



Upper Hunter Air Particles Action Plan



Cover: Aerial view of Hunter Valley coal mines/Lex Stewart EPA

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1 Introduction

1.1 NSW 2021 and the Upper Hunter Air Particles Action Plan

NSW 2021: A plan to make NSW number one is the NSW Government's 10-year plan for change in NSW (see www.2021.nsw.gov.au/about-nsw-2021). NSW 2021's Goal 22, 'protect our natural environment', includes actions to inform local communities on air quality and reduce particle emissions from coal mines. For the Upper Hunter Region, NSW 2021 includes actions now completed or substantially progressed to:

- give the community local and timely information on air quality through a network of 14 air quality monitoring sites for the Hunter, and
- require and support NSW coal mines to reduce dust emissions.

The Upper Hunter has become a primary focus for the Environment Protection Authority's (EPA) action and communication on air quality and the impacts of particle emissions. The *Upper Hunter Air Particles Action Plan* outlines a range of measures in place or being developed to improve air quality in the Upper Hunter and better inform the public. These include actions to engage communities, improve planning decisions, reduce particle emissions from coal mines and other sources and improve the evidence base for action through monitoring and research.

1.2 Interagency Upper Hunter Air Quality Taskforce

The EPA has established a high level interagency taskforce to provide a sound management framework and clear accountability for delivering improved air quality in the Upper Hunter.

The taskforce is chaired by the EPA and includes representatives from NSW Health, the Department of Planning and Infrastructure and the NSW Trade & Investment – Division of Resources & Energy (DRE). Its role is to deliver emission reduction actions through cross-agency collaboration and address community concerns about air quality in the Upper Hunter.

The taskforce's first priority is to reduce emissions from coal mining as the most significant source of particle pollution in the region.

1.3 Particles and their effects (PM₁₀ and PM_{2.5})

Air contains tiny solid and liquid airborne particles (PM). These come from natural sources such as bushfires or soil erosion, and from human activities such as mining, wood burning, motor vehicles and industrial processes. They can also result from chemical reactions in the atmosphere between gases or gases and other particles.

According to the World Health Organisation (WHO), particles affect more people than any other pollutant and their health effects occur at levels of exposure currently experienced by most urban and rural populations in both developed and developing countries. (See WHO, Air quality and health fact sheet at www.who.int/mediacentre/factsheets/fs313/en/index.html.)

Particles less than 10 µm in diameter are known as PM₁₀ and particles less than 2.5 µm as PM_{2.5}. (A micrometre is one thousandth of a millimetre.) PM_{2.5} particles are thus a subset of PM₁₀. Both PM₁₀ and PM_{2.5} can be associated with health impacts such as coughs, asthma and other lung conditions. PM_{2.5} particles can also be small enough to pass through lung tissue into the bloodstream, where they can impact cardiovascular health.

While larger particles such as PM₁₀ generally settle quickly close to their source, smaller particles can remain suspended and be carried long distances, potentially causing impacts far from their source. Further information is available at www.environment.nsw.gov.au/air/particlepollutionPM2.5.htm.

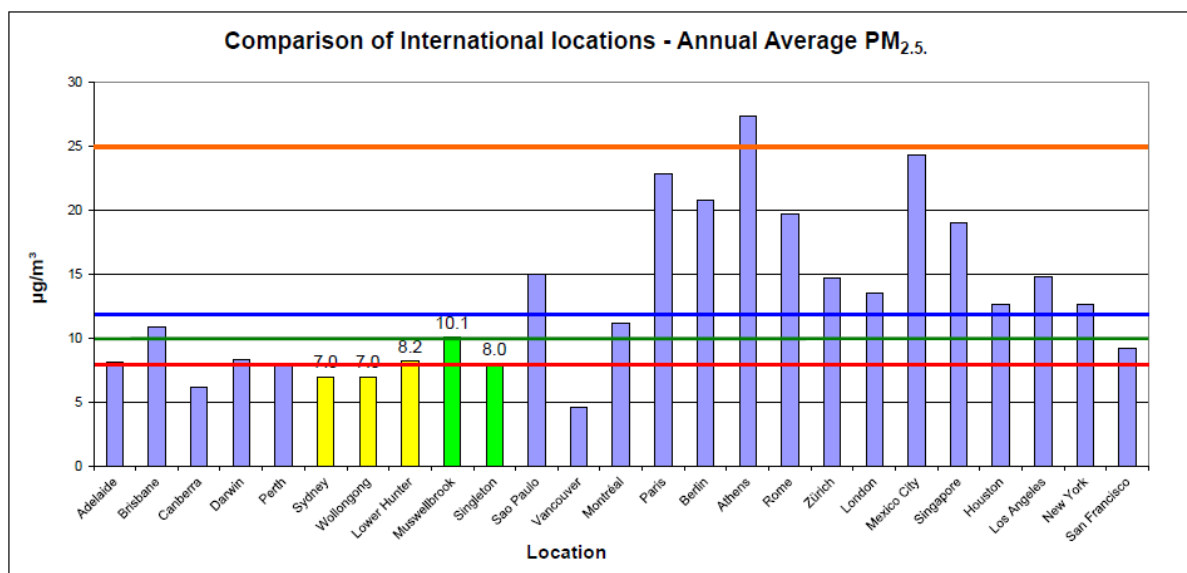
2 Particles in the Upper Hunter

2.1 National Standards and International Comparison

The *National Environment Protection (Ambient Air Quality) Measure*¹ (Air NEPM) sets health based air quality standards to be achieved in cities and large towns across Australia. The Air NEPM sets a compliance standard for PM₁₀, of 50 µg/m³ as a 24-hour average, with a maximum of five allowable exceedences permitted per year in recognition of natural events such as bushfires or dust storms. The Air NEPM also sets 8 µg/m³ as an annual average and 25 µg/m³ as a 24-hour average as advisory reporting standards for PM_{2.5}.

