogenic, mutagenic or teratogenic:

> Phase-out of carcinogenic compounds is essential for eliminating health risks to the community.[261]

4.80 Responding to an inquiry about the phasing out of dangerous chemicals, Mr Routh, Manager, Air Policy for DEC, referred to the National Environment Pollution Measure for air toxics,

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254 Submission 6, p5

255 Submission 10, Environmental Defender's Office (NSW), p3

256 Submission 10, p8

257 Submission 10, p3

258 Submission 10, p7

259 Submission 10, p7

260 Submission 10, p7

261 Submission 10, p8

which sets standards for air toxics across Australia, and commented that the current process for reducing these emissions was 'as best as is practical at present'.[262]

4.81 In Chapter 5 the Committee examines air toxics in more detail, including the limitations of the existing monitoring network, and makes recommendations for change.

Department of Environment and Conservation resources

4.82 In evidence to the Committee, the then Acting Director General, Ms Barnes, responded to a question requesting total numbers of DEC officers working in the regulatory area on air quality by commenting that the integrated nature of the *POEO Act* resulted in people working on a range of issues, not just air pollution.[263] A response provided by DEC to the same question taken on notice did not specify the number of staff, but re-iterated Ms Barnes' comments:

> [R]egulatory and enforcement functions of the DEC are integrated under the *Protection of the Environment Operations Act* and regulatory officers work across the media of air, water, noise and waste.[264]

4.83 Mr Ross Carter, Director of the Metropolitan Branch, Environmental Protection and Regulation Division, DEC, in evidence to the Committee said that the Metropolitan Branch, which included the Illawarra area, had two operational offices with branches covering the Sydney basin. Mr Carter commented on staff numbers in relation to auditing:

> Around 30 or 40 operational staff in the metropolitan branch are involved in the auditing process on a day-to-day basis, but that can increase depending on the campaign that we might run at any one time.[265]

4.84 The Committee has heard no evidence that suggests there is a lack of resources for DEC's current role and responsibilities. However, if DEC is to play a more significant role in strategic planning for Sydney, the NSW Government may need to review DEC's resources and consider augmenting them.

Improving the effectiveness of the regulatory framework

4.85 Associate Professor Chris Winder suggested in an answer to questions taken on notice during the Committee's public hearing of 16 August 2006 that the current environmental pollution and control legislation should be amended to establish that organisations have a specific duty of care 'to ensure that their activities [do] not affect the community or the environment'.[266]

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262 Mr Routh, Evidence, 16 August 2006, p5

263 Ms Barnes, Evidence, 16 August 2006, p4

264 Answers to questions taken on notice during evidence 16 August 2006, Department of Environment and Conservation, Question 53, p14

265 Mr Carter, Evidence, 11 September 2006, p35

266 Answers to questions taken on notice during evidence 16 August 2006, Associate Professor Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, Question 5, p4

4.86 Associate Professor Winder explained that corporations draw their licence to operate from the community and therefore have an obligation to that community - a duty of care to the community established through environmental pollution and control legislation.[267] Associate Professor Winder said he believed environmental legislation should be modified to ensure that the duty of care is understood by organisations.[268]

4.87 In relation to the need for a cohesive and coordinated approach to monitoring and maintaining air quality, Associate Professor Winder commented on the 'piecemeal approach to chemical control' embodied in existing state legislation, and called for 'a chemicals based approach … that involves everyone who has a responsibility for controlling chemicals working co-operatively'. [269]

Recommendation 13

That the NSW Government amend the environmental pollution and control legislation to specify that organisations have a specific duty of care to ensure that their activities minimise effects on the community and the environment.

Committee comment

4.88 The principal challenge to managing air quality in Sydney, as it is in other major cities, is to balance the transport and development needs of the community with the impacts of air pollution. Consequently, the Committee believes that the NSW Government's focus should be on:

- increasing awareness in the community of the health impacts of air pollution and the sources of air pollution, particularly the contribution to air pollution made by the use of motor vehicles
- ensuring that strategic planning for Sydney incorporates the reduction of air pollution as a major priority, and that viable public transport alternatives for communities that are currently dependent on private motor vehicles are provided and their use encouraged.

4.89 In a previous section of this chapter, the Committee has made recommendations in relation to making air pollution a greater priority in the strategic planning for Sydney. The issue of raising awareness of air pollution issues is covered in Chapter 5, and the challenge of addressing emissions from motor vehicles is addressed in Chapter 6.

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267 Answers to questions taken on notice during evidence 16 August 2006, Associate Professor Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, Question 5, p4

268 Associate Professor Winder, Evidence, 16 August 2006, p66

269 Associate Professor Winder, Evidence, 16 August 2006, p66

4.90 The Committee acknowledges the comments of Associate Professor Winder and the Auditor General in relation to self-regulation by industry, but notes the comments of DEC on the operation of the licensing system. The Committee believes that the current system of self-regulation is an appropriate way of monitoring the emissions of a large number of industries with limited resources. The continued use of environmental audits and inspections is an essential check on this self-regulatory system.

4.91 The Committee believes that existing legislation and regulations as they relate to industrial sources of air pollution are essentially adequate to monitor and control industrial air pollution, however the Committee believes it is essential that the Department of Environment and Conservation have sufficient resources available to be able to fulfil the more central strategic role recommended in this Report, as well as sufficient resources to perform those environmental audits and inspections that are an integral part of the self-regulatory system, and resources to adequately monitor and report on air pollution across the Sydney basin.

4.92 The Committee notes that the NSW Government believes that, as a result of improvements to fuel quality and motor vehicle standards, and despite predicted increases in vehicle usage, motor vehicle emissions of carbon monoxide, volatile organic compounds, oxides of nitrogen and particles in the Sydney Greater Metropolitan Region are forecast to fall by 75%, 46%, 67% and 40% respectively from 2002 to 2020.[270]

4.93 The Committee therefore believes that air pollution laws in NSW (including the *Clean Air Act 1961*, the *Protection of the Environment Operations Act 1997* and applicable regulations made under those Acts) have had a positive impact on air quality but that progress is less than could reasonably have been hoped.

Recommendation 14

That the NSW Government make sufficient resources available to the Department of Environment and Conservation and NSW Health to ensure they are able to fulfil their strategic, regulatory and monitoring roles, as enhanced by the recommendations of this Report.

[270] Submission 25, p16

Chapter 5 Air quality standards and monitoring

In this chapter, the Committee outlines the national measurement standards for air pollution and the mechanisms for the monitoring and reporting of air pollution in New South Wales. The Committee analyses the efficacy of the standards, monitoring and reporting in relation to air pollution levels, and considers the evidence presented by submissions to the Inquiry.

Air pollution standards and measurements

5.1 In this section, the Committee examines the international guidelines and national monitoring standards used in New South Wales for a range of air pollutants, focusing on particulate matter, air toxics and other known carcinogens.

International standards

5.2 Air quality guidelines were first published by the World Health Organisation (WHO) in 1987 and revised in 1997. Given the wealth of new studies on the health effects of air pollution, the WHO reviewed the scientific evidence and its implications for the air quality guidelines and, accordingly, the guidelines for selected air pollutants (particulate matter, ozone, nitrogen dioxide and sulphur dioxide) were updated in October 2006.[271]

5.3 The new air quality guidelines contain substantially tighter standards for particulate matter (PM_{10}), ozone and sulphur dioxide than previous levels. For the first time the new guidelines are relevant to all regions in the world, providing uniform targets for air quality.[272]

5.4 Within the new guidelines, the standard for PM_{10} has been reduced from 70 to 20 micrograms per cubic metre, ozone reduced from 120 to 100 micrograms per cubic metre and sulphur dioxide reduced from 125 to 20 micrograms per cubic metre.[273] The new guidelines also contain an annual mean standard ($10\mu g/m^3$) and a 24-hour mean standard ($25\mu g/m^3$) for $PM_{2.5}$.[274]

5.5 For each of the new air quality guidelines there are between one and three interim targets, providing a gauge for countries to measure their progress over time in reducing population exposure to these pollutants.[275]

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271 World Health Organisation, <www.who.int/phe/health_topics/outdoorair_aqg/en/index.html> (accessed 20 October 2006)

272 World Health Organisation, "WHO challenges world to improve air quality: Stricter air pollution standards could reduce deaths in polluted cities by 15%', *Media Release*, 5 October 2006

273 World Health Organisation, "WHO challenges world to improve air quality: Stricter air pollution standards could reduce deaths in polluted cities by 15%', *Media Release*, 5 October 2006

274 World Health Organisation, *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide*, October 2006, p9

275 World Health Organisation, *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide*, October 2006, p11, 12, 15, 19

5.6 Within Australia, the WHO guidelines inform the Air National Environment Protection Measures (Air NEPM). The Committee did not receive specific information from the Department of Environment and Conservation (DEC) in relation to how Australia measures against these new WHO standards, which were released after the Committee had concluded its public hearings.

National Environment Protection Measure for Ambient Air Quality

5.7 The Commonwealth Government administers legislation that protects the environment, particularly matters of national environmental significance. The Commonwealth provides a national environmental assessment and approvals process, protects Australian biodiversity and integrates management of important natural and cultural places. Bilateral agreements between the Commonwealth and the states or territories also serve to protect the environment, promote conservation and ecologically sustainable use of natural resources, increase the efficiency of environmental assessments and approvals and reduce duplication in environmental assessment and approval.[276]

5.8 The National Environment Protection Council (NEPC) was formed following the Special Premiers' Conference held in October 1990. At this conference the Prime Minister, Premiers and Chief Ministers agreed to develop an Intergovernmental Agreement on the Environment, which came into effect on 1 May 1992. Since 2001, the NEPC has formed part of the Environment Protection and Heritage Council.[277]

5.9 The NEPC is a statutory body with law making powers established under the *National Environment Protection Council Act 1994* (Cth) and corresponding legislation in the other jurisdictions.[278] The members of the NEPC are ministers, not necessarily environment ministers, representing the participating Commonwealth, State and Territory governments.[279]

5.10 The NEPC has two primary functions: to establish the National Environment Protection Measures and to assess and report on their implementation and effectiveness in participating jurisdictions.[280]

5.11 On 26 June 1998, the NEPC created Australia's first national ambient air quality standards as part of the National Environment Protection Measure for Ambient Air Quality, known as the 'Air NEPM' or the 'NEPM'.[281]

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276 Department of the Environment and Heritage, <www.deh.gov.au/epbc/about/index.html> (accessed 18 October 2006)

277 Environment Protection and Heritage Council, <www.ephc.gov.au> (accessed 6 October 2006)

278 In NSW the relevant Act is the *National Environment Protection Council (New South Wales) Act 1995*

279 Department of the Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

280 Environment Protection and Heritage Council, <www.ephc.gov.au> (accessed 6 October 2006)

281 Department of the Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

5.12 The Air NEPM sets the national standard, which must be met by 2008, for the following six key air pollutants:

- carbon monoxide - an eight hour measure
- nitrogen dioxide - a one hour and a one year measure
- photochemical oxidants (as ozone) – a one hour and a four hour measure
- sulphur dioxide – a one hour, one day and one year measure
- lead – a one year measure
- particulate matter (PM_{10}) – a one day measure.[282]

5.13 Chapter 2 provides background information on each of these pollutants and their major sources.

5.14 The Air NEPM, which applies to all states and territories, are legally binding on each level of government. The Air NEPM requires all jurisdictions to monitor air quality, which helps to identify potential air quality problems.[283] The table below outlines the Air NEPM standards.

Table 5.1 Ambient air quality NEPM standards and goals[284]

Pollutant	Averaging Period	Maximum Concentration	Goal within 10 years (2008) – maximum allowable exceedences
Carbon monoxide	8 hours	9.0ppm	1 day a year
Nitrogen dioxide	1 hour	0.12ppm	1 day a year
	1 year	0.03ppm	none
Photochemical oxidants (as ozone)	1 hour	0.10ppm	1 day a year
	4 hours	0.08ppm	1 day a year
Sulphur dioxide	1 hour	0.20ppm	1 day a year
	1 day	0.08ppm	1 day a year
	1 year	0.02ppm	none
Lead	1 year	0.50μg/m^3	none
Particles as PM_{10}	1 day	50μg/m^3	5 days a year

Source: Department of Environment and Conservation, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region,* 2005, p3

282 Department of Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

283 Department of Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

284 NSW Government, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region*, Department of Environment and Conservation, 2005, p3, accessed 28 September 2006, <www.environment.nsw.gov.au/publications/epa/air.htm> (*Air Pollution Economics*)

5.15 NSW already meets the national goals for four of the six pollutants (lead, carbon monoxide, sulphur dioxide and nitrogen dioxide) ahead of the 2008 target. In its submission to the Inquiry, the NSW Government notes that PM_{10} particles in the Sydney region generally meet national air quality standard; however ozone does not, and they note that 'Sydney faces key air quality challenges in the future'.[285]

5.16 The Auditor-General's Performance Audit *Managing Air Quality: Department of Environment and Conservation* released in 2005 noted that NSW had met four of the six national goals ahead of the 2008 target date, and further noted that trends indicate that NSW is unlikely to meet the national goals for ozone and PM_{10}. [286]

5.17 The Committee notes with concern that the NEPC's *Annual Report 2004-2005* demonstrates that Sydney's air pollution levels for ozone are the worst of any capital city in Australia.[287]

5.18 The following table outlines the specific anthropogenic sources of PM_{10}, nitrogen oxides and volatile organic compounds (VOCs) in the Greater Sydney Metropolitan Region in 2002.

Table 5.2 Pollutant sources for nitrogen oxides, PM_{10} and VOCs in the Greater Metropolitan Region in 2005

Pollutant	Domestic fuel	Domestic lawn mowing	Domestic natural gas combustion	Domestic waste combustion	Commercial / industrial	Industrial facilities / power station	Motor vehicles	Other mobile source
Nitrogen oxides	<1	<1	<1	<1	4	35	58	3
Particles as PM_{10}	23	1	<1	<1	13	47	9	7
VOCs	41					15	38	5

Source: Department of Environment and Conservation, *Air Pollution Economics: Health Costs of Air Pollution in the Greater Sydney Metropolitan Region,* 2005, p6

5.19 In its submission to the Inquiry, the NSW Government acknowledged that the national ozone levels are exceeded in Sydney on a number of days each year and, whilst PM_{10} exceedences take into account bushfires, similar natural events and necessary hazard reduction burning, on some days bushfires add to the emission loads.[288] However, it also acknowledged that even without the bushfires ozone would still, on occasion, breach the 2008 national goals.[289]

285 Submission 25, NSW Government, p3

286 Audit Office of New South Wales, Auditor-General's Report Performance Audit, *Managing Air Quality: The Department of Environment and Conservation*, 2005, p12, accessed 10 October 2006, <www.audit.nsw.gov.au/publications/reports/performance/2005/air_quality/Airquality-contents.html> (*Managing Air Quality*); Submission 9, The Audit Office of New South Wales, p3

287 National Environment Protection Council, *Annual Report 2004-2005*, accessed 1 November 2006, <www.ephc.gov.au/pdf/annrep_04_05/059_064_AT_0_NEPC.pdf>

288 Department of Environment and Conservation, *Air Pollution Economics,* 2005, p4

289 Submission 25, NSW Government, p5

5.20 Accordingly, in the *Action for Air: 2006 Update*, the focus is on reducing the two main air pollutants of photochemical smog (ozone) and fine particle pollution.[290]

5.21 In responding to the Committee as to whether the Air NEPM standards are credible and 'safe', Associate Professor Winder, Toxicology, School of Safety Science, University of New South Wales, stated that interpretation of the scientific context in which the guidelines are set could cause problems when levels reach the higher limit:

> The guideline for particulate matter is 50 micrograms per cubic metre, and that sounds like 49 is ok. This is not that case … different measurements, you make to find that 50, the average of those numbers is about 25 … they just see 49 being ok, 51 being dangerous.[291]

5.22 In responding to the Committee as to whether Australian standards are world's best practice, Mr Ross Carter, Director, Metropolitan Branch, Environment Protection and Regulation Division, Department of Environment and Conservation (DEC) and Mr Nigel Routh, Manager, Air Policy, DEC advised that, whilst direct comparisons were difficult to make between national and international standards, Australian standards were in keeping with best practice, which take into account local circumstances:

> **Mr CARTER:** … we generally examine standards that we feel are most appropriate for Australian circumstances but we rely quite heavily on international work because of the cost involved in deriving those sorts of standards.
>
> **Mr ROUTH:** You cannot always make direct comparisons but I think that it is fair to say that Australia does have standards that most pollutants are up there with the best.[292]

5.23 In 2003 an advisory reporting standard was introduced by the NEPC for $PM_{2.5}$ particles.[293] NSW, which has been measuring these fine particles since 1997, is generally below the national advisory reporting standard for a 24-hour period, but has been above the annual reporting standard level ($8\mu g/m^3$) since measurements first commenced.[294]

5.24 In 2004, the NEPC established the National Environment Protection (Air Toxics) Measure to monitoring the following five air toxics:

- benzene
- formaldehyde

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290 NSW Government, *Action for Air: 2006 Update*, Department of Environment and Conservation, 2006, p1, accessed 9 October 2006, <www.environment.nsw.gov.au/resources/actionforair06465.pdf >

291 Associate Professor Chris Winder, Associate Professor in Toxicology, School of Safety Science, University of New South Wales, Evidence, 16 August 2006, p66

292 Mr Ross Carter, Director, Metropolitan Branch, Environment Protection and Regulation Division, Department of Environment and Conservation and Mr Nigel Routh, Manager, Air Policy, Department of Energy and Conservation, Evidence, Monday 11 September 2006, p27

293 Submission 25, p5

294 Submission 25, Appendix 6, p3

- benzo(a)pyrene as a marker for polycyclic aromatic hydrocarbons (PAHs)
- toluene
- xylenes.[295]

5.25 The advisory reporting standard for $PM_{2.5}$ and the National Environment Protection (Air Toxics) Measure are further discussed at paragraphs 5.31-5.35 and 5.54-5.62 respectively.