The Australian annual average advisory standard of 8µg/m³ for PM_{2.5} is tighter than other comparable international standards (European Union – 25µg/m³, United States EPA – 12µg/m³ and World Health Organisation – 10µg/m³). A comparison of international standards and annual average PM_{2.5} levels for several Australian and international cities, along with Upper Hunter locations is shown in Figure 1.

Figure 1: Comparison of the annual average PM_{2.5} levels in Australia and worldwide – annual standards: Europe (orange, 25µg/m³), USA (blue, 12µg/m³), WHO (green, 10µg/m³), Australia (red, 8µg/m³)



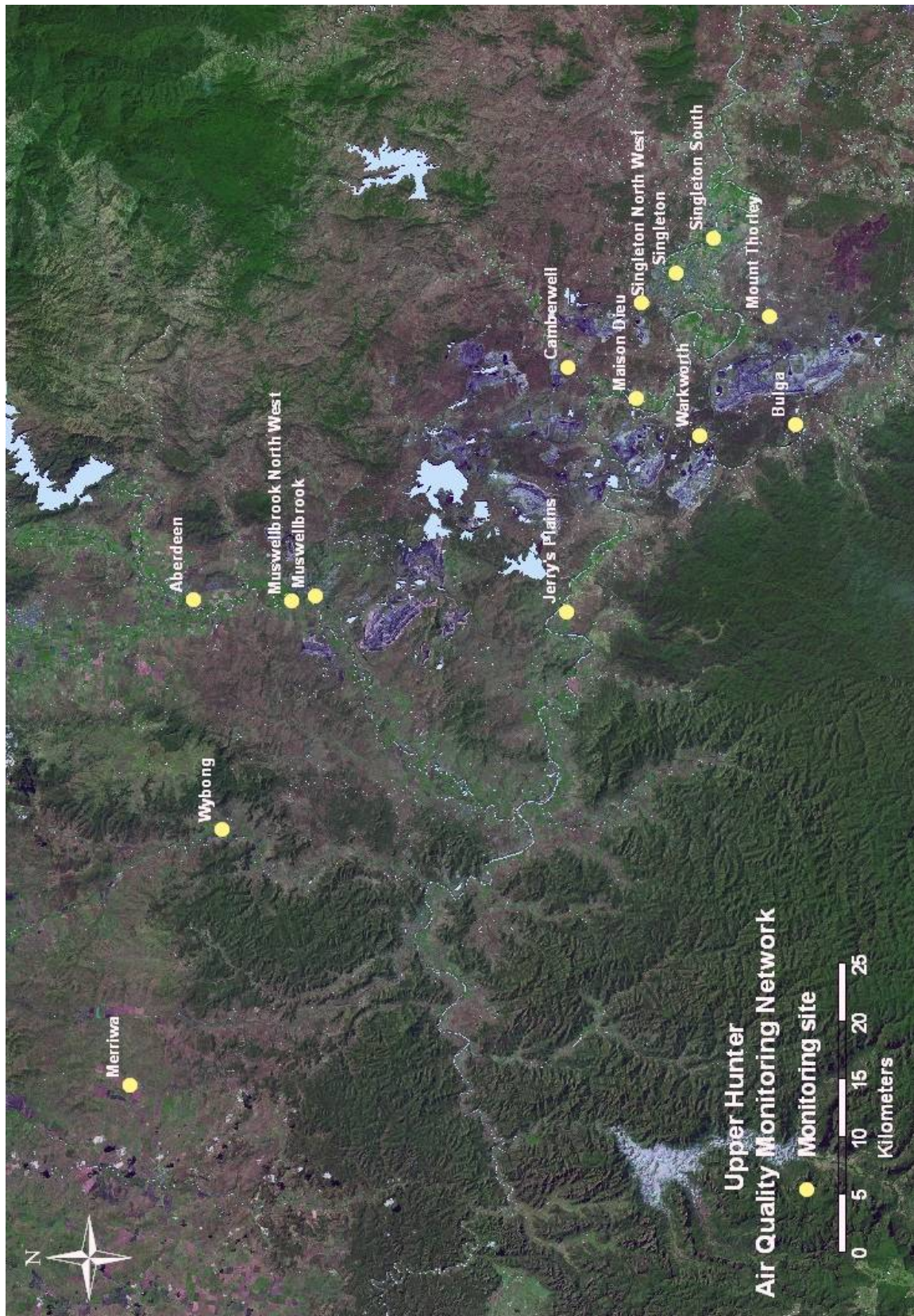
Sources: 1. NSW Office of Environment and Heritage (OEH) air quality monitoring data Upper Hunter (Singleton and Muswellbrook) 2012. 2. World Health Organisation, Department of Public Health and Environment Geneva, Switzerland. 2008–2009 Data: Urban outdoor air pollution database. Published September 2011. (All other sites).