Review of the Air NEPM

5.26 The NEPC commenced a full review of the Air NEPM in 2005, noting the importance of ongoing research in providing a better understanding of the health effects of air pollution. The NEPC released an issues scoping paper in October 2005, to gain stakeholder input to identify key issues that are to be considered in the full review of the Air NEPM. The issues paper was open for public comment until December 2005.[296]

5.27 Prior to this, in March 2004, the NEPC commenced a review of the practicability of developing a 10-minute sulphur dioxide standard (there is currently a one hour, one day and an annual measure).[297] The review found that such a variation was not required and advised that the other issues raised regarding the scope and framework of the Air NEPM would be considered as part of the full review of the NEPM.[298]

5.28 As further preliminary work to the full review, in May 2005 the NEPC also released an issues paper on a sub-set of issues for ozone.[299] Whilst the ozone review recommended that, among other things, appropriate averaging periods for ozone standards in the Air NEPM are one, four and eight hours, it was noted that standard levels should be determined during the full Air NEPM review.[300]

5.29 The 2005 Report on the ozone review titled *Report on the Preliminary Work for the Review of the Ozone Standard* also noted the importance of considering the health effects of air pollution on the community:

> Standards should seek to protect all sensitive groups in the community, and where susceptible groups are not able to be wholly protected by the standards, this should be

295 Department of the Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

296 NSW Government, *Action for Air: 2006 Update*, p4

297 Environment and Protection Heritage Council, <www.ephc.gov.au/nepms/air/air_nepm_so2_review.html> (accessed 18 October 2006)

298 National Environment Protection Council, *Report on the Review of the Practicability of a 10 Minute Sulphur Dioxide Standard*, July 2004, p4, accessed 18 October 2006, <www.ephc.gov.au/pdf/Air_SO2_Review/SO2Report.pdf>

299 National Environment Protection Council, *Preliminary Work on Ozone for the Review of the Ambient Air Quality NEPM*, May 2005, accessed 18 October 2006 <www.ephc.gov.au/pdf/Air_Ozone_Review/O3IssuesPaper_13_May_05.pdf>

300 National Environment Protection Council, *Report on the Preliminary Work for the Review of the Ozone Standard,* October 2005, p5, accessed 18 October 2006, <www.ephc.gov.au/pdf/Air_Ozone_Review/Ozone_Report_October_2005.pdf>

> documented. Children with asthma are considered to be a particularly significant sensitive subgroup in relation to ozone. Other sensitive subgroups are people with existing conditions such as chronic respiratory conditions and cardiovascular disease, the elderly and people who may have an inherent genetic susceptibility to ozone. Active individuals who spend long periods outdoors in summer such as outdoor workers, children and athletes are also susceptible because of their potential exposure.[301]

5.30 The NEPC advises that it is expected that the full Air NEPM review will be completed by 2008.[302]

Advisory reporting standard for fine particles ($PM_{2.5}$)

5.31 The Committee received a number of submissions to the Inquiry which highlighted the growing significance of the health impacts of finer particles such as $PM_{2.5}$ and smaller, given that diesel exhaust and new technology in motor vehicles emit the fine particles $PM_{1.0}$ and $PM_{0.03}$.[303] (Fine particles are described in paragraphs 2.13-2.19)

5.32 In 2003, an advisory reporting standard was introduced for $PM_{2.5}$ designed to collect information at a national level to facilitate a review of the goal, potentially leading to the setting of an actual standard. The table below outlines this reporting standard.[304]

Table 5.3 Advisory reporting goal for $PM_{2.5}$

Pollutant	Averaging Period	Maximum Concentration
Particles as $PM_{2.5}$	1 day	$25\mu g/m^3$
	1 year	$8\mu g/m^3$

Source: National Environment Protection Council, *Variation to the National Environment Protection (Ambient Air Quality) Measure,* June 2003, p3

5.33 In evidence to the Committee, Mr Nigel Routh, Manager, Air Policy, DEC, stated that this standard is the tightest in the world.[305] The Committee notes that Australia's annual mean

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301 National Environment Protection Council, *Report on the Preliminary Work for the Review of the Ozone Standard,* p5

302 National Environment Protection Council, *Review of the National Environment Protection (Ambient Air Quality) Measure: Issues Scoping Paper*, October 2005, p25, accessed 18 October 2006, <www.ephc.gov.au/pdf/Air_Quality_NEPM/air_review_draft_ISP_October_2005.pdf>

303 Submission 32, Western Sydney Regional Organisation of Councils Ltd, p10; Submission 29, Asthma Foundation New South Wales, p6; Submission 19, Lane Cove Tunnel Action Group Inc, p56

304 National Environment Protection Council, *Variation to the National Environment Protection (Ambient Air Quality) Measure,* June 2003, p3, accessed 20 September 2006, <www.ephc.gov.au/pdf/Air_Variation_PM25/PM2_5_Variation.pdf>; Submission 25, p5; NSW Government, *Action for Air: 2006 Update*, p4

305 Mr Routh, Evidence, 11 September 2006, p27

$PM_{2.5}$ advisory reporting standard is tighter than the new WHO $PM_{2.5}$ annual mean standard ($10\mu g/m^3$).

5.34 As mentioned in paragraph 5.23, NSW is generally below the national advisory reporting standard for a 24-hour period, but has been above the annual reporting standard level ($8\mu g/m^3$) since measurements were first taken in 1997.[306]

5.35 However, in evidence to the Committee, Mr Routh downplayed the importance in exceeding the annual standard, confirming that this standard was not a reporting standard but an advisory standard, designed to assist in determining an appropriate national standard in 2008:

> … given the paucity of information in the field its explicit intent is to gather data nationally with a mid-term review in 2008 so that over the eight-year period we will have a bank of information nationally that will better inform where to move in terms of setting compliance standard.[307]

Measurement of ultra fine particles (PM_1 and smaller)

5.36 Some submissions to the Inquiry raised increasing concern regarding measurement of ultra fine particles such as PM_1 or smaller.[308]

5.37 The 2005 DEC report *Air Pollution Economics* stated that ultra fine particles may be more toxic than the larger particles due to their size and ability to be trapped deeper in the lung:

> Another hypothesis is that ultra fine particles are more toxic than larger particles, because they can deposit effectively in the alveolar region and can penetrate the lung epithelium. It is also possible that particles can carry potentially toxic gases or toxins into the deep lung, thus increasing the risk of cellular damage.[309]

5.38 In evidence to the Committee, Associate Professor Winder confirmed his belief that smaller particles are more dangerous than the larger particles:

> … most of the health problems are occurring at exposure to 2.5 or even lower than 2.5, maybe even PM_1 … yes, smaller particles are more dangerous than larger particles.[310]

5.39 The Asthma Foundation New South Wales, in its submission, advised that research has shown that these smaller particles reach the lungs more easily and lodge in the respiratory tracts.[311]

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306 Mr Chris Eiser, Manager, Atmospheric Science, Department of Environment and Conservation, Evidence, 11 September 2006, p33; Submission 25, Appendix 6, p3

307 Mr Routh, Evidence, 11 September 2006, p34

308 Submission 27, Residents Against Polluting Stacks, p1; Submission 19, p49; Submission 29, p6

309 Department of Environment and Conservation, *Air Pollution Economics*, p10

310 Associate Professor Winder, Evidence, p67

311 Submission 29, p2

5.40 In its submission to the Inquiry, Residents Against Polluting Stacks claimed that the current Air NEPM standard for particulate matter (PM_{10}) underestimates the importance of the ultra fine particles:

> … compelling evidence over the last decade suggests that the harmful agents are actually those particles less than 1 micron in diameter (PM_1), which may make up less than 1% of the PM_{10} measurement. Although PM_1 particles are technically included in the PM_{10} measurement, the inclusive gravimetric measurement used must necessarily underestimate and under represent their importance.[312]

5.41 The Lane Cove Tunnel Action Group Inc (LCTAG), in its submission to the Inquiry, claimed that toxicity in particles may lie in 'a finer fraction of the particles, perhaps below 2.5μm or smaller', therefore demonstrating that 'PM_{10} might not be the measurement most representative of the fraction of the ambient aerosol that is responsible for its harmful effects on health'.[313]

5.42 LCTAG also claimed that current monitoring by DEC excludes most particles 1μm and less and that about 90% (by mass) of diesel particulates are less than 1μm. LCTAG concludes that PM_1 measurements would provide good information about contributions from the combustion engine, as opposed to other pollution.[314]

5.43 In its submission to the Inquiry, the Asthma Foundation New South Wales also highlighted its concern with the current monitoring system's inability to distinguish between the larger and fine/ultra fine particles, particularly given that fuel combustion produces particles that are predominantly size $PM_{0.1}$ and $PM_{0.03}$.[315]

5.44 In response to these comments, Mr Chris Eiser, Manager, Atmospheric Science, DEC advised that research into the health effects of ultra fine particles is still unclear in relation to which part of the particle should be measured, and which part of the particle is most toxic:

> The health evidence is still to come in in terms of what part of the particle we have to measure, what part of the particle is the most toxic that we need to measure at the moment. The agreement is en masse that $PM_{2.5}$ is the current understanding.[316]

5.45 In evidence to the Committee, Mr Routh advised that these particles are not measured on a routine basis anywhere in the world, but that measurements of ultra fine particles are currently conducted on a research basis only.[317]

5.46 In responding to a question as to whether fine particulate matter, particularly vehicle emissions, should be regarded as a significant health risk with both long and short-term

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312 Submission 27, pp1-2

313 Submission 19, p49

314 Submission 19, p56

315 Submission 29, p6

316 Mr Chris Eiser, Manager, Atmospheric Science, Department of Environment and Conservation, Evidence, 16 August 2006, p11

317 Mr Routh, Evidence, 11 September 2006, p32

impacts, DEC advised that whilst more information on the health impacts are required, they believe that fine particles may be a health risk:

> There is a need to gain better information and data on the health impact of the finer fraction of particulate matter. This has been discussed as part of the national air quality standard setting process under the National Environment Protection Measures, however DEC considers that fine particulate matter may be a health risk.[318]

5.47 Mr Eiser also advised the Committee that, should research indicate that smaller particles should be measured, then DEC will measure them:

> If the health information confirms that we need to look at smaller and smaller particles, and that seems to be the way international literature is going, we will go that way. At the moment, no jurisdiction around the world is actually measuring routinely particle numbers. They have gone as far as $PM_{2.5}$.[319]

Measurement methods for particulate matter

5.48 LCTAG queried whether the current means for measuring particles is appropriate.[320] LCTAG asserted that measurement by mass is no longer suitable in that as more research becomes available regarding ultra fine particles, 'measuring weight is inappropriate for assessing health-risk impact'.[321]

5.49 LCTAG claimed that, in a weight-for-weight comparison, ultra fine particles have a greater surface area that PM_{10} and therefore ultra fine particles have a greater capacity to cause harm:

> Weight-for-weight, fine particles in fossil fuel combustion have an enormous surface area. For example, one billion 0.01μm particles are equivalent to one PM_{10} (10μm) particle but have 1,000 times the surface area, hence an enormous carrying capacity for their carcinogenic cargo of PAHs.[322]

5.50 In this regard, LCTAG has called on the NSW Government to review this form of measurement as an appropriate measure in today's climate:

> … as a matter of urgency, … [r]eview and address the inappropriateness of National air quality standards regarding weighing particulates. Number and surface area of particles, rather than weight, are more accurate indicators of toxicity of fine particles in the emissions of motor vehicles powered by petrol or diesel'.[323]

5.51 *Air Pollution Economics* noted that there has been ongoing discussion regarding the most appropriate metric for particulate measurement, in that, in addition to particle mass, particle

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318 Answers to questions taken on notice during Evidence, 16 August 2006, Department of Environment and Conservation, Question 45, p12

319 Mr Eiser, Evidence, 16 August 2006, p10

320 Submission 19, p5

321 Dr Ray Kearney, Lane Cove Tunnel Action Group Inc, Evidence, 11 September 2006, p5

322 Submission 19, p11

323 Submission 19, p5

number and surface area might also be relevant measurements. The report also noted that the health effects of different types of particles are currently ambiguous:

> … it is currently unclear whether certain characteristics of particulates are more closely associated with health effects than others, and regulatory action has focussed on controlling particulate mass.[324]

5.52 In evidence to the Committee, Mr Routh advised that the composition of particles changes at different sources, making it difficult to determine which form of measurement should be utlised:

> Particles, by their very nature, are quite large in terms of size, composition and a whole lot of other properties. To properly define a particle you can use mass, you can use number, you can use the surface area, or you can use its composition, which is what makes up the particle. We have found that particles are different in locations.[325]

5.53 Mr Routh further advised that, as part of the Air NEPM review, consideration of alternate measurement techniques will be examined, and that the process is a flexible one:

> Part of that review process would encompass looking at appropriate measurement technologies and techniques. It is not something that is static. It is something that is being looked at by a national committee of environmental agencies that reports through to environmental agencies CEOs and ministers through to the Environment Protection Heritage Council.[326]

Measurement of air toxics

5.54 In December 2004, the NEPC introduced the National Environment Protection (Air Toxics) Measure (known as the Air Toxics NEPM) which establishes 'monitoring investigation levels' for five air toxics:

- benzene
- formaldehyde
- benzo(a)pyrene as a marker for polycyclic aromatic hydrocarbons (PAHs)
- toluene
- xylenes.[327]

5.55 The NEPC advises that the data gathered under the Air Toxics NEPM will inform future decisions on the management of these pollutants.[328]

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324 Department of Environment and Conservation, *Air Pollution Economics*, p10

325 Mr Routh, Evidence, 11 September 2006, p33

326 Mr Nigel Routh, Manager, Air Policy, Department of Environment and Conservation, Evidence, 16 August 2006, p10

327 Department of the Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

5.56 In its *2004-2005 Annual Report*, the NEPC advised that NSW had previously undertaken a three-year air toxics monitoring program, which resulted in a comprehensive report on air toxics.[329]

5.57 However, in *Managing Air Quality*, the Audit Office noted that DEC advised they ceased conducting routine monitoring of organic air toxics in August 2004:

> The DEC advised that it stopped the routine monitoring of organic air toxic substances in August 2004, but that it intends releasing monitoring data collected between 2001 (the end of the air toxics research study) and 2004. This however, is low priority due to resources and concentration on the six criteria pollutants [the six Air NEPM].[330]

5.58 A recent article in the Sunday Telegraph quoted a 'confidential' internal email from Mr Chris Eiser, Manager, Atmospheric Science, DEC, which expressed Mr Eiser's concerns regarding the cessation of this monitoring:

> DEC will not be able to carry out any air toxics monitoring post 1 July 2004 on staffing levels at that time. I don't believe that this is a good strategic decision, but it is a consequence of the cuts.[331]

5.59 As mentioned in Chapters 2 and 3, air toxics are highly toxic and pose significant health risks at low concentrations. Furthermore, *Air Pollution Economics* stated that the health effects of these pollutants at low levels are still relatively unknown:

> Therefore, while there is considerable information about the toxicity and risk posed by the more common air toxics at elevated levels, much less is known about the potential risks of ongoing exposure to the low levels that occur in the general environment.[332]

5.60 However, in its submission the NSW Government claimed that DEC monitoring of the levels of air toxics in the Greater Metropolitan Region "broadly found that ambient levels of most air toxics were low and well below current international standards and benchmarks'.[333]

5.61 Whilst there is no provision in the *Protection of the Environment Operations Act 1997* to phase out these toxins, Mr Routh, in evidence to the Committee, stated that the measure for air toxics and the five-year monitoring program will identify exactly what is in the atmosphere.[334]

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328 Department of the Environment and Heritage, <www.deh.gov.au/atmosphere/airquality/standards.html> (accessed 21 September 2006)

329 National Environment Protection Council, *NEPC Annual Report 2004-05*, 2005, p278, accessed 1 November 2006, <www.ephc.gov.au/pdf/annrep_04_05/059_064_AT_0_NEPC.pdf>; Environment Protection Agency, *Dioxins, organics, polycyclic aromatic hydrocarbons and heavy metals,* May 2002, accessed 1 November 2006, <www.epa.nsw.gov.au/air/dopahhm/index.htm>

330 Audit Office of New South Wales, *Managing Air Quality*, p42

331 'Watch on air toxics axed', *Sunday Telegraph*, 1 October 2006

332 Department of Environment and Conservation, *Air Pollution Economics*, p16

333 Submission 25, Appendix 3, p2

334 Mr Routh, Evidence, 16 August 2006, p5

5.62 Mr Routh also stated that the world's best practice in relation to emission limits for industry premises is being applied in NSW and, within that, a comprehensive assessment program applies to premises' specific emission limits that are tighter than the regulatory emission limits.[335]

Measurement of carcinogens

5.63 There is currently no NEPM for carcinogens such as 1,3-butadiene and acetaldehyde. To prevent further harm to individuals, NSW Health advises that the emphasis should therefore be on minimising exposure to these pollutants. In the absence of Australian guidelines or standards, NSW Health states that if health guidelines are required, other sources, such as the World Health Organisation, are used.[336]

5.64 In its submission to the inquiry, the Environmental Defender's Office (NSW) (EDO) noted that the *Protection of the Environment Operations Act 1997* does not establish standards for the eventual phase out of dangerous chemicals that are known to be carcinogenic, mutagenic and tetragenic such as dioxins, furans and mercury. However, the EDO stated that the Act should specify timeframes by which these chemicals will be completely prohibited, a step that is essential for eliminating health risks to the community.[337]

5.65 This issue is further explored in Chapter 4, in the context of the NSW regulatory framework for managing air quality.

Committee comment

5.66 The Committee notes the various international guidelines and national standards that relate to air pollution levels in NSW, and those that are met and exceeded in the Sydney basin.

5.67 The Committee further notes the importance of ongoing local and international research in informing the national standards for safe levels of air pollutants for the whole community. In particular, it is noted that the recent review of the World Health Organisation guidelines found a tightening of standards across a range of common air pollutants, including those of particular concern in Sydney, ozone and particulate matter.

5.68 Given that the Air NEPM is currently under review, the Committee recommends that the NSW Government play an active role in ensuring that the national standards are best suited for the community at large and are as low as is reasonably achievable, taking into account international research and best practice.

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335 Mr Routh, Evidence, 16 August 2006, p5

336 Answers to questions taken on notice during Evidence, NSW Health, 11 September 2006, Question 6, p3

337 Submission 10, Environmental Defender's Office (NSW), p8

Recommendation 15

That the NSW Government work with the National Environment Protection Council to ensure regular reviews of the National Environment Protection Measure in the context of Australian deaths from air pollution, levels set as low as is reasonably achievable, and international best practice, and that review intervals are short enough to allow for the timely incorporation of the latest information on air pollution.

5.69 The Committee notes the concerns raised by a range of Inquiry participants such as the NSW Government, the Lane Cove Tunnel Action Group, Residents Against Polluting Stacks, the Environmental Defender's Office NSW and Associate Professor Winder arising out of the growing research into the detrimental health effects of fine and ultra fine particulate matter.

5.70 The Committee acknowledges that DEC and NSW Health are aware of this growing body of international and domestic research and that this research informs their decision making.

5.71 Nevertheless, the Committee believes that, given the evidence suggesting that diesel and other fuels produce fine and ultra fine particles, further efforts into research and cooperation with the NEPC regarding the health effects and measurement of fine and ultra fine particles should be undertaken by the NSW Government, particularly DEC and NSW Health.

5.72 The Committee believes that there is sufficient evidence of the harm from fine and ultra-fine particles to justify taking immediate action to reduce these levels.

Recommendation 16

That the Department of Environment and Conservation work closely with NSW Health and the National Environment Protection Council to trial testing of ultra fine particle measuring technology and research into the health impacts of ultra fine particles, informed by relevant international research.

Recommendation 17

That the NSW Government, in working with the National Environment Protection Council to develop the National Environment Protection Measure for particulate matter of $PM_{2.5}$, ensure that the standards take into account international research into fine and ultra fine particles.

Recommendation 18

That the NSW Government take immediate action to reduce levels of fine and ultra-fine particles.

5.73 As highlighted in the Audit Office's report, *Managing Air Quality*, the Committee is concerned that DEC no longer routinely measures air toxics in New South Wales.

5.74 The Committee notes the evidence regarding the health impacts of air toxics and, in particular, the concerns raised by the Environmental Defender's Office (NSW), and the limited amount of information available regarding these pollutants and their effects.

5.75 The Committee further notes that, as mentioned in Chapter 2, the air toxics of concern in the Sydney basin are benzene, formaldehyde and polycyclic aromatic hydrocarbons (PAHs) and, specifically within the Sydney central business district, 1,3-butadiene and benzene.[338]

5.76 The Committee is concerned that the community, particularly those groups more susceptible to air pollution, may be at a risk that is currently unquantified.

5.77 The Committee accepts the contention of the Environmental Defender's Office (NSW) that there is potential to increase the pace at which emissions of those air pollutants known as air toxics, which include a number with demonstrable carcinogenic properties, are reduced to zero.

5.78 In this regard, the Committee recommends that in addition to monitoring levels of air toxics, DEC work towards actively reducing the levels of air toxics in the Sydney basin.

Recommendation 19

That the Department of Environment and Conservation recommence regular monitoring of air toxic substances in New South Wales, particularly in the Sydney basin.

Recommendation 20

That the NSW Government, in consultation with the National Environment Protection Council, investigate the feasibility of including a target of reducing the emission of that class of air pollutants known as 'air toxics' to zero. The NSW Government should address this issue as part of the 2008 review of the Air National Environment Protection Measures.

Recommendation 21

That the Department of Environment and Conservation undertake programs that actively seek to reduce the levels of known air toxics in the Sydney basin.

338 NSW Government, *Action for Air: 2006 Update*, Department of Environment and Conservation, 2006, p8, accessed 9 October 2006, <www.environment.nsw.gov.au/resources/actionforair06465.pdf>; Department of Environment and Conservation, *Air Pollution Economics*, p16

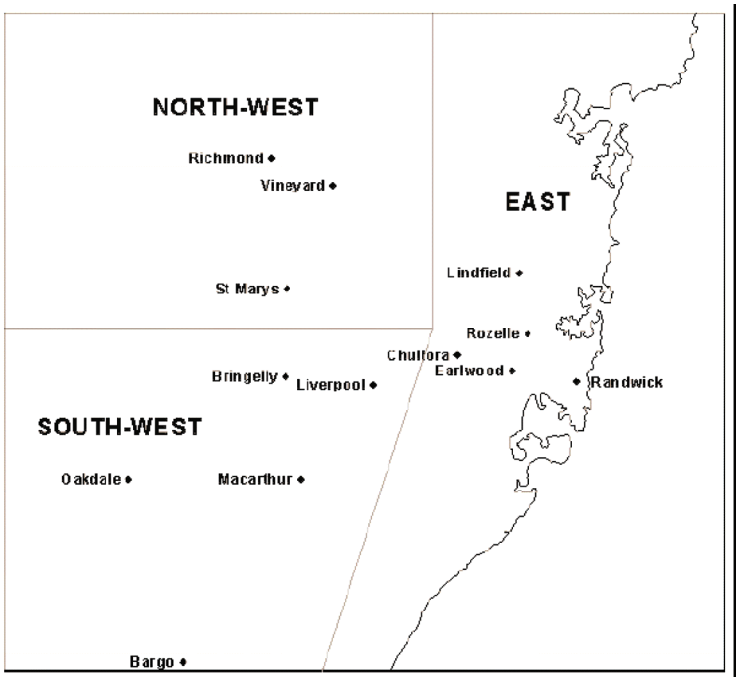
Monitoring and reporting of air pollution levels

In this section, the Committee examines the various monitoring and reporting functions of air pollution levels in NSW, such as the Air Quality Monitoring Network, daily, quarter year and annual reporting of air pollution levels and the Regional Pollutant Index.

Air Quality Monitoring Network

5.79 DEC is responsible for the Air Quality Monitoring Network in New South Wales. Under this program, accurate real-time measurements of ambient level pollutants are collected at sites located around Sydney, the Illawarra, the lower Hunter and selected rural sites. The map below identifies the monitoring station locations in the Sydney region.[339]

Figure 5.1 Location of air quality monitoring stations in the Sydney region



Source: Submission 25, NSW Government, p8

5.80 The NSW Audit Office 2005 performance audit report, *Managing Air Quality: Department of Environment and Conservation* (*Managing Air Quality*), reviewed the network of air quality monitoring stations and noted that the network had undergone a 'significant' reduction since 2003-2004.[340]

5.81 Whilst DEC still operates the largest number of air quality monitoring stations in Australia,[341] the number of stations was reduced by a quarter in 2004-05. The Audit Office, in *Managing Air*

339 Submission 25, p8

340 Audit Office of New South Wales, *Managing Air Quality*, p55

341 Answers to questions taken on notice during Evidence, Department of Environment and Conservation, 16 August 2006, Question 54, p14

Quality, stated that DEC advised that the reduction in monitoring stations was due to its resources being 'cut back'.[342]

5.82 DEC now operates 24 monitoring stations, 14 in Sydney, three in the Illawarra, three in the lower Hunter and four in rural NSW.[343]

5.83 In *Managing Air Quality*, the Audit Office stated that 'the impact of this significant reduction in monitoring capacity should be reviewed in the future'.[344]

5.84 In responding to a question as to whether the review as suggested by the Audit Office had been undertaken, DEC advised that the NEPC review of the Air NEPM by 2008 would provide an opportunity to 'review the current network configuration'.[345]

5.85 The Committee received several submissions expressing concern that the number of air monitoring stations was being reduced. Of particular concern was the closure of the monitoring station in the Sydney central business district, as highlighted by Ms Clover Moore MP, Member for Bligh and Lord Mayor of Sydney, the Asthma Foundation New South Wales and the EDO.[346]

5.86 In its submission to the Inquiry, the Southern Sydney Regional Organisation of Councils (SSROC) highlighted its concern at the closure of two of the four monitoring stations in Eastern Sydney, particularly given their proximity to potentially important sources of emissions (the industrial area of Kurnell and the high traffic of the central business district).[347]

5.87 Warringah Council, in its submission, raised concern that the closest monitoring station to the Northern Beaches was at Lindfield on the North Shore, meaning 'that at best the Northern Beaches region is relying on assumptions and extrapolations about the air quality data in the area and at worst the issue is not being considered at all'.[348]

5.88 In response to criticism regarding the reduced monitoring network, Mr Eiser, Manager, Atmospheric Science, DEC, stated that a review of the existing stations and the decision to close some of them were based on changing technologies and shifting population:

> We basically look at the scientific value of the various stations. Our assessment is that the ones we closed were of lesser scientific value than the ones we were going to maintain … So you will find where we closed the stations, being towards the coast, we

342 Audit Office of New South Wales, *Managing Air Quality*, p55

343 Submission 25, Appendix 6, p5

344 Audit Office of New South Wales, *Managing Air Quality*, p55

345 Answers to questions taken on notice during Evidence, Department of Environment and Conservation, 16 August 2006, Question 19, p12

346 Submission 30, Ms Clover Moore MP, Member for Bligh, p1; Submission 39, Ms Clover Moore, Lord Mayor of Sydney, p1; Submission 29, p1; Submission 10, p12

347 Submission 28, Southern Sydney Regional Organisation of Councils, p7

348 Submission 21, Warringah Council, p1

> are actually maintaining our coverage in the areas where there is going to be population growth in the future.[349]

5.89 The EDO, in its submission to the Inquiry, stated that in addition to the closure of some monitoring stations, the sampling levels have also decreased from 1,500 to 450, indicating a 'concern in terms of data sampling and in terms of DEC's capacity to accurately monitor air quality levels'.[350]

5.90 The Western Sydney Regional Organisation of Councils Ltd (WSROC) highlighted the importance of a comprehensive air quality monitoring network, as well monitoring pollution where it is emitted:

> Air quality monitoring networks should be enhanced and maintained to provide a more comprehensive overview of air quality in the region and monitoring points must be established near known and potential pollution point sources. Effective monitoring is a critical necessity for the effective management of air pollution and its impacts.[351]

5.91 In its submission to the Inquiry, LCTAG highlights lack of point source monitoring as a shortcoming with the current air pollution monitoring network, as this absence allows large pollutant sources such as road tunnel vent stacks to avoid meeting the national standards:

> This flaw in the standards enables the Regulatory Authorities to pump emissions from vent stacks in a concentrated, toxic plume that would far exceed the standards it if were measured at source.[352]

5.92 In response to these concerns, DEC advised that the air quality monitoring network is not static and that changes continually occur due to changing technology and other factors. DEC further advised that changes to the network mean that there is an increased percentage of collected information available to the public, which is more easily accessible:

> The network is the most comprehensive in Australia and is regularly reviewed according to national criteria. Sampling levels as measured by the number of instruments in the Air Quality Monitoring Network have been changed following the closure of redundant stations. As a result of the changes to the network, data from 98% of the remaining air quality monitoring instruments are now available for posting onto the DEC website where previously this was 81%. Resource intensive batch sampling has been reduced from 19% of the air quality monitoring instruments to around 2% today. This translates to air quality data from the network being more quickly accessible to the community.[353]

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349 Mr Eiser, Evidence, 16 August 2006, p3

350 Submission 10, p12

351 Submission 32, p5

352 Submission 19, p66

353 Answers to questions taken on notice during Evidence, Department of Environment and Conservation, August 2006, Question 54, p14

Committee comment

5.93 The Committee shares the widespread community concern regarding the changes to the air quality monitoring network across Sydney, and the Audit Office's comments in this regard.

5.94 The Committee believes that DEC should undertake the review of the monitoring network as suggested by the Audit Office, allowing the planned review of the Air NEPM to inform the future network composition.

Recommendation 22

That the Department of Environment and Conservation undertakes the review of the monitoring network as suggested by the Audit Office, allowing the planned review of the Air NEPM to inform the future network composition.

5.95 Notwithstanding the above recommendation, the Committee believes that in recognition of the widespread community concern regarding the closure of stations across the Sydney basin, particularly within the Sydney central business district and in air pollution 'hot-spots', that DEC should ensure that air quality information is able to be captured in all relevant areas.

Recommendation 23

That the Department of Environment and Conservation ensure that information on air pollution levels across New South Wales is adequately captured, by reinstating monitoring stations in the Sydney central business district and air-pollution 'hot-spots'.

Regular reporting of air pollution levels

5.96 DEC produces a number of regular air quality reports:

- Annual reports to the NEPC on compliance with the national standards for the six Air NEPM pollutants
- Quarterly reports available on the DEC website providing detailed air quality monitoring data from all monitoring stations
- Daily summaries available on the DEC website providing air quality data for the Air NEPM pollutants at locations monitored on the previous day
- Regional Pollution Index available on the DEC website, in print media and via a 24-hour hot line, measures the worst pollutant of the day in a region.[354]

5.97 In *Managing Air Quality*, the Audit Office stated that 'there is scope to improve the timeliness, user-friendliness and consistency of publicly reported air quality data'. The Audit Office

354 Audit Office of New South Wales, *Managing Air Quality*, pp62-63

advised that quarterly reports were released on the web 'up to 18 months following the end of the quarter, with the latest reports released nine months after the end of the quarter'.[355]

5.98 The Audit Office noted that DEC advised it that 'delays with the quarterly report have been addressed'.[356] However, a recent check of the DEC website indicated that the last quarterly report available was for the October – December 2005 quarter, that is, over nine months ago.[357]

5.99 In his submission to the Inquiry, Mr Cliff Maurer, a concerned citizen, raised concerns with the Environmental Protection Agency (EPA) regarding what appeared to be a duplication of monthly average and highest value statistics for the July 1993 and October 1993 data, the August 1993 and November 1993 data and the September 1993 and December 1993 data. Mr Maurer stated that, although he has brought the apparent duplication of data to the attention of the EPA, he has not received a response.[358]

5.100 In response to a query regarding what redress a citizen has should they receive inaccurate data, in evidence to the Committee, the Auditor-General, Mr Bob Sendt, advised that if the information itself is not accurate, there is 'probably limited redress' for the individual. Mr Sendt also stated that the Audit Office had previously recommended that key performance information released by agencies should be subject to an independent validation process but that the Government had not responded to the recommendation that the Audit Office perform that process:

> An argument that I and the Audit Office have been making for many years is that New South Wales should adopt the system that is in place in some other jurisdictions in Australia and around the world that key performance information released by government and government agencies should be subject to some validation process, whether by the Audit Office or by some external party, to give the same level of assurance about that information as applies to financial information, which has to be audited for every government agency across the State. That is an issue that the Government has been considering since 1998, when Treasury proposed that that power be given to the Auditor-General. Some eight years on, the Government is yet to respond to that recommendation.[359]

5.101 In *Managing Air Quality,* the Audit Office stated that DEC should provide information that was more easily understood by the public, by reducing the amount of data published and increasing the amount of descriptive information to accompany the data:

> We believe the DEC should rationalise data provision and focus on data interpretation to enhance its usefulness to a range of stakeholders, including local authorities and the public at large.[360]

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355 Audit Office of New South Wales, *Managing Air Quality*, p63

356 Audit Office of New South Wales, *Managing Air Quality,* p55 & 63

357 Department of Environment and Conservation, <www.epa.nsw.gov.au/air/datareports.htm> (accessed 19 October 2006)

358 Submission 15, Mr Cliff Maurer, p1

359 Mr Bob Sendt, NSW Auditor General, Evidence, 16 August 2006, p46

360 Audit Office of New South Wales, *Managing Air Quality*, p63

5.102 In its submission to the Inquiry, WSROC recommended that the Government collect useful information, such as information on the health and financial impacts of air pollution, and use this information constructively to reduce the impacts of air pollution:

> The State Government should collect data on the economic impacts and health costs of air pollution on a sub-regional (air-shed) level and the data should be used to develop equitable programs to mitigate these impacts.[361]

Regional Pollutant Index

5.103 As mentioned in Chapter 3, DEC, in conjunction with NSW Health, utilises the data collected from its monitoring stations to issue twice daily reporting of air pollution in the Sydney, Wollongong and Newcastle regions, in the form of the Regional Pollutant Index (RPI). The RPI is calculated by comparing fine particle, ozone and nitrogen dioxide levels to national standards and environmental goals.[362]

5.104 The RPI reports whether air pollution levels have been low, medium, high or hazardous, and forecasts the likely pollution levels for the next day. Health alerts, issued when the RPI is likely to be high or hazardous, are based on the forecast and take into account extreme pollution events such as bushfires.[363]

5.105 The RPI reports are based on measured concentrations of ozone and nitrogen dioxide and a measure of visibility. For each time period and for each region, the maximum 1-hour concentration for each pollutant is determined, and compared to the national standards. For ozone and nitrogen dioxide, the one-hour NEPM goals are used. For visibility, the EPA one-hour visibility goal corresponding to a visual distance of approximately nine kilometres is used.[364]

5.106 For each region, the highest calculated index is used as the RPI for that region. An RPI of 50 corresponds to the relevant standard/goal. Similarly, an RPI of 25 equals half of the standard or goal level. The RPI is categorised as low, medium or high as follows:

- low: pollution index from 0 to 24
- medium: pollution index from 25 to 49
- high: pollution index 50 or higher.

5.107 Therefore, when the RPI is reported as high, it indicates that the determining pollutant levels have reached or exceeded the relevant standard or goal.[365]

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361 Submission 32, p5

362 Submission 25, Appendix 11

363 Submission 25, Appendix 11

364 Department of Environment and Conservation, <www.epa.nsw.gov.au/air/rpi.htm> (accessed 19 October 2006)

365 Department of Environment and Conservation, <www.epa.nsw.gov.au/air/rpi.htm> (accessed 19 October 2006)

5.108 In its submission to the Inquiry, Warringah Council suggested that the information related to the RPI should be more easily accessible to enable Councils to understand and utilise it in a meaningful manner:

> While air quality data is available on the Department of Environment and Conservation website, the Regional Pollution Index trends are not clearly presented. It is hard for Councils to quickly gather a picture of the state of air quality in their region or local area and the long-term trends without drilling into the data stored and extrapolating conclusions. It would greatly assist Councils and the public if this information was tabulated and averages provided.[366]

5.109 In its submission, the Asthma Foundation New South Wales suggested that information on the health effects of air pollution and specific events or instances of high pollution should be greater publicised. In this regard, the Asthma Foundation:

> … recommends that the NSW Government encourage media outlets, especially television, to broadcast details of suburbs affected by fire reduction or bushfires during the main months of the bushfire season (October to March). This could be done during popular weather reports and used as an opportunity to remind people with respiratory conditions of a few simple measures to avoid exacerbation of asthma.[367]

Committee comment

5.110 The Committee believes that the public reporting of air pollution is an opportunity to raise awareness about the sources and dangers of air pollution. It is also a means for linking levels of pollution with particular activities by individuals and industry.

5.111 Given the uncertainty highlighted in Chapters 2 and 3 in relation to the role that air pollution may play in any individual health event, and the precise health effect that air pollution has on the community and the health system, it is apparent to the Committee that the information that can be confirmed should be accurately and regularly reported to the public.

5.112 The Committee acknowledges the efforts that have been made by DEC and NSW Health in reporting and distributing information on air pollution; however, as suggested by the evidence received, improvements could be made to this system.