2.2 Particle levels in the Upper Hunter

The 14 station Upper Hunter Air Quality Monitoring Network was completed in February 2012. The 14 monitoring stations are located to provide coverage of air quality levels in population centres, dust levels close to mining activities and air quality at background sites at the northern and southern ends of the Upper Hunter region (Merriwa and Singleton South).

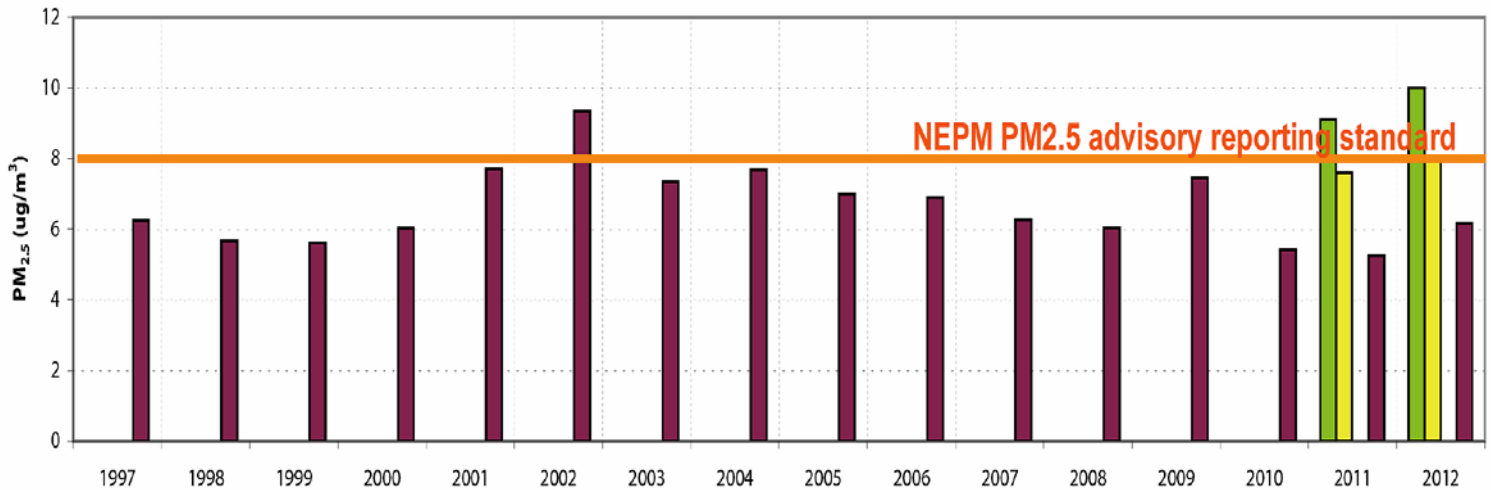
¹ *National Environment Protection (Ambient Air Quality) Measure 1998*: www.ephc.gov.au/airquality/aaq_nepm

Figure 2: Map of Upper Hunter air quality network - OEH



The network has been delivering information on air quality in the two major population centres of Singleton and Muswellbrook since December 2010. This data provides a representative measure of air quality likely to be experienced in population centres in the Upper Hunter region. Figure 3 compares annual average $PM_{2.5}$ levels in Singleton and Muswellbrook with average levels across sites in Sydney, Wollongong and Newcastle.

Figure 3: Annual PM_{2.5} averages in Sydney, Wollongong and Newcastle – 1997–2012 (purple) and Singleton (yellow) and Muswellbrook (green) – 2011–2012



Data from the Upper Hunter and other air quality monitoring sites in NSW are available at www.environment.nsw.gov.au/aqms/aqitable.htm. An interim report on the first six months of the UHAQMN operation and the first annual report on Upper Hunter air quality – for 2012, are available to the community on the air quality website at www.environment.nsw.gov.au/aqms/uhaqmnmonitoring.htm.

The Air NEPM states that air quality monitoring stations must be located so they ‘obtain a representative measure of the air quality likely to be experienced by the general population in the region or subregion’. As such, only those sites designated as larger population centres should be compared to the Air NEPM goals, as these stations are specifically located to record air quality likely to be experienced by the general population in the region.

The 2012 annual report shows the daily average standard for PM₁₀ of 50 ug/m³ was exceeded on six days in Singleton (central) and one day in Muswellbrook (central). Singleton therefore did not meet the NEPM goal for PM₁₀.

Muswellbrook recorded PM_{2.5} levels above the daily average advisory reporting standard of 25 ug/m³ and the annual average of 8 ug/m³ in 2012. The daily level was exceeded on two occasions during that year and the annual average was 10.1 ug/m³. Readings at Singleton in 2012, with a highest daily average of 19.5 ug/m³ and annual average of 8 ug/m³, did not exceed the PM_{2.5} standard.

2.3 Sources of particles in the Upper Hunter

The NSW Air Emissions Inventory provides detailed information for over 850 air pollutants and their sources in the NSW Greater Metropolitan Region (GMR) – including Sydney, Wollongong and Newcastle – and the Upper Hunter. In the Air Emissions Inventory, the term Upper Hunter relates to the Dungog, Great Lakes, Muswellbrook and Singleton local government areas. The EPA uses Inventory information to develop strategies and specific emission abatement actions. Information from the Inventory is available to the public in the *NSW Greater Metropolitan Region Air Emissions Inventory – 2008* available at www.environment.nsw.gov.au/air/airinventory2008.htm.