5.113 The Committee notes the concerns raised by the Audit Office in its report, *Managing Air Quality*, in relation to the quality and accessibility of the reports issued by DEC.

5.114 The Committee also believes that WSROC's suggestion that data be collected and collated for a meaningful purpose has merit.

5.115 The Committee therefore recommends that the NSW Government ensures that key performance information is validated by an independent body such as the Audit Office, and that the information and reports released by DEC are easily understood by, and accessible to, the public.

366 Submission 21, p1

367 Submission 29, p10

Recommendation 24

That the NSW Government ensure that key performance information relating to air pollution released by government agencies is subject to an external validation process, to provide assurance to the public that the information is correct. The power to validate key performance information and the decision on which key performance information should be validated should rest with an independent body such as the Audit Office.

Recommendation 25

That the Department of Environment and Conservation review its current array of quarterly and annual reports to ensure that a plain English language summary accompanies each report, and that the reports provide information on the links between air pollutants and their health and financial impacts in a way accessible to stakeholders.

5.116 The Committee notes that whilst the current RPI measures levels of ozone, particles and nitrogen dioxide, it only reports on the pollutant that is highest in concentration over the reporting period.

5.117 In this regard, to allow the RPI to be more meaningful for the whole community and to emphasise the pollutants that are currently the highest priority in NSW, the Committee recommends that the RPI be expanded to report on the levels of ozone and particulate matter (both $PM_{2.5}$ and PM_{10}), as well as the air pollutant with the highest level.

5.118 Given the amount of evidence received by the Committee in relation to fine particle emissions from motor vehicles and other fuels, the Committee recommends that the information contained in the RPI also be linked to the source or activity that causes the pollution. By linking the source or activity to the pollution level, the community, business and industry will all be aware of the impact their activities have on the quality of the air they breathe.

Recommendation 26

That the Department of Environment and Conservation expand the Regional Pollution Index to allow for reporting on the levels of photochemical smog, particulate matter (both $PM_{2.5}$ and PM_{10}), as well as the air pollutant with the highest level.

Recommendation 27

That the Department of Environment and Conservation develop methods of presenting air pollution information contained in the Regional Pollution Index in a targeted way that attributes pollution to its main sources, to better and more routinely inform the public of the connection between activities such as motor vehicle use and air pollution levels.

5.119 The Committee recognises the merit in the Asthma Foundation New South Wales' suggestion of incorporating air pollution messages into public announcements such as weather reports.

5.120 However, the Committee recommends taking this a step further by incorporating not only specific events or high levels of pollution, but also the information contained in the expanded RPI contained in Recommendations 26 and 27.

5.121 By linking the existing reporting mechanisms such as the RPI and Air Pollution Health Alert System with existing services such as daily television, radio, newspaper and internet weather reports, more sectors of the community will be made aware of how the local air pollution may affect them, and how their activities may affect the level of air pollution.

Recommendation 28

That the Department of Environment and Conservation, in conjunction with NSW Health, work with media outlets to develop ways of incorporating air pollution advisories into the existing broadcast meteorological services, and take action to implement them.

Chapter 6 Specific issues

Sydney is a growing city, with a steadily increasing population exerting a corresponding influence on the environment within which it is located. In this chapter, the Committee examines a number of specific air pollution issues that have an impact on the health of people living within the Sydney basin. The role of motor vehicles in relation to air pollution is examined in particular detail, and the challenges facing the management of air quality into the future are outlined. Possible solutions to current and future challenges are identified.

Use of private motor vehicles

6.1 There is an overwhelming consensus expressed in evidence received during this Inquiry that emissions from motor vehicles are the key current and future challenge to maintaining air quality in the Sydney basin. This view is shared by the NSW Government which, in its submission to this Inquiry, highlighted the significant impact of motor vehicle emissions on the quality of the air in Sydney and noted it as one of the major challenges in reducing air pollution in the future.[368]

6.2 In the principal policy document governing the maintenance of air quality in New South Wales, *Action for Air*, the Department of Environment and Conservation (DEC) stated:

> As the population of Sydney grows, the number of cars and trucks on the road also increases. The number of trips we take and the length of those trips are rising too, as we use our vehicles more intensively than ever before. This seemingly unstoppable growth of vehicle use not only congests our roads: it is the most significant source of many of the pollutants that damage our air quality.[369]

6.3 The 2002 *Action for Air: An Update* continued to identify motor vehicle emissions as the 'highest priority' for the future in order to meet national air quality standards and goals, and further identified a number of important objectives:

> Improvement of transport choices, reduction of private vehicle travel (measured as vehicle kilometres travelled or VKT) and the integration of urban infrastructure and public transport are critical objectives in the plan.[370]

6.4 As discussed in Chapter 2 of this Report, motor vehicles are particularly important contributors to the air pollutants photochemical smog (ozone) and particulate matter. They are the most significant source of precursor pollutants for ozone in Sydney, and are the dominant source of nitrogen oxides (71%) and anthropogenic volatile organic compounds

368 Submission 25, NSW Government, p4

369 NSW Government, *Action for Air*, Environment Protection Authority, 1998, p5, accessed 9 October 2006, < http://www.environment.nsw.gov.au/resources/actionair.pdf> (*Action for Air*)

370 NSW Government, *Action for Air: An update September 2002*, Environment Protection Agency, September 2002, p3, accessed 16 October 2006, <www.environment.nsw.gov.au/resources/update.pdf>

(VOC)(38%).[371] Motor vehicles are also the third highest anthropogenic particle contributor (12%), after industry (36%) and commercial/domestic sources (35%).[372]

6.5 The 2002 *Action for Air: An Update* identified the two air pollutants, ozone and particles, as being of 'primary concern'[373] and *Action for Air: 2006 Update* reaffirmed that 'ozone and particles remain the two biggest challenges we face in managing air quality'.[374]

6.6 *Action for Air: 2006 Update* noted that while the relative contribution from motor vehicles of each pollutant (VOCs, nitrogen oxides and particles) fell between 1992 and 2002, and is expected to further decline in the following 10-15 years due to improved engine technology and changes in fuel composition, motor vehicles remain 'the major source of air pollution in Sydney'.[375]

6.7 There is broad community awareness and concern over Sydney's reliance on private motor vehicles for transport and the implications this has for air quality. A large number of individual councils and groupings of councils such as the Western Sydney Regional Organisation of Councils (WSROC), the Southern Sydney Regional Organisation of Councils (SSROC) and the Western Sydney Alliance, made submissions to this Inquiry that identified motor vehicle emissions as a major cause for concern.[376]

6.8 In its submission to the Inquiry, SSROC emphasised its concern over the contribution that motor vehicle emissions make to air pollution by citing a study undertaken by NSW Health and the Central Sydney Area Health Service. The study compared exposure to air pollution for five commuting modes (car, train, bus, bicycle and walking) in Sydney, and found that exposure to motor vehicle emissions had a direct impact on the health of the population:

> … the results indicating elevated exposure to motor vehicle related pollutants in transport corridors were "consistent with NSW Environment Protection Agency data indicated that cars and other motor vehicles are generating considerable volumes of air pollutants that directly and adversely impact upon other commuters and the population in general".[377]

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371 Submission 25, p11

372 Submission 25, p11

373 Environment Protection Authority, *Action for Air: An update September 2002*, p3

374 NSW Government, *Action for Air: 2006 Update*, Department of Environment and Conservation, 2006, p2, accessed 9 October 2006, <www.environment.nsw.gov.au/resources/actionforair06465.pdf>

375 Submission 25, Appendix 1, p8

376 See for example, Submission 28, Southern Sydney Regional Organisation of Councils; Submission 32, Western Sydney Regional Organisation of Councils; Submission 17, Western Sydney Alliance; Submission 20, Campbelltown City Council; Submission 13, Lane Cove Council; Submission 14, Randwick Council; Submission 21, Waringah Council; Submission 26, Willoughby Council; Submission 30, Ms Clover Moore MP, Member for Bligh; Submission 33, Baulkham Hills Council; Submission 39, Ms Clover Moore, Lord Mayor of Sydney.

377 Chertok, M, Voukelatos, A, Sheppeard, V and Rissel, C. 'Comparison of air pollution exposure for five commuting modes in Sydney – car, train, bus, bicycle and walking' *Health Promotion Journal of* Australia Vol. 15, No. 1, 2004, cited in Submission 28, Southern Sydney Regional Organisation of Councils, p3

6.9 The main areas of concern in relation to motor vehicles as a source of air pollution are:

- the increasing number of motor vehicles
- the increasing use of existing private motor vehicles and the increasing distances travelled by private motor vehicles (expressed by vehicle kilometres travelled - VKT)
- the kind of fuel used and the efficiency of its combustion.

6.10 The following sections of this chapter will examine these issues in more detail.

Increasing number and use of motor vehicles

6.11 Vehicle ownership in Sydney has increased significantly since 1971. While the population has increased from just under 3 million in 1971 to approximately 4.25 million in 2004, the number of vehicles has more than doubled in the same period of time, from less than 1 million to more than 2 million.[378]

6.12 The distances travelled in private motor vehicles have also increased. In 2002, over 70% of all weekday trips in Sydney were made by private car, with car travel increasing at a faster pace than population growth. Between 1991 and 2002, while population grew by 1.3% annually, the number of weekday car driver and passenger trips increased by 1.8% per year. Over the same period the total number of household vehicles increased by 2.2% per year and VKT increased by 2.3% per year.[379]

6.13 *Action for Air: 2006 Update* attributed the increase in VKT to a range of factors including a growing economy, lower unemployment and an increase in car sales since 2000, all working together to generate 'greater demand for mobility' and 'an increase in travel for all purposes'. The increase in employment in areas such as western Sydney that 'favour a dependency on the car' has also contributed.[380]

6.14 Despite the high priority given by the NSW Government to reducing private vehicle use in *Action for Air* and its subsequent *Updates*, it is obvious to a large number of Inquiry participants, as well as to the NSW Government itself, that private vehicle use is more widespread than ever before.

6.15 In evidence to the Committee, Mr Bob Sendt, the NSW Auditor General commented on the findings of the Audit Office 2005 report *Managing Air Quality,* which found that the NSW Government had failed to reduce VKT:

> A key aim of the strategic plans was to reduce the use of private cars, the most significant threat to urban air quality. We found that government actions had failed to achieve this reduction.[381]

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378 Submission 25, pp10, 11

379 NSW Government, *Action for Air: 2006 Update*, p10.

380 NSW Government, *Action for Air: 2006 Update*, p10.

381 Mr Bob Sendt, NSW Auditor General, Evidence, 16 August 2006, p44

6.16 In its submission to the Inquiry, the Environmental Defender's Office (NSW) (EDO) identified the consistent increase in motor vehicle use and VKT as the most significant challenge facing Sydney. A lack of viable public transport options was cited as a reason for the increases:

> Unless a drastic overhaul of the transport system is instituted in NSW, in conjunction with urban planning initiatives that lead to a decrease in motor vehicle reliance, then gains made in motor vehicle technology and in the industrial sector will soon be substantially subverted by burgeoning vehicle use.[382]

6.17 In his answer to questions taken on notice during the Committee's public hearing of 16 August 2006, Mr Sendt, the NSW Auditor General, commented on the ineffectiveness of *Action for Transport 2010* and *Action For Air* in achieving a reduction in vehicle kilometres travelled:

> Eight years after the release of the two plans, we still had more cars on our roads. People were making more and longer trips by car. By 2020, car use is expected to increase by a third. In 2004, only one in nine trips was by public transport.[383]

6.18 The NSW Government's *Action for Transport 2010* had as two points of its ten point action plan the specific objectives of improving air quality and reducing car dependency.[384] *Action for Transport 2010* further stated that improving air quality would require a halt in the growth of VKT per capita by 2011, and a halt in growth of total VKT by 2021. Reduction in car dependency would require the implementation of all the major public transport infrastructure and policy initiatives outlined in *Action for Transport 2010*.[385]

6.19 The major public transport infrastructure initiatives outlined in *Action for Transport 2010* were intended to improve public transport options and raise awareness about the benefits of public transport:

> These major new rail and transitway infrastructure projects will help reduce the need for travel by car. However, we also need to increase community awareness of the benefits of travelling by public transport for the environment, its affordability and accessibility.[386]

6.20 Many of the public infrastructure projects outlined in *Action for Transport 2010* have not been implemented by the dates specified. At the same time, road infrastructure projects such as tollways have often been completed on or before the dates specified.

6.21 The submission to this Inquiry from the EDO detailed a number of areas where it considered public transport enterprises in *Action for Transport 2010* had been undermined:

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382 Submission 10, Environmental Defender's Office (NSW), p3

383 Answers to questions taken on notice during evidence 16 August 2006, Mr Bob Sendt, Auditor General, NSW Audit Office, Question 2, p3

384 NSW Government, *Action for Transport 2010*, 1998, accessed 20 October 2006, <www.urbantransport-technology.com/projects/sydney2>

385 NSW Department of Transport, *Action for Transport 2010,* p10-11

386 NSW Department of Transport, *Action for Transport 2010,* p11

- the delay in commencement of the North West Rail Link
- the abandonment of the Parramatta to Epping rail link (now Epping to Chatswood rail link)
- low patronage of the Bus Transitways System
- poor reliability of services
- increased fares
- reduction in train services on many lines.[387]

6.22 These perceived deficiencies in achieving the objectives of *Action for Transport 2010* led the EDO to conclude that '[t]here is therefore currently very little incentive for passengers to choose public transport and reduce their motor vehicle use'.[388]

6.23 The EDO went on to comment it was 'highly supportive' of the enterprises outlined in *Action for Transport 2010*, adding that:

> Travel management strategies that deliver results must be of the highest priority, and must be initiated immediately.[389]

6.24 The identification of inadequate public transport as a major obstacle to reducing the use of private motor vehicles is common to a number of submissions.

6.25 Mr Greg Smith, CEO of the Asthma Foundation New South Wales, summarised the Foundation's concern over vehicle emissions by highlighting that reliance on the private motor vehicle for transport is the root of the air pollution problem:

> I guess the biggest ticket item that we would want to put before the Committee and the community generally is one of saying that, while ever we rely on cars so heavily for our transport system, we are always going to have severe problems with air pollution.[390]

6.26 The Western Sydney Alliance also identified transport and transport infrastructure as a major challenge, particularly the dependence on private motor vehicles:

> The key element of this challenge is to reverse the high and increasing level of dependence and reliance throughout Sydney on private motor vehicle usage.[391]

6.27 The strategic importance of improving public transport infrastructure is clearly recognised by the NSW Government. According to Mr Jim Glasson, Director General of the Ministry for Transport, *Action for Transport 2010* and its successor documents, the Metropolitan Strategy

387 Submission 10, p11

388 Submission 10, p11

389 Submission 10, p11

390 Mr Greg Smith, Chief Executive Officer, Asthma Foundation NSW, Evidence, 16 August 2006, p23

391 Submission 17, p9

and the draft *State Plan* have a 'clear outline in terms of expansion of the heavy rail network, both with the completion of Epping to Chatswood but also the north west and the south west and the future CBD linkage'.[392]

6.28 Public transport is not the only alternative to private motor vehicle use, but it is the most viable for longer journeys. For shorter journeys, cycling and walking provide healthy and environmentally responsible alternatives to the private motor vehicle.

6.29 In evidence to the Committee, Mr Les Wielinga, Chief Executive, RTA, commented that cycleways were important components of the road infrastructure and that the RTA had invested 'about $250 million' in cycleways and pedestrian ways over the last 10 years.[393]

6.30 Mr Wielinga further commented that the RTA works with local councils to develop cycleways, with spending on a 50:50 basis. He noted however that bicycles were only one element of the road-using population:

> There is competition for the road space with public transport, cyclists, pedestrians and motor vehicles ... cycleways are important, but there needs to be a balance between the different competition for road users. [394]

Committee comment

6.31 The Committee believes that the issue of increasing use of private motor vehicles is a major concern in the context of air pollution.

6.32 Problems caused by private motor vehicle use have two causes – a lack of viable public transport and other alternatives to the use of the car for transport, and the linked community attitude that favours the use of the car. NSW Government action to reduce the use of the car therefore needs to focus on these areas. Demonstrating the contribution that vehicle use makes to air pollution is one way to reinforce that we, as community members, have to take responsibility for our actions, and the recommendations of Chapter 5 are intended to raise the profile of air pollution in the community in that regard.

6.33 Meeting and exceeding the public transport objectives once contained within *Action for Transport 2010* and now reconfigured in the Metropolitan Strategy and the draft *State Plan* will send a clear message to the community that public transport is a reliable, viable and environmentally responsible alternative to the private motor vehicle.

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392 Mr Jim Glasson, Director General, Ministry for Transport, Evidence, 16 August 2006, p41

393 Mr Les Wielinga, Chief Executive, NSW Roads and Traffic Authority, Evidence, 16 August 2006, p33

394 Mr Wielinga, Evidence, 16 August 2006, p33

Recommendation 29

That the NSW Government develop clear public transport infrastructure objectives and performance indicators, to be incorporated into the completed *State Plan*, with progress towards those objectives annually reported to the NSW Parliament.

Fuel and vehicle technology

6.34 The type of fuel used in vehicle engines and the efficiency with which it is burnt affects the quantity and quality of the emissions released. The NSW Government, in its submission to this Inquiry, described as a 'major improvement' changes in fuel composition and vehicle engine technology, particularly the introduction of unleaded fuel, cleaner fuels and 'progressively cleaner vehicles'.[395]

Fuel and vehicle emission standards

6.35 Fuel and vehicle emission standards nationally are regulated by the Australian Government through the *Fuel Quality Standards Act 2000,* the *Motor Vehicle Standards Act 1989* and the Australian Design Rules.[396] In its submission to this Inquiry, the NSW Government said that NSW has 'actively engaged in the process of setting national standards'.[397]

6.36 Australian emission standards for both petrol and diesel vehicles are set in Australian Design Rules and enforced nationally under the *Motor Vehicle Standards Act 1989* by the Australian Government. The standards are aligned with international standards, which are referred to as 'Euro X' standards.[398]

6.37 Australian emission standards lag behind the highest international standards, for both petrol and diesel vehicles. *Action for Air* specified the details of the lag:

> By 2007, emission standards for new diesel vehicles will be about 15 months behind those applying in Europe and the United States. The Euro 3 standards for petrol vehicles, which came into effect in Europe in 2000, were adopted here in 2005.[399]

6.38 Euro 4 standards for heavy duty diesel vehicles are due to be implemented in 2007-8, with Euro 5 standards proposed for 2010-11. [400]

6.39 The NSW Government submission stated that the stricter national fuel standards that have been introduced over the last three decades mean that future vehicle emission levels are expected to fall across the Sydney Greater Metropolitan Region, despite the increase in motor

395 Submission 25, p4

396 Australian Design Rules (ADRs) set out design standards for vehicle safety and emissions.

397 Submission 25, p16

398 NSW Government, *Action for Air: 2006 Update*, p14

399 NSW Government, *Action for Air: 2006 Update*, p15

400 NSW Government, *Action for Air: 2006 Update*, p15

vehicles. Citing the 2005 DEC *National Environment Protection (Ambient Air Quality) Measure*: *New South Wales Annual Compliance Report 2004*, the submission stated:

> The stricter standards that are being progressively introduced mean that, despite the predicted increases in vehicle use, motor vehicle emissions of carbon monoxide, VOCs, NO_x and particles in the Sydney GMR are forecast to fall by at least 75%, 46%, 67% and 40% respectively from 2002 to 2020.[401]

6.40 The earlier DEC report *State of the Environment 2003* cited similar figures for the reduction in key pollutants from vehicle emissions but noted that projections were based on a 32% increase in VKT, which the report admitted 'may be an under-estimate'.[402]

6.41 Some of the specific changes in fuel standards include the phasing out of lead in petrol in January 2002, which has eliminated the last major source of airborne lead and contributed to a significant reduction in lead levels in the atmosphere, well below the NEPM standard. Both carbon monoxide emissions and sulphur dioxide emissions are also 'well below the national standard in Sydney' as a result of the current restriction on sulphur content in diesel and petrol under the Commonwealth *Fuel Quality Standards Act 2000*.[403]

6.42 While the improvement in engine and fuel technology is having an important impact on air quality, that impact is counterbalanced by an increase in the number of vehicles on the roads and the amount those vehicles are used.

6.43 In its submission to the Inquiry, the EDO also acknowledged that air pollution levels have 'benefited greatly' from improved car designs, greater regulation and the introduction of unleaded petrol. However, the submission went on to note that 'increased car use and transport reliance will serve to offset any gains made'.[404]

6.44 The Lane Cove Tunnel Action Group (LCTAG) also raised a note of warning about the perceived improvements in vehicle emissions, commenting that 'particles generated by modern vehicles are smaller and on a weight for weight basis with pollution from older vehicles, modern car emissions may be more toxic in terms of particle numbers and surface area'.[405]

6.45 This concern is shared by the Asthma Foundation New South Wales. In evidence to the Committee, the CEO of the Foundation, while acknowledging that progress has been made in improving the quality of air, commented that the improvement in engine technology might be leading to health impacts associated with finer particles:

> … unfortunately we are all faced with the challenge that the technologies that are being used are highlighting other sorts of problems in that the engines and fuels are

401 Submission 25, p16

402 NSW Government, *State of the Environment 2003* Report, Department of Environment and Conservation, Chapter 3, accessed 28 September 2006, <www.environment.nsw.gov.au/soe/index.htm> *(SOE 2003* Report)

403 Submission 25, p5

404 Submission 10, p10

405 Submission 19, Lane Cove Tunnel Action Group, p106

> burning much more efficiently so the particles that they are still producing are smaller and lodging further down in people's respiratory systems and causing serious issues.[406]

6.46 In Chapters 2 and 3 the Committee discusses the full range of air pollutants in some detail, including the issues associated with fine and ultra-fine particles, and makes recommendations about ongoing research and the development of appropriate standards for fine particles.

Petrol volatility

6.47 In evidence to the Committee, witnesses from DEC discussed a range of strategies currently employed or being investigated by the Department to reduce VOCs in the atmosphere. One of those strategies is regulating to reduce the volatility level of petrol in the summer months, to minimise the evaporation of petrol occurring during refuelling of motor vehicles. Mr Nigel Routh, Manager, Air Policy Section, DEC, said that the regulation, under the Protection of the Environment Operations (Clean Air) Regulation 2002, set a petrol volatility limit of 62 kPa (kilopascal – unit for the measure of pressure), with a maximum of 64 kPa and was the most stringent in Australia:

> Most other jurisdictions have summer volatility levels in Australia, but, as I said, we have the tightest in Sydney. A review of that is due over the next couple of years. Like all of our policies and programs there is a regular review process in place that will look at the signs to see whether it is necessary and justifiable to tighten those limits further.[407]

6.48 The regulation is estimated to reduce emissions of VOCs by 17% across the Greater Metropolitan Area over the summer months, according to the NSW Government submission to the Inquiry.[408]

6.49 Ms Sally Barnes, then Acting Director General, DEC, described another initiative, also intended to reduce the release of vapour into the atmosphere:

> We have had a trial of what is called vapour recovery II equipment, where we have looked at a suction cap or petrol cap on your car, which keeps those vapours in the system and puts them back into the tank. That has been quite successful.[409]

6.50 The Committee notes that preventing or reducing the emission of petrol vapours (which contain smog-producing volatile organic compounds) has the potential to result in air quality improvements. The Committee believes that the technological developments with respect to the recovery of petrol vapours are encouraging and notes the success of the trial of stage II vapour recovery equipment.

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406 Mr Smith, Evidence, 16 August 2006, p23

407 Mr Nigel Routh, Manager, Air Policy Section, DEC, Evidence, 11 September 2006, p34

408 Submission 25, p16

409 Ms Sally Barnes, then Acting Director General, Department of Environment and Conservation, Evidence, 16 August 2006, p8

Recommendation 30

That the NSW Government consider making the introduction of stage 2 vapour recovery equipment at service stations compulsory over a reasonable time period to be determined in consultation with all affected stakeholder groups.

Alternative fuels - biofuels

6.51 Biofuels is the term given to fuels produced from organic or renewable sources. Two of the most common biofuels are ethanol and biodiesel. Ethanol is produced from organic matter, while biodiesel is produced from reclaimed waste oil, often from vegetable sources.

6.52 Ethanol is currently available in some areas of New South Wales as a 10% by quantity blend with petrol called E10, also known as petrohol.[410] Petrohol reduces air toxics by 17%, and may also reduce particulates.[411] However, fuel consumption increases by 2.6-2.8%, and it is not suitable for engines manufactured prior to 1986, or those that use carburettors or mechanical fuel injection. Petrohol also increases carbon dioxide emissions relative to base petrol, but has overall lower net carbon dioxide emissions because of the carbon sequestration involved in producing the ethanol component of the fuel. [412]

6.53 The NSW Government's submission to this Inquiry stated that the use of E10 in Government owned vehicles would be required 'where this is practicable, available and cost-effective'.[413] Mr Routh, in evidence to the Committee, confirmed that NSW Government policy was to have ethanol E10 introduced by 2011:

> I understand that a task force will be established to look at things such as supply and whether there are any potential operability issues. That is a recent public policy commitment by the Government. We are also working with the Commonwealth on the impacts of E10 as well.[414]

6.54 The E10 Taskforce was announced by the NSW Government on 23 August 2006 and the mandated use of E10 petrohol will occur subject to the Taskforce's findings.[415] The E10 Taskforce is chaired by Mr Col Gellatly, Director General of the NSW Premier's Department, and membership includes Dr John Keniry, Chair of the Ridley Corporation, Dr Brian Fisher, Agriculture economist, Dr Paul Martin, Director of the Australian Centre for Agriculture and Law at the University of New England, Mr Tony Windsor MP, Independent Federal Member for New England and Mr Alan Evans, President of the NRMA. The E10 Taskforce had its first meeting on October 11.

410 NSW Parliamentary Library Research Service, *Briefing Paper 13/06: Biofuels*, NSW Parliament, Sydney, 2006, p6

411 NSW Parliamentary Library Research Service, *Briefing Paper 13/06: Biofuels*, p7

412 NSW Parliamentary Library Research Service, *Briefing Paper 13/06: Biofuels*, p9

413 Submission 25, p17

414 Mr Routh, Evidence, 11 September 2006, p34

415 NSW Parliamentary Library Research Service, *Briefing Paper 13/06: Biofuels*, Executive Summary

6.55 The Commonwealth Government has set the objective of approximately 1% (350 million litres) of the total Australian automotive gasoline market being from renewable resources by 2010.[416]

6.56 The Committee believes that the Commonwealth and NSW Government biofuel objectives are a modest step in the right direction, but has not received sufficient evidence to come to conclusions about whether the pace of the current movement toward increased biofuel use is sufficient.

Reducing emissions from existing trucks and cars

6.57 While new and future vehicles are required to meet increasingly strict vehicle emission standards, existing motor vehicles are only required to meet those vehicle emission standards that were in existence at the time of their construction.

6.58 In July 2006 DEC and the Roads and Traffic Authority (RTA) completed a one year trial of technology to reduce emissions from older diesel vehicles. The study concluded that catalysts and filters are practical and effective devices for reducing emissions from older diesel vehicles – catalysts reduced particulates by 30%, the filters by 90%.

6.59 The Committee notes that compulsory emissions testing for vehicles as part of the registration process is conducted in many other countries, including some states of the United States of America and countries of the European Union, but it is not a current requirement of the New South Wales vehicle registration process. Vehicles that produce excessive smoke must be observed by a relevant DEC or RTA officer, who can then take action against the owner of the car, including issuing defect notices and fines. As the Committee has detailed in Chapter 4, the existing regulatory framework encourages the reporting of smoky vehicles through an online or telephone service operated by DEC, but these reports (appropriately) generate only warning notices.

6.60 Mr Les Wielinga, Chief Executive, RTA, in evidence to the Committee, commented that while the RTA did not have a regulatory or coordinating role in relation to air quality, there were three main areas where the RTA played a significant role. These areas are 'observing and adhering closely to all relevant air quality regulations and conditions of approval; promoting clean air technology in cars and heavy vehicles; and participating in planning anti-congestion measures to obtain obvious air quality benefits'.[417]

6.61 Mr Wielinga commented that measures to address air pollution caused by diesel trucks (vehicles that contribute a much higher proportion of particulate pollution than their numbers would suggest – contributing more than 60% of particle emissions from mobile sources while only constituting 9% of the vehicles on the road)[418] are largely limited to voluntary action. Mr Wielinga explained that better maintenance of trucks would lead to a '30 per cent or 40 per cent reduction in emissions' from those vehicles.[419]

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416 NSW Parliamentary Library Research Service, *Briefing Paper 13/06: Biofuels*, Executive Summary

417 Mr Wielinga, Evidence, 16 August 2006, p33

418 Mr Wielinga, Evidence, 16 August 2006, p29

419 Mr Wielinga, Evidence, 16 August 2006, p35

6.62 The Clean Fleet Program is the RTA's initiative to work with the NSW trucking industry to encourage the maintenance of their vehicles. Mr Wielinga explained that the voluntary Program includes the use of mobile heavy vehicle emissions testing facilities to allow the RTA to work out of trucking depots, a TAFE diesel awareness course and a Particle Trap Program, where devices are retrofitted to older trucks to improve their emissions performance.[420]

6.63 Mr Wielinga told the Committee that the RTA attempts to ensure that the contribution to air pollution of the RTA's own substantial vehicle fleet of 1,703 light vehicles and 1,295 heavy vehicles[421] is reduced:

> So far our strategy is to start progressively introducing hybrid vehicles. I think we have about 30 of those at the moment. The other part of our strategy is to reduce the size of the vehicles. We now have a lot more four-cylinder vehicles than six cylinder vehicles. We are continuing that progress.[422]

6.64 The Committee also heard evidence from Mr Jim Glasson, Director General, Ministry of Transport, who outlined the recent decision of the State Transit Authority to purchase 505 new buses for public transport purposes. The new buses include 255 Compressed Natural Gas (CNG) buses and 250 new Euro 5 standard diesel buses.[423]

6.65 In a response to a question taken on notice during the hearing, Mr Glasson explained that the replacement of Euro 2 standard diesel buses with the CNG and Euro 5 diesel buses would substantially reduce total emissions of greenhouse gases and other air pollutants.[424] Mr Glasson also commented that future purchases of 'Euro 4 or better' buses to replace existing vehicles would further contribute to reducing total air pollution.[425]

Committee comment

6.66 The Committee acknowledges the actions taken by the RTA in working cooperatively with the trucking industry in reducing vehicle emissions, and their own actions in ensuring that the RTA's vehicle fleet sets an example to other motorists, and the actions of STA in replacing older buses with vehicles that meet standards beyond those currently required in Australia.

6.67 However, the Committee believes that there is scope to improve the current system of monitoring vehicle emissions, both for heavy vehicles and for cars. The Committee did not receive sufficient information to determine the feasibility of requiring all private motor vehicles of a certain age to undergo emissions testing as part of the registration process, but notes comments on the EPA website that, due to the cost of testing equipment being

420 Mr Wielinga, Evidence, 16 August 2006, p29

421 Answers to questions taken on notice during evidence 16 August 2006, Roads and Transport Authority, Question 12, p5

422 Mr Wielinga, Evidence, 16 August 2006, p32

423 Mr Glasson, Evidence, 16 August 2006, p40

424 Answers to questions taken on notice during evidence 16 August 2006, Ministry of Transport, Question 43, p7

425 Answers to questions taken on notice during evidence 16 August 2006, Ministry of Transport, Question 43, p8

approximately $80,000, the RTA has determined that emission testing not be part of the registration process.[426] The Committee believes it is worth reviewing this situation, particularly in relation to diesel trucks in light of their disproportionate contribution to air pollution.

6.68 The Committee notes that as the diesel fleet turnover is slow due to the long lasting nature of diesel engines, further work should be done on a possible diesel retrofit program. In particular, the Committee believes there is merit in further investigating the potential for the use of catalysts and filters to reduce emissions from existing older diesel vehicles.

6.69 The Committee notes that these recommendations reflect those of the Auditor General in Chapter 2 of the 2005 *Managing Air Quality* report, recommending an expansion of emission testing for diesel vehicles and a similar program for light vehicles.

Recommendation 31

That the NSW Government consider the most cost-effective way to reduce particles from existing diesel vehicles and explore possible models such as off-set arrangements with industry or large fleet owners. Possible regulatory actions, incentive approaches and educative tools associated with a retrofit program should be investigated.

Recommendation 32

That the current NSW Roads and Traffic Authority program targeting diesel trucks be expanded to require all diesel trucks to undergo emission testing as part of the registration process, with the costs of this emission testing to be absorbed into the registration fee.

Recommendation 33

That the NSW Government investigate and report to NSW Parliament on the feasibility of requiring all vehicles older than 5 years to undergo emission testing as part of the annual registration and licensing process, with permissible emission levels to be set in accordance with those standards in existence at the time of the vehicle's construction.

6.70 The Committee also believes that linking the registration cost of vehicles to the amount of emissions produced would encourage greater use of vehicles with smaller more fuel-efficient engines, hybrid vehicles, and alternative fuels. Such a system would clearly identify the link between the health costs of air pollution and the contribution individuals make to that air pollution through the vehicles they use, but should take into account ways of mitigating the impact of the system on disadvantaged members of the community who rely on cars to meet their transport needs.

426 Department of Environment and Conservation, <www.epa.nsw.gov.au/esdsmoky/faq.asp> (accessed 26 October 2006)

Recommendation 34

That the NSW Government investigate and report to NSW Parliament on options for linking registration costs to the quantity of emissions for private motor vehicles to provide incentives for low emission vehicles and to clearly identify the link between the health costs of air pollution and the contribution individuals make to that air pollution through the vehicles they use.

Rail freight emissions

6.71 The Committee received evidence that currently 1,500 semi-trailers move each day in and out of Port Botany, and that the Port's expansion would result in an additional 1,650 trucks on Sydney's roads.[427]

6.72 The Committee also notes that the State Government contends that the impact of the expansion of Port Botany will be ameliorated by up to 40% of freight being moved by diesel freight train to the Enfield Logistics Centre and eventually beyond.

6.73 The Committee also notes that the de-electrification of Sydney's goods lines means that all rail freight is moved by diesel-powered engines but that there is no regulatory framework in place to control hazardous emissions from those engines.

6.74 The Committee considers that the NSW Government should immediately investigate and implement at the earliest opportunity a system to regulate diesel emissions from freight train engines. In developing this system the NSW Government should seek to consult with the Commonwealth Government and other State and Territory Governments.

Recommendation 35

That the NSW Government immediately investigate and implement at the earliest opportunity a system to regulate diesel emissions from freight train engines. In developing this system the NSW Government should seek to consult with the Commonwealth Government and other State and Territory Governments.

Road tunnels

6.75 The Committee received submissions and heard evidence from many individuals and organisations concerned about concentrated and unfiltered vehicle emissions from road tunnel ventilation stacks. Another issue of concern was the exposure of motorists within the tunnel to vehicle emissions. There are a number of road tunnels that currently have ventilation systems relying on unfiltered stacks: the M5 East, the Cross City Tunnel, the Eastern Distributor and the soon to be completed Lane Cove Tunnel. In this section, the Committee examines the issue of responsibility for setting and monitoring air quality standards in road

427 Submission 4, Mr Gary Blaschke, p1; Submission 38, Botany Bay and Catchment Alliance

tunnels, and the related issue of providing warnings to the road-using population about the dangers of air within unfiltered road tunnels.

6.76 The Committee notes that there have been a large number of parliamentary committee inquiries into various aspects of road tunnels in Sydney which addressed issues of air quality in some detail. Concern over unfiltered emissions from the M5 East ventilation stack, the ventilation stack's location and conditions within the M5 East Tunnel have resulted in three NSW Parliament inquiries by the Legislative Council's General Purpose Standing Committee No. 5, with reports tabled in December 1999, July 2001 and December 2002.[428] The 2006 Third Report of the NSW Parliament Joint Select Committee on the Cross City Tunnel (*Third Report: The Lane Cove Tunnel*) also specifically addressed the issue of air quality and road tunnels, particularly for the Lane Cove Tunnel.[429]

6.77 These reports, and the large number of submissions made to the inquiries and during the planning process for recent road tunnels, highlight the concern of community members over the release of concentrated and unfiltered emissions through ventilation stacks located in residential areas.