This is the latest NSW Air Emissions Inventory report. It shows PM₁₀ emissions from Upper Hunter industrial activity have doubled, from approximately 25,000 tonnes in 2003 to 50,000 in 2008. There is also an increase in industrial emissions of PM_{2.5}, from approximately 4,300 tonnes in 2003 to 9,600 in 2008. PM_{2.5} emissions from off-road diesel equipment, which is primarily used at mine sites, also increased. Figures 4 and 5 show the proportionate contribution of PM₁₀ and PM_{2.5} by various sectors in 2008. These reveal 88 per cent of PM₁₀ and 66 per cent of PM_{2.5} in the Upper Hunter are generated by coal mining activities. Figures 6 and 7 compare 2003 and 2008 emissions.

Figure 4: PM₁₀ emissions from all sectors in the Upper Hunter Region – 2008 Air Emissions Inventory

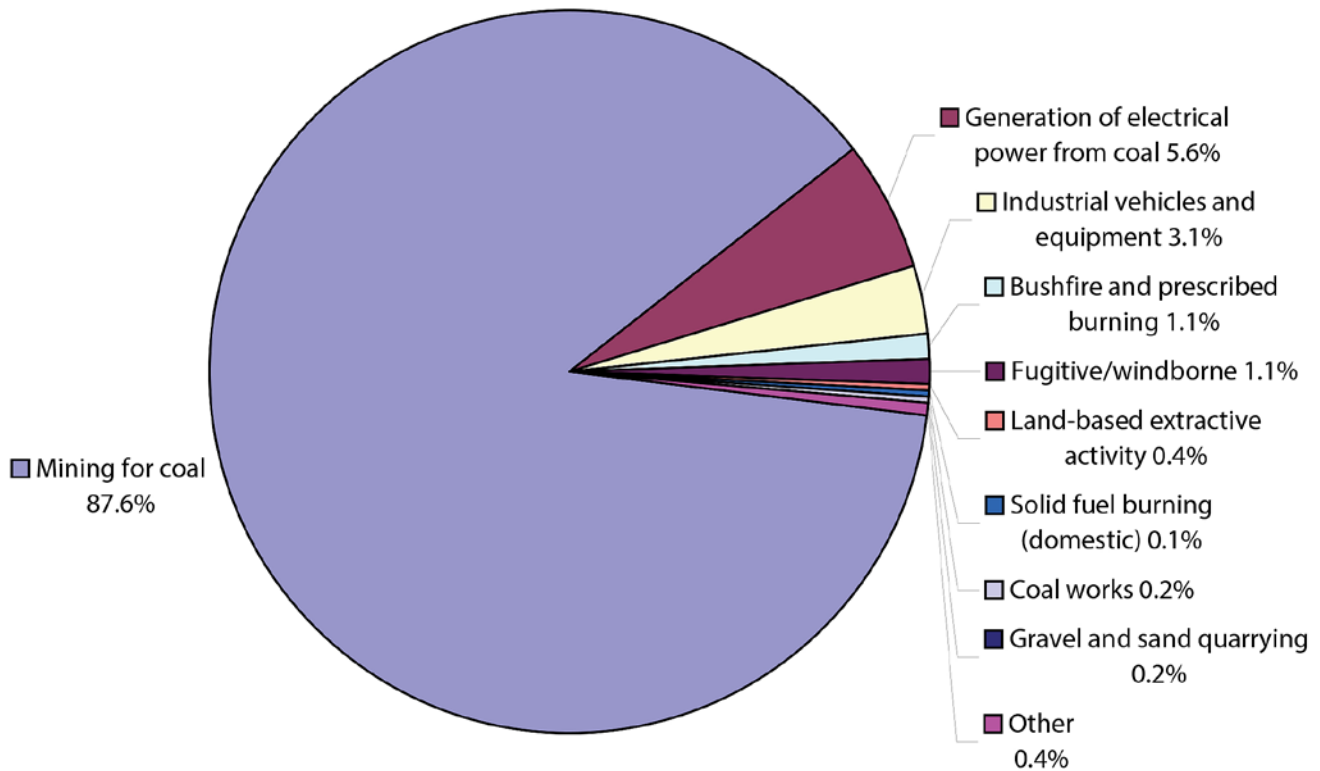


Figure 5: PM_{2.5} emissions from all sectors in the Upper Hunter Region – 2008 Air Emissions Inventory

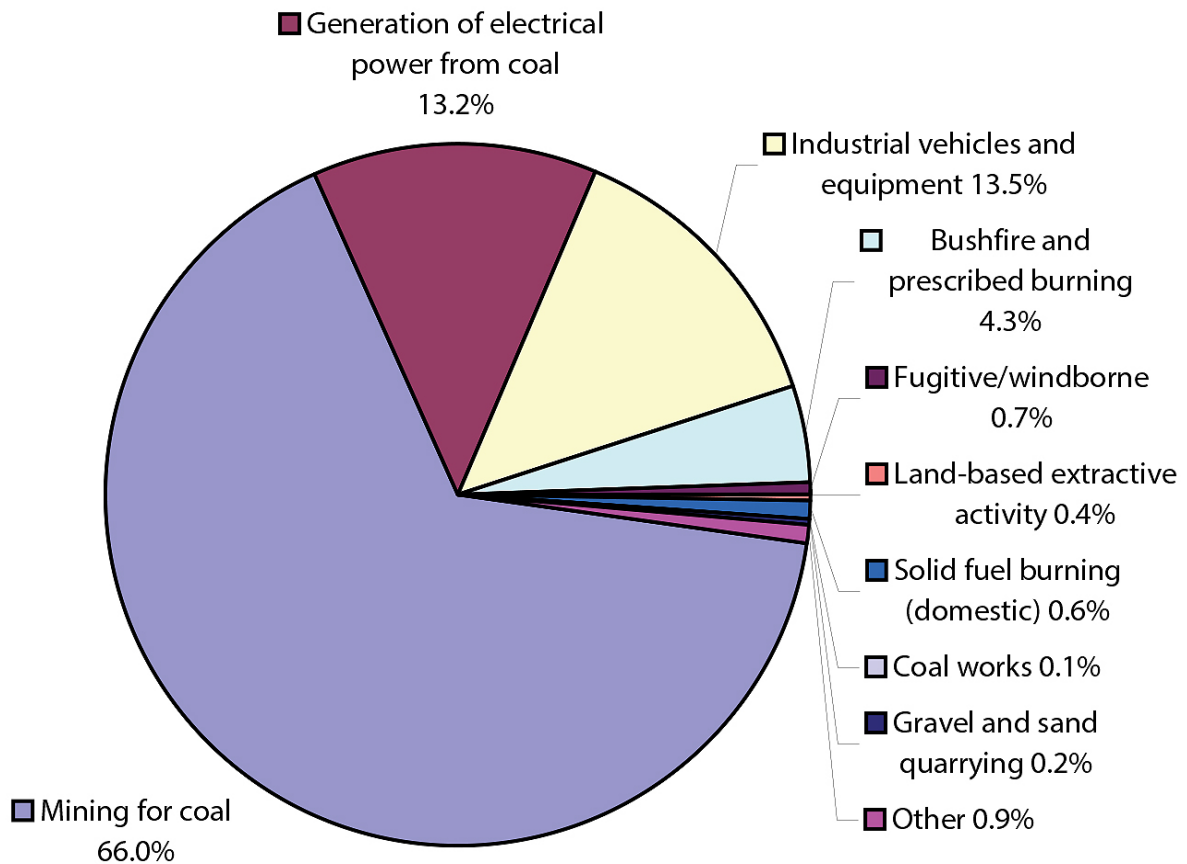


Figure 6: Comparison of the contribution by different sectors to PM₁₀ emissions Upper Hunter, 2003 to 2008