Responsibility for road tunnel air quality standards

6.78 In DEC's response to questions taken on notice during their appearance at the hearing on 16 August 2006, it was confirmed that the role of DEC in major projects such as road tunnels was to provide technical advice to the Department of Planning on air quality issues, including advice on the technical methodology for assessing air quality impacts and the environmental outcomes required.[430]

6.79 The Department of Planning sets the conditions of approval for major road tunnel projects, under Part 3A of the *Environmental Planning and Assessment Act 1979* (NSW). As the operation of a road tunnel is not a scheduled activity under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998 (NSW), DEC has no ongoing role in regulating the operation of the road tunnel or monitoring the emissions from the ventilation stacks. Enforcement of the conditions of approval is the responsibility of the Department of Planning, although DEC 'provides technical assistance where required.' [431]

6.80 Mr Les Wielinga, Chief Executive, RTA, told the Committee that a sense of perspective was needed in relation to emissions from road tunnels; tunnels comprise 'a few kilometres in many

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428 NSW Legislative Council, General Purpose Standing Committee No. 5, Report 4, *Inquiry into the M5 East Ventilation Stack*, December 1999; NSW Legislative Council, General Purpose Standing Committee No. 5, Report 11, *Inquiry into the M5 East Ventilation Stack (2001)*, July 2001; NSW Legislative Council, General Purpose Standing Committee No. 5, Report 18, *Inquiry into the M5 East Tunnel*, December 2002

429 NSW Parliament, Joint Select Committee on the Cross City Tunnel, *Third Report: Lane Cove Tunnel*, August 2006

430 Answers to questions taken on notice during evidence 16 August 2006, Department of Environment and Conservation, Question 8, p4

431 Answers to questions taken on notice during evidence 16 August 2006, Department of Environment and Conservation, Question 8, p4

hundreds of kilometres of roads in the Sydney network'. Mr Wielinga went on to emphasise that the RTA works according to the conditions of approval for infrastructure projects that are imposed by the Department of Planning:

> … there is a set of conditions of approval on projects, including tunnels, that are set by people independent of the RTA. Our obligation is to meet those conditions of approval, and we do.[432]

6.81 In evidence to the Committee, Ms Barnes confirmed that, apart from providing technical advice to the Department of Planning in the setting and monitoring of the relevant conditions of approval for a road tunnel, DEC has no ongoing formal role in the monitoring of air pollution from road tunnels - the construction of road tunnels is a scheduled activity, but operation of tunnels is not. Therefore, DEC is 'not the regulator of the tunnels after construction'.[433]

6.82 The current arrangement for major infrastructure projects, including road tunnels, highlights the lack of coordination referred to in the Auditor General's 2005 performance audit report *Managing Air Quality: the Department of Environment and Conservation.*[434] DEC and NSW Health can provide technical advice to the Department of Planning in the setting of conditions of approval in relation to the project, but the final decision on those conditions of approval is taken by the Department of Planning, which then has the primary responsibility for monitoring those conditions, even where those conditions are within the area of expertise of another government department.

6.83 In a submission to this Inquiry, Mr Mark Curran of the community action group Residents Against Polluting Stacks, commented that, in relation to road tunnel projects, 'monitoring and compliance with project conditions continually falls between the cracks of bureaucratic blame shifting'. Mr Curran attributed this situation to a lack of environmental licensing of the activity – in this case the operation of road tunnels.[435]

Committee comment

6.84 The Committee concurs with the comments of Mr Curran in relation to the current lack of clear responsibility for monitoring compliance with air quality standards set for road tunnels, and agrees with the Auditor General's comments on the need for greater clarity of roles and responsibilities in relation to managing air quality.

6.85 The Committee believes that it is appropriate that the EPA be the regulatory body for the continuing operation of road tunnels, and that owner/operators of such facilities should be required to hold an Environment Protection Licence, to ensure that the agency with the

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432 Mr Wielinga, Evidence, 16 August 2006, p31

433 Ms Barnes, Evidence, 16 August 2006, p11

434 Audit Office of New South Wales, Auditor-General's Report Performance Audit, *Managing Air Quality: The Department of Environment and Conservation*, 2005, p2, accessed 10 October 2006, <www.audit.nsw.gov.au/publications/reports/performance/2005/air_quality/Airquality-contents.html>

435 Submission 27, Residents Against Polluting Stacks, p10

expertise is the agency that monitors and enforces the air quality standards set for the project. Environment Protection Licences are discussed in Chapter 4 of this Report.

6.86 Accordingly, to allow the EPA to have ongoing regulatory authority over the operation of road tunnels, the operation of road tunnels should be an activity explicitly covered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.

Recommendation 36

That the NSW Government extend the Environment Protection Authority's regulatory authority to cover the operation of road tunnels by including it as an activity under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998 (NSW).

6.87 Additionally, the Committee believes that it would be sensible for the NSW Government to ensure that there are no other classes of activity that may have a significant impact on air quality and are currently not covered by Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998 (NSW).

Recommendation 37

That the NSW Government review the full range of pollution causing activities to determine which additional activities should be included under Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998 (NSW).

6.88 The Committee appreciates that the understanding of the science of air pollution increases every year and that air quality standards that are applied to current road tunnel projects may be inadequate to protect the community in the future, on the basis of an improved understanding of best practice in maintaining air quality. It is therefore important that the existing road tunnels be able to retrospectively install the necessary technology to meet new and improved air quality standards when they arise. In the context of Public Private Partnerships (PPP), where the private sector puts a price on future risk associated with the project, the price of this particular element of risk may result in substantially higher costs for the delivery of infrastructure. For that reason, the Committee believes that the NSW Government should accept responsibility for the reasonable cost of meeting future air quality standards in relation to existing road tunnel infrastructure.

Recommendation 38

That the NSW Government accept responsibility for the reasonable cost of meeting future air quality standards in relation to existing road tunnel infrastructure.

6.89 As a mechanism for achieving this aim, the Committee endorses the recommendation of the Auditor General in the 2005 performance audit *Managing Air Quality* that the Department of Planning monitors existing conditions of approval and submit proposals to the Cabinet

Committee on Infrastructure, or equivalent, for upgrading facilities to meet new air pollution standards.[436]

Recommendation 39

That the Department of Planning monitor existing conditions of approval for road tunnels and submit proposals to the Cabinet Committee on Infrastructure, or equivalent, for upgrading facilities to meet new air quality standards.

6.90 In order to ensure that the community is not required to compensate private sector operators for the future installation of such technology, the NSW Government should ensure that future PPP contracts require the private sector operator not only to make provision for the installation of technology to meet future air quality standards, but also to facilitate that installation if and when it occurs.

Recommendation 40

That the NSW Government ensure that future contracts with the private sector to deliver road tunnel infrastructure require the private sector to make provision for the installation of technology to meet future air quality standards and facilitate the installation of that technology if and when it is required.

Road tunnel air pollution warning signs

6.91 The issue of warning motorists about air quality within road tunnels has been of particular concern to sections of the community in relation to the M5 East tunnel. In 2003, NSW Health were advised by their internal legal department that they should exhaust all normal channels before requiring the RTA to take action on the NSW Health recommendations relating to internal tunnel air quality, including the use of warning signs on entry to the tunnel. In a response to a question taken on notice by NSW Health at the 11 September 2006 hearing, NSW Health indicated that an approach to managing the air pollutant NO_2, a pollutant of concern in road tunnels, was still being finalised:

> Information to assist the community to mitigate air pollution risks in road tunnels is available through a variety of channels. NSW Health will continue to collaborate with the RTA and other agencies in finalising a considered approach to managing nitrogen dioxide risks in road tunnels.[437]

6.92 Mr Wielinga, Chief Executive, RTA, explained to the Committee the RTA's approach to advising motorists of how to respond to air pollution in road tunnels, using brochures in motor registries and via notices sent out with vehicle registration renewals. Mr Wielinga

436 Audit Office of New South Wales, *Managing Air Quality*, p38

437 Answers to questions taken on notice during evidence 11 September 2006, NSW Health, Question 5, p3

explained that considerations of motorist safety underpinned the decision not to act on the NSW Health's recommendation to use signage for this purpose:

> The RTA's approach at the moment is that we send out a notice to people in our registry advices. From time to time we send them out as they are renewed. We also have brochures in our motor registries that provide that advice. When you look at the way the road system works and you look at the amount of signposting that is on a road on the approach to tunnels and other structures, there are advisory speed signs, reassurance direction signs, incident management-type signs and VMSs all on the approach to these things. There is a limited amount of information that people can take in. Our focus is on safety and incident management on the approach to tunnels.[438]

Committee comment

6.93 Variable Message Signs (VMS) exist both at the entrance to and in Sydney road tunnels. They are intended to advise motorists of traffic conditions and provide a range of other advice, including the hours of operation of school zone speed restrictions.

6.94 The Committee believes that VMS could be used easily and effectively to convey simple precautionary measures to motorists using road tunnels, such as those that are currently contained in the RTA's brochures. The use of existing signs would address the concerns raised by Mr Wielinga in relation to an excessive amount of signage causing a distraction to motorists. This approach would have the added advantage of being targeted specifically at road tunnel users rather than at all motorists renewing vehicle registration regardless of where they live, and would highlight the immediacy of the problem for motorists about to enter a tunnel in a way that a brochure sent out with vehicle registration papers cannot.

Recommendation 41

That the NSW Roads and Traffic Authority use existing Variable Message Signs at the entrance of major Sydney road tunnels to advise motorists to take precautions against air pollution in the tunnels.

Indoor air pollution

6.95 While the focus of this Inquiry has been on ambient air quality, the air quality inside homes, workplaces and indoor leisure spaces is also of concern. With up to 90% of people's time spent indoors, the quality of indoor air is vital for their health and wellbeing. A particular contributor to indoor air pollution of concern is unflued gas heaters, which emit NO_x as a product of their combustion.

438 Mr Wielinga, Evidence, 16 August 2006, p32

6.96 Mr Jeff Mann, Air Quality Practice Leader, Clean Air Society of Australia and New Zealand told the Committee that indoor air quality was often poorer than ambient air quality.[439] Citing a 2004 report *Unflued Gas Appliances and Air Quality in Australian Homes* commissioned by the Department of Environment and Heritage through the Natural Heritage Trust,[440] Mr Mann commented that 'maximum indoor levels of NO_2 were greater than the World Health Organisation guidelines in the majority of houses tested'. [441]

6.97 Mr Mann commented that it was important to allocate responsibility for the issue of indoor pollution:

> We believe the issue is controllable. I do not think it will be easy, particularly for retrofitting and rectifying existing installations. But the biggest single thing that we can do on this issue is allocating single-point responsibility and authority to some department so that we can start having discussions, co-ordination and actions. It is too easy to let it slip through the cracks if everyone is saying, "It's not our bailiwick."[442]

6.98 Mr Mann went on to tell the Committee that 'the health impact of these exposures are understood but are unquantified' with over 400,000 homes in NSW currently exposed to emissions of NO_x from unflued gas heaters in excess of the World Health Organisation guidelines.[443]

Committee comment

6.99 The Committee believes that the issue of indoor air pollution is one that has not received the attention it merits.

6.100 While the Committee did not receive a large number of submissions relating specifically to this issue, the Committee nevertheless believes that the seriousness of the issue and the credibility of the evidence, given by Mr Mann in his capacity as a representative of the Clean Air Society of Australia and New Zealand, requires a strong response.

6.101 The Committee notes the 2006 article in the journal *Environmental Health* 2006, prepared by NSW Health and Area Health Service staff, reporting on indoor pollution and finding that 'unflued gas appliances were associated with elevated nitrogen dioxide levels'.[444]

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439 Mr Jeff Mann, Air Quality Practice Leader, Clean Air Society of Australia and New Zealand, Evidence, 16 August 2006, p59

440 Natural Heritage Trust, *Technical Report No. 9: Unflued Gas Appliances and Air Quality in Australian Homes,* Department of Environment and Heritage, 2004, accessed 15 September 2006, <www.deh.gov.au/atmosphere/publications/index.htm>

441 Mr Mann, Evidence, 16 August 2006, p60

442 Mr Mann, Evidence, 16 August 2006, p63

443 Mr Mann, Evidence, 16 August 2006, p60

444 Sheppeard V, Morgan G and Corbett C, 'New South Wales Indoor Air Survey: Part II Concentrations of Nitrogen Dioxide in Homes in New South Wales' *Environmental Health,* Vol. 6, No. 3, 2006, pp 25

6.102 Accordingly, the Committee believes that, given the obvious health impacts of unflued gas heaters, particularly for groups 'at risk' of air pollution such as the elderly or people with asthma, the NSW Government should ban the sale of such heaters in NSW and investigate ways of phasing out the use of existing heaters.

6.103 The Committee appreciates that there is also a health impact arising from a lack of heating, and therefore cautions that any phasing out of unflued gas heaters should involve the use of subsidies to ensure that households are not unfairly economically disadvantaged, and incorporate the use of informational material to target and educate current users of unflued gas heaters about the air pollution generated by their use.

Recommendation 42

That the NSW Government identify the Department of Environment and Conservation as having primary responsibility for addressing the issue of indoor air pollution from unflued gas heaters.

Recommendation 43

That the NSW Government ban the sale of unflued gas heaters in NSW and work with other governments at State and Commonwealth levels to encourage similar bans.

Recommendation 44

That the NSW Government establish a subsidy scheme for the voluntary replacement of existing unflued gas heaters with other forms of heating, and produce and make widely available a brochure advising NSW residents of the health risks associated with unflued gas heaters.

Solid fuel heaters

6.104 Solid fuel heaters, such as wood burning stoves, are a source of air pollution in the Sydney basin. Chapter 4 detailed the effect of the recent changes to the *POEO Act*, which provide relevant officers (particularly local council officers) with the authority to issue Smoke Abatement Notices to households whose solid fuel heaters are producing excessive smoke.

6.105 Despite the recent steps to improve the regulation of solid fuel heaters, a number of submissions to the Inquiry identified solid fuel heaters as contributing to excessive air pollution.

6.106 Many local councils identified solid fuel heaters as an air pollution problem.[445] In the submission of Baulkham Hills Shire Council to this Inquiry, the Mayor, Councillor Sonya Phillips, commented that the cost of running a solid fuel stove 'does not incorporate the cost

[445] See for example Submission 20, p5; Submission 32, p10; Submission 28, p5; Submission 26, p1.

of discharging waste into the air and the associated discomfort this smoke and odour causes local residents'.[446]

6.107 Mr Chris Poulton, a private citizen, commented that the use of wet wood exacerbated air pollution, causing 'slow smoky burning'.[447] Mr Peter Conroy, also a private citizen, commented on the air pollution from solid-fuel combustion heaters in Concord:

> The obnoxious smell and particulates that are discharged during the winter months is disgusting and should not be permitted in the City.[448]

Committee comment

6.108 Evidence presented in Chapter 2 of this Report has detailed the substantial contribution solid fuel heaters make to particulate matter, particularly in winter months. While the 2005 reforms to the *POEO Act* and the actions of local councils go a significant way toward reducing the problem, the Committee believes that further action from the NSW Government is warranted.

6.109 In particular, the NSW Government should actively investigate subsidy schemes intended to encourage the replacement of solid fuel heaters with heating sources that produce less air pollution. This is particularly important in those 'hot-spot' areas of the Sydney basin – the south west and western regions.

Recommendation 45

That the NSW Government investigate schemes, including the use of subsidies, to encourage the replacement of solid fuel heaters such as wood burning stoves with less polluting alternatives.

446 Submission 33, p2

447 Submission 2, Mr Chris Poulton, p1

448 Submission 3, Mr Peter Conroy, p1

Appendix 1 Submissions

No	Author
1	Ms Julie Walsh
2	Mr Chris Poulton
3	Mr Peter Conroy
4	Mr Gary Blaschke (Botany Bay and Catchment Alliance Inc.) & (Southwest Enviro Centre Inc.) & (No Port Enfield Community Action Group)
5	Miss Margaret Clinch
6	Mr Garbis Simonian (Weston Aluminium Pty Ltd)
7	Dr Christopher Clarke
8	Ms Diane Michel
9	Mr Bob Sendt (Audit Office of NSW)
10	Ms Rachel Walmsley (Environmental Defender's Office (NSW))
11	Mr Steven Cenatiempo (Leafs Gully Action Group)
12	Mr Steven Cenatiempo
13	Clr Ian Longbottom (Lane Cove Municipal Council)
14	Ms Sima Truuvert (Randwick City Council)
15	Mr Cliff Maurer
16	Mr Tim Macoun (Macoun Environmental Consulting)
17	Mr Noel Child (Child & Associates on behalf of Western Sydney Alliance)
18	Ms Angelika Lange (Western Clean Air & Action Group)
19	Dr Ray Kearney (Lane Cove Tunnel Action Group)
20	Mr Paul Tosi (Campbeltown City Council)
21	Mr Stephen Blackadder (Warringah Council)
22	Ms Lyndall McCormack
23	Ms Kathryn Merrett
24	Dr John Carras (Commonwealth Scientific and Industrial Research Organisation (CSIRO))
25	Mr Roger B Wilkins (The Cabinet Office – New South Wales)
26	Mr Greg Foster (Willoughby City Council)
27	Mr Mark Curran (Groups Against Stack Pollution)
28	Ms Lucy Jenkin (Southern Sydney regional Organisation of Councils)
29	Ms Mimi St John-Austen (Asthma Foundation New South Wales)
30	Ms Clover Moore MP (Member for Bligh)
31	Mr Brian McDonald

No	Author
32	Mr Ryan Pascoe (Western Sydney Regional Organisation of Councils (WSROC))
33	Clr Sonya Phillips (Baulkham Hills Shire Council)
34	Ms Janette Baros
35	Assoc. Prof. Chris Winder (School of Safety Science, University of New South Wales)
36	Mr Anthony Newland (Planning Institute Australia)
37	Clr Allan G Ezzy (Holroyd City Council)
38	Ms Lynda Newnam (Botany Bay and Catchment Alliance)
39	Ms Clover Moore MP (Lord Mayor of Sydney)
40	Mr John Costly (Alcoa Australia Rolled Products)
41	Confidential