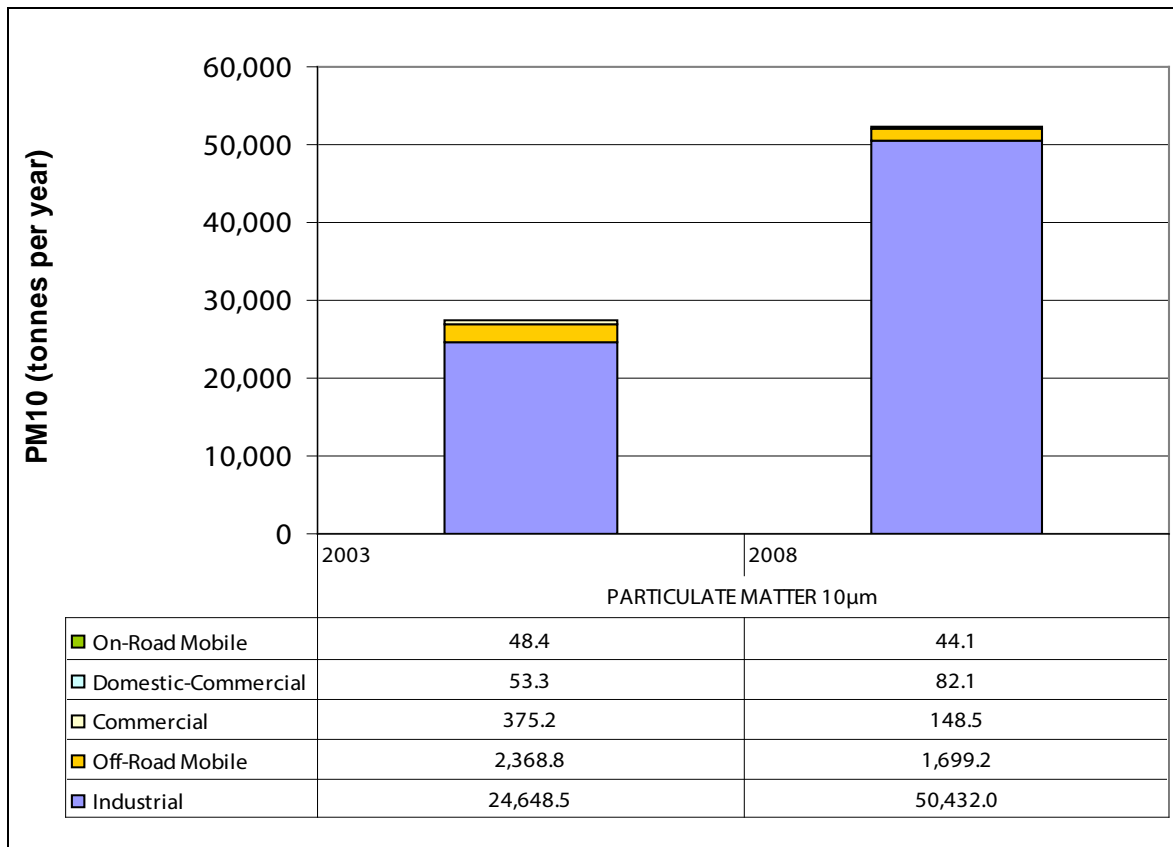
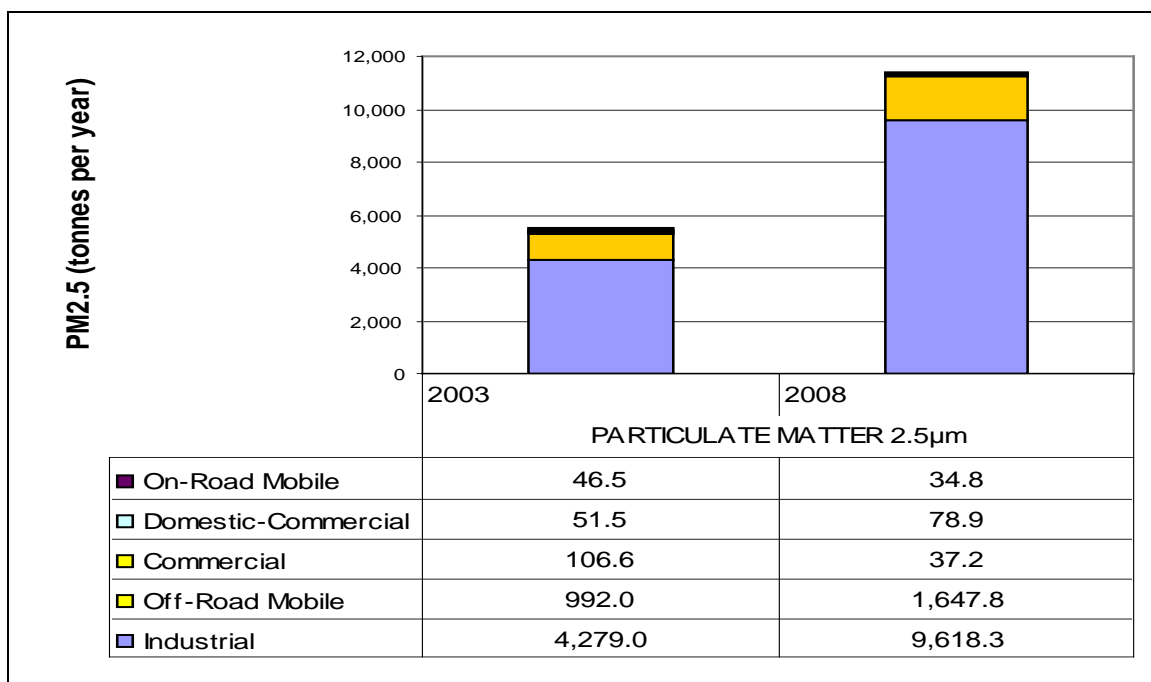


Figure 7: Comparison of the contribution by different sectors to PM_{2.5} emissions Upper Hunter, 2003 to 2008



3 Particle reduction target

The interagency taskforce responsible for addressing air quality in the Upper Hunter has adopted a target of reducing long-term average ambient PM_{2.5} concentrations in Singleton and Muswellbrook. To achieve this, the initial goal is to:

Reduce PM_{2.5} concentrations as measured at Singleton and Muswellbrook air quality monitoring stations to an annual average of less than or equal to 8µg/m³, consistent with the national advisory reporting standard for PM_{2.5}, as set under the National Environment Protection (Ambient Air Quality) Measure.

The initial goal focuses on PM_{2.5} due to its greater potential to impact on human health. Many actions to reduce PM_{2.5} will also reduce PM₁₀. The taskforce will monitor and report progress against the PM_{2.5} target.

Annual PM_{2.5} averages for the preceding calendar year for Muswellbrook and Singleton monitoring stations will be published on the EPA's air web pages, following quality assurance of data.

4 Upper Hunter particle actions

4.1 Reduce particle emissions from coal mine operations

4.1.1 Assessment of development proposals

The NSW Department of Planning and Infrastructure (DP&I) coordinates the development assessment of new mining proposals with key agencies. The aims are to:

- ensure these proposals minimise the generation of particle emissions
- identify and implement all reasonable and feasible mitigation measures consistent with best management practice
- establish an effective regulatory framework for the ongoing regulation of particle emissions on mine sites.

The EPA provides expert advice to DP&I to ensure all reasonable and feasible mitigation measures are used to meet relevant air quality standards and reduce pollution. Mines are required to operate in a proper and efficient manner to reduce dust emissions by DP&I approval conditions and the EPA's Environment Protection Licence.

Action 1: Development consent conditions

Responsible agencies will provide advice to DP&I on air quality issues specific to each new proposal, as part of the development assessment process.

4.1.2 Environment protection licences

As above, consistent with DP&I approval conditions, EPA environment protection licences require mining operations to minimise pollution, including dust emissions. The EPA also negotiates legally enforceable pollution reduction programs (PRP) with mine operators, which are included as conditions in environment protection licences. PRPs may, for example, require mines to reduce dust from haul roads, cease operations in adverse weather conditions and manage stockpiles to reduce windblown dust.

Action 2: Improve links between consent conditions and environment protection licences

DP&I and the EPA are working together to streamline the consent and licensing process, to prevent overlap and improve enforceability of their requirements.

4.1.3 Enforcing compliance

Government agencies carry out enforcement programs for consent, lease and licence conditions. DP&I has a compliance audit team based in Singleton that conducts site inspections and audits of previously approved projects to ensure adherence to consent conditions (for more information see www.planning.nsw.gov.au/compliance.) The EPA Hunter Region conducts regulatory inspections of mining operations to monitor and enforce compliance with environment protection licence requirements. It carries out unannounced surveillance of open cut coal mine operations and issues penalty notices or initiates legal action where warranted. Under Government changes to legislation effective from February 2012, mining operations are required to report any significant pollution incident to the EPA immediately.

Action 3: Continued inspection of mining operations and enforcement of conditions

EPA and DP&I officers will continue to conduct inspections of mining operations to ensure the consent conditions and conditions on environment protection licences are met.



Dragline in operation, Hunter Valley (Photo: Lex Stewart/EPA)

4.1.4 Dust Stop program

An environmental review of NSW coal mining has benchmarked current NSW practices for minimising particle emissions against international best practice and estimated the likely reduction in particle emissions and costs, if feasible best practice measures are adopted. See: *International best practice measures to prevent and/or minimise emissions of particulate matter from coal mining* at www.environment.nsw.gov.au/resources/air/KE1006953volumel.pdf.

Based on the review, the Dust Stop program, through PRPs attached to environment protection licences, has required each NSW coal mine to assess its operations against best practice and identify feasible improvements to reduce dust emissions. By the end of 2012, all coal mines had reported to the EPA.

The reports indicated that the most significant sources of particulate matter from coal mines are wheel-generated dust, overburden handling and wind erosion from exposed surfaces, together accounting for around 80 per cent of PM₁₀ emissions from NSW open cut coal mines. On 22 March 2013, the EPA issued all open cut coal mines with three new PRPs requiring:

- best practice controls of wheel generated dust and monitoring over a year to ensure this is being achieved
- modifying or stopping of handling of overburden during adverse weather conditions and monitoring of outcomes
- building on these initiatives and finding additional, better ways to control dust while handling overburden.

The requirements of each PRP are available by viewing the individual mine licence on the EPA's public register of environment protection licences at www.environment.nsw.gov.au/prpoeoapp/.

Action 4: Implement the Dust Stop program

The EPA is progressively requiring all NSW open cut coal mines to implement best practice measures to significantly reduce dust emissions from their operations.



Dust suppression on a haul road (Photo: Lex Stewart/EPA)

4.1.5 Rehabilitating mine sites



An important strategy for reducing dust emissions in the Hunter is to effectively rehabilitate mining sites.

NSW Trade & Investment - Division of Resources & Energy (DRE) works to ensure that land disturbed by mining is returned to a sustainable use.

DRE's powers include placing rehabilitation conditions on mining titles, requiring security bonds for mining and exploration titles, and enforcing title holders' compliance with their obligations. Mines must submit and comply with an approved mine operations plan which covers rehabilitation, and undertake rehabilitation progressively over the life of the mine. DRE determines when rehabilitation has met the required standard.

Inspecting rehabilitation at Bulga coal mine (Photo: NSW DTIRIS Image Library)

Action 5: Rehabilitation outcomes

DRE will continue to collaborate with industry and the community to achieve positive rehabilitation outcomes and a sustainable mining industry.

4.1.6 Dust handbook

In consultation with industry and DP&I, the EPA has prepared and distributed a glove box size pictorial handbook as a tool for both the mining industry and Government regulatory staff (available from the EPA Newcastle office). The handbook is designed to be kept on mine site machinery and to assist operators assess and reduce dust emissions from haul roads and drilling rigs.

4.1.7 Best practice diesel emissions management strategy at mine sites

Off-road diesel vehicles and equipment from coal mines account for a significant proportion of man made particulate matter in both the Upper Hunter and the total GMR. Approximately 14 per cent of PM_{2.5} emissions in the Upper Hunter and six per cent of PM_{2.5} in the total GMR comes from equipment used in coal mines in the Upper Hunter.

Action 6: Commence diesel emissions management review of mine sites

Similar to the Dust Stop program, the EPA is initiating a study to benchmark international best practice to reduce emissions from off-road vehicles and equipment at coal mines. Mines will be required to take feasible measures to reduce diesel emissions, via PRPs attached to their environment protection licences.



Hunter Valley coal mine (Photo: Lex Stewart/EPA)

4.1.8 Dust from coal trains

To investigate levels of dust from coal trains, the Government issued the Australian Rail Track Corporation (ARTC) with a binding PRP, requiring it to install monitoring stations and assess dust generated by train movements along the Hunter Valley rail corridor. The results, published by ARTC in September 2012, indicate there is no appreciable difference between dust levels from coal trains and other types of freight movement. The EPA has issued ARTC with a second PRP requiring further monitoring to confirm the pilot results.