Appendix 2 Witnesses

Date	Name	Position and Organisation
Wednesday 16 August 2006	Ms Sally Barnes	Acting Director-General, Department of Environment and Conservation
	Mr Nigel Routh	Manager, Air Policy, Department of Environment and Conservation
	Mr Chris Eiser	Manager, Atmospheric Science, Department of Environment and Conservation
	Dr Denise Robinson	Chief Health Officer, NSW Health
	Dr Michael Staff	Director of Environmental Health, NSW Health
	Dr Vicky Sheppeard	Senior Policy Analyst, NSW Health
	Mr Greg Smith	Chief Executive Officer, Asthma Foundation of NSW
	Mr Nick Bleszynski	Media Coordinator, Asthma Foundation of NSW
	Mr Les Wielinga	Chief Executive Officer, Roads and Traffic Authority
	Mr Jim Glasson	Director General, Ministry of Transport
	Mr Bob Sendt	Auditor General, NSW Audit Office
	Mr Sean Crumlin	Director of Audit, NSW Audit Office
	Mr Mark Curran	Groups Against Stack Pollution (GASP)
	Mr Jeff Mann	Clean Air Society of Australia and New Zealand
	Assoc. Prof. Chris Winder	School of Safety Science, University of New South Wales
	Mr Sam Haddad	Director General, Department of Planning
	Mr Chris Wilson	Executive Director, Major Projects Assessment, Department of Planning
	Ms Angelika Lange	Concerned Residents of Guildford
	Mr Hugh Nguyen	Concerned Residents of Guildford
	Rev Len Stephens	Western Sydney Clean Air and Water Action Group
Monday 11 September 2006	Dr Ray Kearney	Chair, Lane Cove Tunnel Action Group
	Ms June Herreran	Deputy Chair, Lane Cove Tunnel Action Group
	Dr Denise Robinson	Chief Health Officer, NSW Health
	Dr Michael Staff	Director of Environmental Health, NSW Health
	Dr Vicky Sheppeard	Senior Policy Analyst, NSW Health
	Ms Sally Barnes	Director, Strategy Communication and Governance, Department of Environment and Conservation
	Mr Chris Eiser	Manager, Atmospheric Science, Department of Environment and Conservation
	Mr Nigel Routh	Manager, Air Policy, Department of Environment and Conservation

Date	Name	Position and Organisation
	Mr Ross Carter	Director, Metropolitan, Department of Environment and Conservation
	Mr Mike McKinstry	Managing Director, Alcoa Australia Rolled Products

Appendix 3 Minutes

Minutes No. 66

Tuesday, 14 March 2006
General Purpose Standing Committee No. 2
At Parliament House at 1.30 pm, Rm 814/815

1. Members Present

Ms Patricia Forsythe (Chair)
Mr Tony Catanzariti (Deputy Chair)
Dr Arthur Chesterfield-Evans
Ms Sylvia Hale
Ms Melinda Pavey
Ms Christine Robertson
Mr Henry Tsang

2. Correspondence

The Committee noted the following items of correspondence received:

…

- Letter received from Ms Forsythe, Ms Hale and Ms Robertson (members of GPSC 2) requesting that the Committee meet to discuss a proposed inquiry into the health impacts of air pollution in the Sydney Basin (9 March 2006)

…

…

3. Self reference – health impacts of air pollution

The Committee discussed draft terms of reference, previously circulated to the Committee.
Resolved, on the motion of Ms Robertson: That the proposed terms of reference for an inquiry into the health impacts of air pollution be modified by:

- Deleting all of the words in (a) up until the word 'decades' and inserting instead 'changes in the emissions of various air pollutants and the impact of those changes on air quality in the Sydney basin over the past three decades'
- Inserting a new paragraph between the existing (a) and (b) to read 'the impact of NSW air pollution laws (including the Clean Air Act 1961, the Protection of the Environment Operations Act 1997 and any regulations made under those Acts) on air quality over the past three decades'
- Deleting the word 'two' prior to the word 'decades' in the existing (b) and inserting instead 'three'
- Inserting the words 'laws and' after the word 'current' in the existing (e)

Resolved, on the motion of Ms Hale: That the Committee adopt the following terms of reference:
That General Purpose Standing Committee No. 2 inquire into and report on the health impacts of air pollution in the Sydney basin, and in particular:

a) Changes in the emissions of various air pollutants and the impact of those changes on air quality in the Sydney basin over the past three decades, including any 'hot-spots' where pollution is concentrated
b) the impact of NSW air pollution laws (including the Clean Air Act 1961, the Protection of the Environment Operations Act 1997 and any regulations made under those Acts) on air quality over the past three decades
c) the causes of air pollution in the Sydney basin over the past three decades
d) the health impacts of air pollution on any 'at risk' groups
e) the financial impacts of air pollution on the NSW health system
f) the effectiveness of current laws and programmes for mitigating air pollution
g) strategies to reduce the health impacts of air pollution; and
h) any other relevant matter.

Resolved, on the motion of Ms Pavey: That the Committee defer consideration of the inquiry to a later date.

4. …

5. …

6. …

7. …

8. Adjournment

The Committee adjourned at 4.50 pm sine die.

Katherine Fleming

Clerk to the Committee

Minutes No 69

Tuesday, 5 June 2006
General Purpose Standing Committee No. 2
At Parliament House at 3.35pm, Rm 1108

1. Members Present

Ms Patricia Forsythe (Chair)
Mr Tony Catanzariti (Deputy Chair)
Dr Arthur Chesterfield-Evans
Ms Kayee Griffin (Tsang)
Ms Sylvia Hale
Ms Melinda Pavey
Ms Christine Robertson

2. Substitute members

The Chair advised the Ms Griffin would be substituting for Mr Tsang for the purposes of this meeting.

3. …

4. …

5. …

6. Inquiry into health impacts of air pollution in the Sydney basin

Resolved, on the motion of Ms Hale: That the Committee commence its Inquiry into the Health Impacts of Air Pollution in the Sydney Basin by:

- informing the House of the terms of reference
- advertising for submissions on Saturday 17 June 2006, with a closing date of 4 August 2006, in the Sydney Morning Herald and the Daily Telegraph
- issuing a press release announcing the commencement of the Inquiry and the call for submissions to coincide with the advertisement
- inviting the list of stakeholders prepared by the Secretariat, and any other stakeholders identified by members, to make a submission.

Resolved, on the motion of Ms Robertson: That the Committee approve the proposed timetable for the inquiry prepared by the Secretariat pending confirmation of members' availability for the hearing dates.

7. Adjournment

The Committee adjourned at 4.07 pm until a date to be determined.

Stephen Frappell

Clerk to the Committee

Minutes No 70

Wednesday, 16 August 2006
General Purpose Standing Committee No. 2
At Parliament House at 8:45am, Room 814/815

1. Members present

Ms Patricia Forsythe (Chair)
Mr Tony Catanzariti (Deputy Chair)
Dr Arthur Chesterfield-Evans
Ms Kayee Griffin (Tsang)
Ms Sylvia Hale
Ms Melinda Pavey
Ms Christine Robertson

2. Substitute members

The Chair advised the Committee that Ms Griffin would be substituting for Mr Tsang for the purposes of this meeting.

3. Deliberative meeting

3.1 Confirmation of Minutes No. 69

Resolved, on motion of Mr Catanzariti: That Minutes No. 69 be confirmed.

3.2 Correspondence

The Committee noted the following correspondence received:

- Letter from Department of Transport and Regional Services to Chair attaching report 'Health impacts of transport emissions in Australia: economic costs' (undated)
- Letter from National Health and Medical Research Council to Director attaching report 'Discussion paper: Developing a health-based methodology for setting ambient air quality standards' (undated)

The Committee noted the following correspondence sent:

- Letter from Chair to the Hon John Watkins MP, Minister for Transport, attaching letter from Chair to Mr Jim Glasson, Director General of the Ministry of Transport, requesting the attendance of Mr Glasson and officers of the Ministry of Transport at the public hearing on 16 August 2006
- Letter from Chair to the Hon Eric Roozendaal MLC, Minister for Roads, attaching letter to Mr Les Wielinga, CEO of the Roads and Traffic Authority, requesting the attendance of Mr Wielinga and senior officers of the Authority at the public heating on 16 August 2006

3.3 Inquiry into health impacts of air pollution in the Sydney Basin – publication of submissions

Resolved, on the motion of Mr Catanzariti: That the Committee publish Submissions 1 to 34, suppressing the identity of the author of Submission No 23 and the annexures thereto, at the request of the author.

4. Inquiry into health impacts of air pollution in the Sydney basin – Public hearing

The media, witnesses and the public were admitted.

The Chair made a brief opening statement.

Ms Sally Barnes, Acting Director-General, and Mr Nigel Routh, Manager, Air Policy Section, Department of Environment and Conservation, affirmed and examined.

Mr Chris Eiser, Manager, Atmospheric Science, Department of Environment and Conservation, sworn and examined.

The witnesses agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witnesses withdrew.

Dr Denise Robertson, Chief Health Officer, Dr Michael Staff, Director of Environmental Health, and Dr Vicky Sheppeard, Senior Policy Analyst, NSW Health, affirmed and examined.

The witnesses agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witnesses withdrew.

Mr Greg Smith, Chief Executive Officer, and Mr Nick Bleszynski, Media Coordinator, Asthma Foundation of NSW, affirmed and examined.

The witnesses agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witnesses withdrew.

Mr Les Wielinga, Chief Executive Officer, Roads and Traffic Authority, sworn and examined.

The witness tendered a document 'RTA Customer Access Guides'.

The witness agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witness withdrew.

Mr Jim Glasson, Director General, Ministry of Transport, sworn and examined.

The witness agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witness withdrew.

Mr Robert Sendt, Auditor General, affirmed and examined.

Mr Sean Crumlin, Director of Performance Audit, NSW Audit Office, sworn and examined.

The witnesses agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witnesses withdrew.

Mr Mark Curran, President, Residents Against Polluting Stacks, sworn and examined.

Mr Curran tendered a document 'Residents Health Study.'

The witness agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witness withdrew.

Mr Jeff Mann, NSW Committee Member, Clean Air Society of Australia and New Zealand, affirmed and examined.

Mr Mann tendered the following documents:
- 'enHealth Council Statement on Unflued Gas Heaters, April 2006'
- 'Indoor Air Quality in Australia: A Strategy for Action'
- 'Unflued Gas Appliances and Air Quality in Australian Homes.'

The witness agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Associate Professor Christopher Winder, affirmed and examined.

The witness agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witness withdrew.

Mr Sam Haddad, Director General, and Mr Chris Wilson, Executive Director, Major Projects Assessment, Department of Planning, sworn and examined.

Mr Haddad tendered a document 'Metro Strategy – Transport Strategy.'

The witnesses agreed to take written questions on notice from the Committee and to provide responses by c.o.b. 6 September 2006.

Evidence concluded and the witnesses withdrew.

Rev Leonard Stephens, Chair, Western Sydney Clean Air and Water Action Group, Ms Angelika Lange and Mr Hugh Nguyen, Representatives, Concerned Residents of Guildford, affirmed and examined.

Ms Lange tendered the following documents:
- 'Letter from Mr Department of Environment and Conservation to Holroyd City Council dated 12 July 2006' and unrelated annexures.
- Ms Lange tendered a document 'Letter from Concerned Residents for Guildford to Holroyd City Council dated July/August 2006' together with attached media clipping and scientific table.
- Ms Lange tendered a document 'Invitation to Attend the Community meeting on Alcoa in Yenorra' together with attached media clipping Alcoa health warning.

Evidence concluded and the witnesses withdrew.

5. Deliberative meeting

5.1 Publication of Submission No 35

Resolved, on the motion of Ms Robertson: That the Committee publish submission No 35.

5.2 Publication of tabled documents

Resolved, on the motion of Dr Chesterfield-Evans: That under Section 4 of the Parliamentary Papers (Supplementary Provisions) Act 1975 and under the authority of standing orders 223 and 224, the Committee authorises the Clerk to the Committee to publish all documents tendered at the public hearing and accepted by the Committee.

5.3 Publication of transcript

Resolved, on the motion of Ms Robertson: That under Section 4 of the Parliamentary Papers (Supplementary Provisions) Act 1975 and under the authority of standing orders 223 and 224, the Committee authorises the Clerk to the Committee to publish the transcript of evidence of today's hearing.

5.4 Adverse mention of Alcoa Australia Rolled Products, Yennora

Resolved, on the motion of Ms Pavey: That the Chair write to Alcoa informing it of the evidence received by the Committee at the public hearing regarding Alcoa's operations at Yenora, and inviting Alcoa to make a written response.

5.5 Future conduct of Inquiry

Dr Chesterfield-Evans moved: That the Committee invite representatives of Weston Aluminium Pty Ltd, including Mr Garbis Simonian, to appear at a further public hearing of the Committee.

The Committee divided.

Ayes: Dr Chesterfield Evans, Ms Hale

Noes: Mr Catanzariti, Ms Forsythe, Ms Griffith, Ms Pavey, and Ms Robertson

Motion resolved in the negative.

Resolved, on the motion of Ms Hale: That the Committee conduct a further public hearing in the week of 11-15 September 2006, on a date to be decided by the Chair in consultation with the Committee, to hear further evidence from representatives of the Department of Environment and Conservation, the Department of Health, and Dr Ray Kearney of the Lane Cove Tunnel Action Group.

6. Adjournment

The Committee adjourned to 2:30pm on Thursday 17 August 2006 in Room 814/815.

Rachel Callinan

Clerk to the Committee

Minutes No 77

Monday, 11 September 2006
General Purpose Standing Committee No. 2
At Parliament House at 8:45am, Room 814/815

1. Members present

Ms Patricia Forsythe (Chair)
Mr Tony Catanzariti (Deputy Chair)
Dr Arthur Chesterfield-Evans
Ms Sylvia Hale
Ms Melinda Pavey
Ms Christine Robertson
Mr Henry Tsang

2. Deliberative meeting

2.1 Confirmation of Minutes No. 70

Resolved, on motion of Mr Tsang: That Minutes No. 70 be confirmed.

2.2 Correspondence

The Committee noted the following correspondence received:

- Letter from Mr Les Wielinga, Chief Executive, RTA to the Director, providing answers to questions taken on notice during the public hearing on 16 August 2006. (22 August 2006)

- Email from Mr Mark Curran, Groups Against Stack Pollution (GASP) to the Director, providing answers to questions taken on notice by GASP witnesses during the public hearing on 16 August 2006. (4 September 2006)
- Email from Professor Chris Winder, School of Safety Science, University of New South Wales to the Principal Council Officer, providing answers to questions taken on notice during the public hearing on 16 August 2006. (4 September 2006)
- Email from Ms Alethea Morrison, Senior Policy Officer, Department of Environment and Conservation to the Principal Council Officer, providing answers to questions taken on notice by Department witnesses during the public hearing on 16 August 2006. (7 September 2006)
- Letter from Mr Sam Haddad, Director General, Department of Planning to the Director, providing answers to questions taken on notice by Department witnesses during the public hearing on 16 August 2006. (7 September 2006)
- Fax from Mr Bob Sendt, NSW Auditor General to the Director, providing answers to questions taken on notice during the public hearing on 16 August 2006. (7 September 2006)
- Emailed letter from Mr Jim Glasson, Director General, Ministry of Transport to the Director, providing answers to questions taken on notice during the public hearing on 16 August 2006. (8 September 2006)
- Emailed letter from Ms Robyn Kruk, Director General, NSW Health to the Chair, providing answers to questions taken on notice during the public hearing on 16 August 2006. (8 September 2006)

Resolved, on the motion of Ms Robertson: That the Committee publish answers received to questions taken on notice during the public hearing on 16 August 2006.

The Committee noted the following correspondence sent:

- 17 August 2006, from Chair to Mr John Costly, General Manager, Alcoa Australian Rolled Products regarding adverse mention at hearing 16 August 2006.

2.3 Inquiry into health impacts of air pollution in the Sydney Basin – publication of submissions

Resolved, on the motion of Mr Tsang: That the Committee publish Submissions 36 to 40.

3. Inquiry into health impacts of air pollution in the Sydney basin – Public hearing

The media, witnesses and the public were admitted.

The Chair made a brief opening statement.

Dr Ray Kearney, Chair, Lane Cove Tunnel Action Group, affirmed and examined.

Ms June Hefferan, Deputy Chair, Lane Cove Tunnel Action Group, sworn and examined.

The witnesses tendered their opening statements.

Evidence concluded and the witnesses withdrew.

Dr Denise Robinson, Chief Health Officer, Dr Michael Staff, Director of Environmental Health, and Dr Vicky Sheppeard, Senior Policy Analyst, NSW Health, examined under previous oath.

Evidence concluded and the witnesses withdrew.

Ms Sally Barnes, Director, Strategy Communication and Governance, Mr Chris Eiser, Manager, Atmospheric Science, and Mr Nigel Routh, Manager, Air Policy, Department of Environment and Conservation, examined under previous oath.

Mr Ross Carter, Director, Metropolitan, Department of Environment and Conservation, sworn and examined.

Evidence concluded and the witnesses withdrew.

Mr Mike McKinstry, Managing Director, Alcoa Australia Rolled Products, affirmed and examined.

Evidence concluded and the witness withdrew.

4. Deliberative meeting

4.1 Publication of tabled documents

Resolved, on the motion of Mr Catanzariti: That under Section 4 of the Parliamentary Papers (Supplementary Provisions) Act 1975 and under the authority of standing orders 223 and 224, the Committee authorises the Clerk to the Committee to publish all documents tendered at the public hearing and accepted by the Committee.

4.2 Publication of transcript

Resolved, on the motion of Mr Catanzariti: That under Section 4 of the Parliamentary Papers (Supplementary Provisions) Act 1975 and under the authority of standing orders 223 and 224, the Committee authorises the Clerk to the Committee to publish the transcript of evidence of today's hearing.

4.3 Questions taken on notice

Resolved, on the motion of Ms Robinson: That witnesses be asked to provide answers to questions taken on notice by Tuesday 3 October 2006.

Resolved, on the motion of Ms Robinson: That, subject to appropriate checks by the Committee secretariat, answers received to questions taken on notice during the hearings on 16 August 2006 and 11 September 2006 be published when received.

5. Adjournment

The Committee adjourned to 11:30am on Thursday 14 September 2006 in Jubilee Room.

Simon Johnston

Clerk to the Committee

Draft Minutes No. 84

Tuesday 9 November 2006
General Purpose Standing Committee No. 2
Room 1153, 10.00am

1. Members present

Ms Robyn Parker *(Chair)*
Mr Tony Catanzariti (*Deputy Chair*)
Dr Arthur Chesterfield-Evans
Ms Melinda Pavey
Ms Sylvia Hale
Ms Christine Robertson
Mr Henry Tsang

2. Minutes

Resolved, on the motion of Ms Robertson: That Minutes No. 77 be confirmed.

3. Correspondence

The Committee noted the following correspondence received:

- Email from Mr Patrick Gibbons, Manager Corporate Affairs, Alcoa Australia to Principal Council Officer, providing answers to questions taken on notice at the hearing on 11 September 2006. (3 October 2006)
- Letter from Ms Lisa Corbyn, Director General, Department of Environment and Conservation, to Director providing answers to questions taken on notice at the hearing on 11 September 2006. (9 October 2006)

- Emailed letter from Dr Denise Robinson, Chief Health Officer, NSW Health, to Director providing answers to questions taken on notice at the hearing on 11 September 2006. (9 October 2006)
- Letter from Dr Denise Robinson, Chief Health Officer, NSW Health, providing additional answers to questions taken on notice at the hearing on 11 September 2006. (12 October 2006)
- Letter from Mr John Costley, Location Manager, Alcoa Australia Rolled Products, to Chair providing update on legal proceedings referred to during the Inquiry. (24 October 2006)

Resolved, on the motion of Ms Robertson: That the Committee publish answers received to questions taken on notice during the public hearing on 11 September 2006.

4. Submissions

Resolved, on the motion of Ms Pavey: That Submission 41 be kept confidential.

5. Chair's draft report

The Chair submitted her draft report titled *Health impacts of air pollution in the Sydney basin,* Report 22 which, having been circulated, was taken as being read.

The Committee proceeded to consider the draft report in detail.

Chapter 1 read.

Resolved, on the motion of Ms Robertson: That Chapter 1 be adopted.

Chapter 2 read.

Resolved, on the motion of Ms Hale: That the following new paragraph be inserted after paragraph 2.59:

The draft report on Regional Air Quality and Greenhouse Issues Affecting Development of North West and South West Sectors prepared by the then Department of Infrastructure, Planning and Natural Resources (DIPNR) and the Environment Protection Authority (EPA) identifies south west Sydney as having peak ozone concentrations significantly above the Sydney average and up to 75% above the national standard.

Ms Hale moved: That the following sentence be added after the last sentence in paragraph 2.78:

The Committee notes that the construction of motor ways and inadequate public transport infrastructure have contributed to increased pollution levels.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Ms Pavey: That paragraph 2.79 be replaced with the following sentence:

The impact of increased motor vehicle use and inadequate public transport infrastructure are examined in further detail in Chapter 6.

Resolved, on the motion of Ms Hale: That the following text be added at the end of paragraph 2.97:

The Committee notes that the Metropolitan Strategy Planning Report for the South West Growth Centre does not adequately address the issue of air pollution 'hot-spots' in the south west growth area, either in identification of the extent of the air pollution issue or in identifying mechanisms for mitigating the negative impact of development of the growth sector on air pollution levels.

Resolved, on the motion of Ms Hale: That paragraph 2.98 be reworded as follows:

> The Committee believes that the NSW Government has a responsibility to explicitly address this issue and to ensure that future development does not contribute adversely to air pollution 'hot-spots'.

Resolved, on the motion of Ms Hale: That Recommendation 1 be amended to include the following sentence after the last sentence:

> That the Department of Environment and Conservation develop and implement a targeted strategy to reduce air pollution in the 'hot spots' identified in south and western Sydney.

Ms Hale moved: That Recommendation 1, as amended, be amended to include the following sentence at the end of the last sentence:

> That the Department of Planning and local councils avoid locating future urban development in air pollution 'hot-spots'.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Ms Robertson: That Chapter 2, as amended, be adopted.

Chapter 3 read.

Dr Chesterfield-Evans moved: That wherever the term 'air pollution-related' is used in the report it be replaced with the term 'air pollution-caused'.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Dr Chesterfield-Evans: That in paragraph 3.79, the first word 'Given' be replaced with 'Evidence was provided explaining', and the words 'given health incidence' be replaced with 'individual health incidence'.

Dr Chesterfield-Evans moved: That the following paragraph be added after paragraph 3.79:

> While the Committee accepts this view for any single episode it is not relevant when calculating the total cost of air pollution.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on motion of Dr Chesterfield-Evans: That the following text be added after the quote in paragraph 3.79:

> While the Committee accepts this view for any one episode, it is, however, not relevant when calculating the total cost of air pollution on the health of the population.

Resolved, on motion of Dr Chesterfield-Evans: That the following text be inserted at the end of paragraph 3.85:

> The Committee notes with concern the lack of recognition of the hazards of air pollution in the Sydney basin and the lack of attention given to the deaths due to air pollution as reported in Air Pollution Economics.

Resolved, on motion of Dr Chesterfield-Evans: That paragraph 3.90 be amended to read as follows:

> A more accurate estimate of air pollution costs on the NSW health system would make incorporating air pollution into development and strategic planning easier. It must be costed so it can be compared to the likely expense associated with it. It is clear that the health impacts of air pollution are significant, and action should be taken to reduce air pollution and limit exposure for not only 'at-risk' groups identified in this chapter, but also for the population at large.

Resolved, on motion of Dr Chesterfield-Evans: That paragraph 3.91 be amended to read as follows:

> In recognising the difficulty in determining the role that air pollution may play in any specific health event, and in view of the evidence received, the Committee has focussed on specific groups at risk of the health impacts of air pollution, but believes that the conclusions must relate to the effect on the general population.

Resolved, on motion of Dr Chesterfield-Evans: That the word 'epidemiological' be inserted after the word 'demographical' in paragraph 3.92.

Resolved, on motion of Dr Chesterfield-Evans: That the words 'the distribution of' be removed and the words 'and the population at large' added to Recommendation 2.

Resolved, on motion of Dr Chesterfield-Evans: That the following recommendation be inserted after Recommendation 3:

> That the Department of Environment and Conservation's policy on air quality, *Action for Air*, should take the health costs and consequences of air pollution into account in the planning and approval process as well as considering overseas standards.

Resolved, on the motion of Ms Pavey: That Chapter 3, as amended, be adopted.

Chapter 4 read.

Resolved, on the motion of Ms Robertson: That a new recommendation be inserted after Recommendation 6, as follows:

> That the NSW Government require NSW Health and the Department of Environment and Conservation to be an integral part of the Department of Planning's environmental assessment processes for major projects.

Resolved, on the motion of Dr Chesterfield-Evans: That a new recommendation be inserted after Recommendation 7, as follows:

> That the NSW Government require the Department of Environment and Conservation to work co-operatively with the Department of Health in the setting of evidence based policy and standards, regular reporting and long term data analysis in relation to air pollution.

Moved, on the motion of Ms Hale: That paragraph 4.43 be replaced with the following paragraph:

> The Committee received evidence of the adverse impacts on residents of the activities of the Alcoa Australia Rolled Products facility at Yennora. It also noted that, although Alcoa is operating within the limits set by its Environment Protection licence, the licence conditions are insufficiently rigorous to prevent health impacts on residents and considered that they should be modified accordingly. The Committee also questions the appropriateness of locating such a potentially hazardous industry in a densely populated residential area.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Dr Chesterfield-Evans: That the following words be inserted at the end of paragraph 4.43:

> The Committee also notes that Weston Aluminium Pty Ltd has appealed this decision to the High Court.

Ms Hale moved: That a new paragraph be inserted after 4.50 as follows:

> The Committee notes that the practice of permitting industries to self-monitor results in considerable disquiet in affected communities and the practice of self-monitoring should be abandoned in favour of independent monitoring supervision.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Ms Hale moved: That a new recommendation be inserted after paragraph 4.50 as follows:

> That the NSW Government require all industries operating under an Environment Protection Licence be required to contribute on a pro rata basis to the costs of establishing and running an independent monitoring scheme which would report to DEC on compliance with licence conditions.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Tsang, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Dr Chesterfield-Evans: That a new recommendation be inserted after paragraph 4.67 as follows:

> That the NSW Government implement the recommendations of the Joint Select Committee on Tobacco Smoking that relate to reducing Environmental Tobacco Smoke.

Resolved, on the motion of Ms Hale: That the following words be deleted from paragraph 4.80:

> commented that 'we apply world's best practice in terms of emission limits for industry premises'. Mr Routh

Resolved, on the motion of Ms Hale: That the following recommendation be inserted after paragraph 4.87:

> That the NSW Government amend the environmental pollution and control legislation to specify that organisations have a specific duty of care to ensure that their activities minimise effects on the community and the environment.

Ms Robertson moved: That the following text be inserted after paragraph 4.91:

> The Committee notes that, over the last decade, levels of most air pollutants have been significantly reduced, including:
>
> - toxic airborne lead cut by nearly 98% (lead in petrol was removed altogether in 2002),
> - harmful carbon monoxide emissions cut by nearly 30%,
> - oxides of nitrogen cut by 6%, and
> - sulphur dioxide concentrations are also well below the national standard in Sydney.

Committee divided.

Ayes: Robertson, Catanzariti, Tsang
Noes: Hale, Chesterfield-Evans, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Ms Robertson: That the following text be inserted after paragraph 4.91:

> The Committee notes that the NSW Government believes that, as a result of improvements to fuel quality and motor vehicle standards, and despite predicted increases in vehicle usage, motor vehicle emissions of carbon monoxide, volatile organic compounds, oxides of nitrogen and particles in the Sydney Greater Metropolitan Region are forecast to fall by 75%, 46%, 67% and 40% respectively from 2002 to 2020.

Ms Robertson moved: That the following text be inserted after paragraph 4.91:

> The Committee also notes and supports the recent changes to, and strengthening of, industrial air pollution regulation. These changes are expected, over the next 20 years, to:
>
> - prevent 26,727 tonnes of harmful solid particles (1,336 tonnes per year) from being emitted,
> - prevent 366,062 tonnes of nitrogen oxides (18,303 tonnes per year) from being emitted, and
> - prevent 94,316 tonnes of sulphur oxides (4,716 tonnes per year) from being emitted,
>
> and that it is estimated that these reductions will result in avoiding health costs of up to $1.26 billion over the next 20 years.

Committee divided.

Ayes: Robertson, Catanzariti, Tsang
Noes: Hale, Chesterfield-Evans, Parker, Pavey

Question resolved in the negative.

Mr Tsang left the room.

Ms Robertson moved: That the following text be inserted after paragraph 4.91:

> The Committee therefore believes that air pollution laws in NSW (including the Clean Air Act 1961, the Protection of the Environment Operations Act 1997 and applicable regulations made under those Acts) have had a positive impact on air quality and there is more that can be done.

Mr Chesterfield-Evans moved: That the amendment be amended to replace the words 'and there is more that can be done' with 'but that progress is less than could reasonably have been hoped.'

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans, Parker, Pavey
Noes: Robertson, Catanzariti

Question resolved in the affirmative.

Original motion, as amended, put:

> The Committee therefore believes that air pollution laws in NSW (including the Clean Air Act 1961, the Protection of the Environment Operations Act 1997 and applicable regulations made under those Acts) have had a positive impact on air quality but that progress is less than could reasonably have been hoped.

Committee divided.

Ayes: Hale, Chesterfield-Evans, Parker, Pavey
Noes: Robertson, Catanzariti

Question resolved in the affirmative.

Mr Tsang returned to the room.

Resolved, on the motion of Ms Robertson: That Recommendation 8 be amended to read:

> That the NSW Government make sufficient resources available to the Department of Environment and Conservation and NSW Health to ensure they are able to fulfil their strategic, regulatory and monitoring roles, as enhanced by the recommendations of this Report.

Resolved, on the motion of Ms Pavey: That Chapter 4, as amended, be adopted.

Chapter 5 read.

Resolved, on the motion of Dr Chesterfield-Evans: That the words 'and are as low as is reasonably achievable' be inserted after the words 'community at large' in paragraph 5.68.

Resolved, on the motion of Dr Chesterfield-Evans: That the words 'Australian deaths from air pollution, levels set as low as is reasonably achievable, and' be inserted after the words 'in the context of' in Recommendation 9.

Resolved, on the motion of Dr Chesterfield-Evans: That the following new paragraph be inserted after paragraph 5.71:

> The Committee believes that there is sufficient evidence of the harm from fine and ultra-fine particles to justify taking immediate action to reduce these levels.

Resolved, on the motion of Dr Chesterfield-Evans: That the following recommendation be inserted after Recommendation 11:

> That the NSW Government take immediate action to reduce levels of fine and ultra-fine particles.

Dr Chesterfield-Evans moved: That the words ',based on independent scientific data' be inserted after the word 'office' in Recommendation 17.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans

Noes: Robertson, Catanzariti, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Mr Catanzariti: That Chapter 5, as amended, be adopted.

Chapter 6 read.

Ms Hale moved: That the following recommendation be added after Recommendation 22:

> That as a matter of urgency, spending on the construction of additional major road infrastructure, such as tollways, be redirected to the provision of public transport infrastructure such as light and heavy rail.

Question put.

Committee divided.

Ayes: Hale, Chesterfield-Evans
Noes: Robertson, Catanzariti, Parker, Pavey

Question resolved in the negative.

Resolved, on the motion of Ms Robertson: That paragraph 6.50 be replaced with the following text:

> The Committee notes that preventing or reducing the emission of petrol vapours (which contain smog-producing volatile organic compounds) has the potential to result in air quality improvements. The Committee believes that the technological developments with respect to the recovery of petrol vapours are encouraging and notes the success of the trial of stage II vapour recovery equipment.

Resolved, on the motion of Ms Robertson: That the following recommendation be inserted after paragraph 6.50:

> That the NSW Government consider making the introduction of stage 2 vapour recovery equipment at service stations compulsory over a reasonable time period to be determined in consultation with all affected stakeholder groups.

Resolved, on the motion of Ms Robertson: That the following new paragraph be inserted after paragraph 6.57:

> In July 2006 DEC and the Roads and Traffic Authority completed a one year trial of technology to reduce emissions from older diesel vehicles. The study concluded that catalysts and filters are practical and effective devices for reducing emissions from older diesel vehicles – catalysts reduced particulates by 30%, the filters by 90%.

Resolved, on the motion of Ms Robertson: That the following new paragraph be inserted after paragraph 6.66:

> The Committee notes that as the diesel fleet turnover is slow due to the long lasting nature of diesel engines, further work should be done on a possible diesel retrofit program. In particular, the Committee believes there is merit in further investigating the potential for the use of catalysts and filters to reduce emissions from existing older diesel vehicles.

Resolved, on the motion of Ms Robertson: That the following recommendation be inserted after paragraph 6.67:

> That the NSW Government consider the most cost-effective way to reduce particles from existing diesel vehicles and explore possible models such as off-set arrangements with industry or large fleet owners. Possible regulatory actions, incentive approaches and educative tools associated with a retrofit program should be investigated.

Resolved, on the motion of Ms Hale: That the following subheading and paragraphs be inserted before the section headed 'Road tunnels':

Rail freight emissions

The Committee received evidence that currently 1500 semi-trailers move each day in and out of Port Botany, and that the Port's expansion would result in an additional 1,650 trucks on Sydney's roads.

The Committee also notes that the State Government contends that impact of the expansion of Port Botany will be ameliorated by up to 40 per cent of freight being moved by diesel freight train to the Enfield Logistics Centre and eventually beyond.

The Committee also notes that the de-electrification of Sydney's goods lines means that all rail freight is moved by diesel-powered engines but that there is no regulatory framework in place to control hazardous emissions from those engines.

The Committee considers that the NSW Government should immediately investigate and implement at the earliest opportunity a system to regulate diesel emissions from freight train engines. In developing this system the NSW Government should seek to consult with the Commonwealth Government and other State and Territory Governments.

Resolved, on the motion of Ms Hale: That the following recommendation be inserted before paragraph 6.69:

That the NSW Government immediately investigate and implement at the earliest opportunity a system to regulate diesel emissions from freight train engines. In developing this system the NSW Government should seek to consult with the Commonwealth Government and other State and Territory Governments.

Resolved, on the motion of Ms Robertson: That the word 'voluntary' be inserted after the words 'a subsidy scheme for the' in Recommendation 34

Resolved, on the motion of Ms Pavey: That Chapter 6, as amended, be adopted.

Resolved, on the motion of Mr Catanzariti: That the recommendations of the Report, as amended, be adopted.

Resolved, on the motion of Mr Tsang: That the Committee adopt the Executive Summary subject to changes made by the Secretariat to reflect the amended Report and that the Executive Summary be circulated to Committee members.

Resolved, on the motion of Mr Tsang: That the Secretariat be permitted to correct any typographical and grammatical errors in the Report prior to tabling.

Resolved, on the motion of Ms Pavey: That the Report, as amended, be the Report of the Committee and be signed by the Chair and presented to the House in accordance with Standing Orders 227(3) and 230(5).

Resolved, on the motion of Ms Hale: That dissenting reports be provided to the Secretariat by 9.30am Monday 13 November 2006.

5. Adjournment

The Committee adjourned at 2.10pm. Next meeting Monday 13 November at 11am. Room 1108.

Rachel Callinan
Clerk to the Committee

Appendix 4 Dissenting statement

Sylvia Hale MLC

General Purpose Standing Committee 2

Inquiry into health impacts of air pollution in the Sydney basin

Dissenting Report

1. Introduction

In general I support the report of the Committee. There are however two specific issues about which I take a different view to the majority of my colleagues on the Committee. These relate to the evidence presented on the operation of the ALCOA Australia Rolled Products facility at Yennora and the more general issue of the monitoring of emissions from industrial facilities.

2. ALCOA Australia Rolled Products facility at Yennora

In light of the evidence presented by the Western Sydney Clean Air and Action group of significant increases in emissions of certain polluting compounds and the acknowledgement by Mr McKinstry and Mr. Gibbons on behalf of ALCOA that the emissions of certain pollutants have increased, I believe the report should acknowledge the concerns about the operation of the ALCOA Australia Rolled Products facility at Yennora.

The Committee received evidence of the adverse impacts on residents of the activities of the facility at Yennora. I note that, although Alcoa is operating within the limits set by its Environment Protection licence, the licence conditions are insufficiently rigorous to prevent health impacts on residents and I recommend that they be modified accordingly. I also question the appropriateness of locating such a potentially hazardous industry in a densely populated residential area.

Recommendation 1:

That the emission limits contained within the operating licence of the ALCOA Australia Rolled Products facility at Yennora be reviewed and reduced to ensure the prevention of adverse health impacts on nearby residents.

3. Monitoring of Emissions from Industrial Facilities

I note that evidence presented to the Committee that the practice of permitting industries to self-monitor emissions is causing considerable disquiet in affected communities. I consider that the practice of self-monitoring should be abandoned in favour of independent regulatory supervision. I also consider that industrial facilities should be under a duty of care to ensure that their activities do not result in adverse health consequences for surrounding residents or adverse environmental outcomes for the surrounding area.

Recommendation 2:

That all industries operating under an Environment Protection Licence be required to contribute on a pro rata basis to the costs of establishing and running an independent monitoring scheme which would report annually to DEC on compliance with licence conditions.

Sylvia Hale MLC