Action 7: Further monitoring of dust along the rail corridor

The EPA will review results of ARTC and other monitoring of train generated dust to determine if any new measures are required to control and reduce coal dust emissions along the Hunter rail corridor.

4.2 Using strategic planning and guidance to improve air quality

4.2.1 Strengthening policy for assessing impacts of coal mine proposals

Under the *Environmental Planning and Assessment Act 1979*, DP&I's Director General can require proponents of a development to include specific information such as detailed assessment of key environmental issues, risk analysis of environmental impacts, assessment of social and economic impacts and stakeholder consultation as part of the development application and/or environmental impact assessment. These are referred to as Director General's requirements (DGRs). DP&I may request input to these requirements from other agencies. DP&I and the EPA are reviewing the DGRs for coal mines to ensure that proponents show that best practice controls to reduce dust are proposed and that a monitoring and reporting framework will be applied. DP&I and the EPA will develop guidance material for proponents.

Action 8: Development of guidance material for Director General's requirements

DP&I and the EPA will review current DGRs and process and develop guidance for industry.

4.2.2 Strategic regional land use plan – Upper Hunter

Strategic regional land use plans have been or are being developed for regional areas, including the Upper Hunter, to protect strategic agricultural land and water resources and give greater certainty to companies seeking to invest in mining projects in regional NSW.

The *Upper Hunter strategic regional land use plan* was released in September 2012 (see www.nsw.gov.au/sites/default/files/uploads/common/UpperHunterSLUP_SD_v01.pdf). The plan outlines a comprehensive suite of actions to minimise the impacts of mining and coal seam gas extraction, including air quality and noise impacts. These actions include developing a cumulative impact assessment methodology for mining and coal seam gas development and preparing a development assessment guideline on the health risks from dust. Actions and timeframes are shown in the table in Appendix 1.

An executive level interagency implementation group has been established to oversee delivery of actions in the Upper Hunter and New England North West strategic regional land use plans.

Action 9: Implementation of the strategic regional land use plan

Responsible agencies will implement actions to improve management of air quality and protect public health in the Upper Hunter, as specified in the *Upper Hunter strategic regional land use plan* (see Appendix 1).



Aerial view of Hunter Valley coal mines (Photo: Lex Stewart/EPA)

4.3 Reducing particle emissions from other sources

4.3.1 Clean Machine Program

The EPA's Clean Machine Program aims to reduce diesel exhaust emissions from off-road diesel machinery by developing better worksite practices, encouraging the procurement of cleaner machines and subsidising the retrofit of diesel particle filters to machinery. Under the program, the EPA and Roads and Maritime Services partner with local government and industry organisations and subsidise the retrofitting of particle filters to machines such as tractors, loaders, cranes and gantries.

The EPA has invited councils and industry other than coal mines in the Upper Hunter to participate and take advantage of the available subsidy. A specific program for off-road diesel machinery is being implemented for coal mines. See Action 6.

Action 10: Promote the Clean Machine Program in the Upper Hunter

The EPA will continue to work with local government and industry in the Upper Hunter to promote participation in the Clean Machine Program. Subsidies for diesel retrofitting of off-road diesel equipment will be available under the program until December 2013.

4.3.2 Developing a new wood smoke reduction framework

According to the NSW Air Emissions Inventory for 2008, smoke from domestic wood heaters produces approximately 78 tonnes of PM₁₀ and 75 tonnes of PM_{2.5} annually in the Upper Hunter. These emissions are concentrated in the winter months in built up areas as people use wood fires for heating. The EPA works on wood smoke management with local councils, which have regulatory responsibility for wood smoke and direct knowledge of local communities' needs.

The wood smoke management framework in NSW is currently under review, with options being considered from which councils can select as appropriate to their localities. In late 2012 the Minister for the Environment announced more than \$1 million in grant funding available to NSW councils over the winters of 2013 and 2014 to help them target wood smoke reduction. Councils can apply for up to \$60,000 per year.

The EPA has invited Hunter Region councils to comment on the potential control options and to apply for funding under the wood smoke reduction program. Both Singleton and Muswellbrook Councils have received funding for projects over winter in 2013. For more detail on the wood smoke program, go to www.environment.nsw.gov.au/woodsmoke/index.htm.

Action 11: Promote and support local government participation in the wood smoke program

The EPA will continue to work with local government in the Upper Hunter to improve wood smoke management and promote participation in the wood smoke program over the winters of 2013 and 2014.

4.4 Engaging and informing communities and industry stakeholders

4.4.1 Stakeholder participation

NSW 2021 commits to increasing transparency and community participation in Government decision making, particularly at regional level. In the Hunter, the Government has held community forums to discuss air quality concerns and potential solutions, sought industry's input via the licensing process on better managing mining emissions and engaged local councils in air quality workshops and programs, particularly to improve wood smoke management.

In September 2010, the Government established the Upper Hunter Air Quality Monitoring Network Advisory Committee. The role of the committee is to advise the Government on matters specifically related to the design and operation of the Upper Hunter Air Quality Monitoring Network. Information on this advisory committee is available at www.environment.nsw.gov.au/aqms/upperhunter.htm.

Action 12: Engage stakeholders

The Government will continue to inform and engage community, industry and local government stakeholders via targeted forums and consultations. The EPA will also continue to work closely with the Upper Hunter Air Quality Monitoring Network Advisory Committee to manage the way air monitoring data are provided to the public.

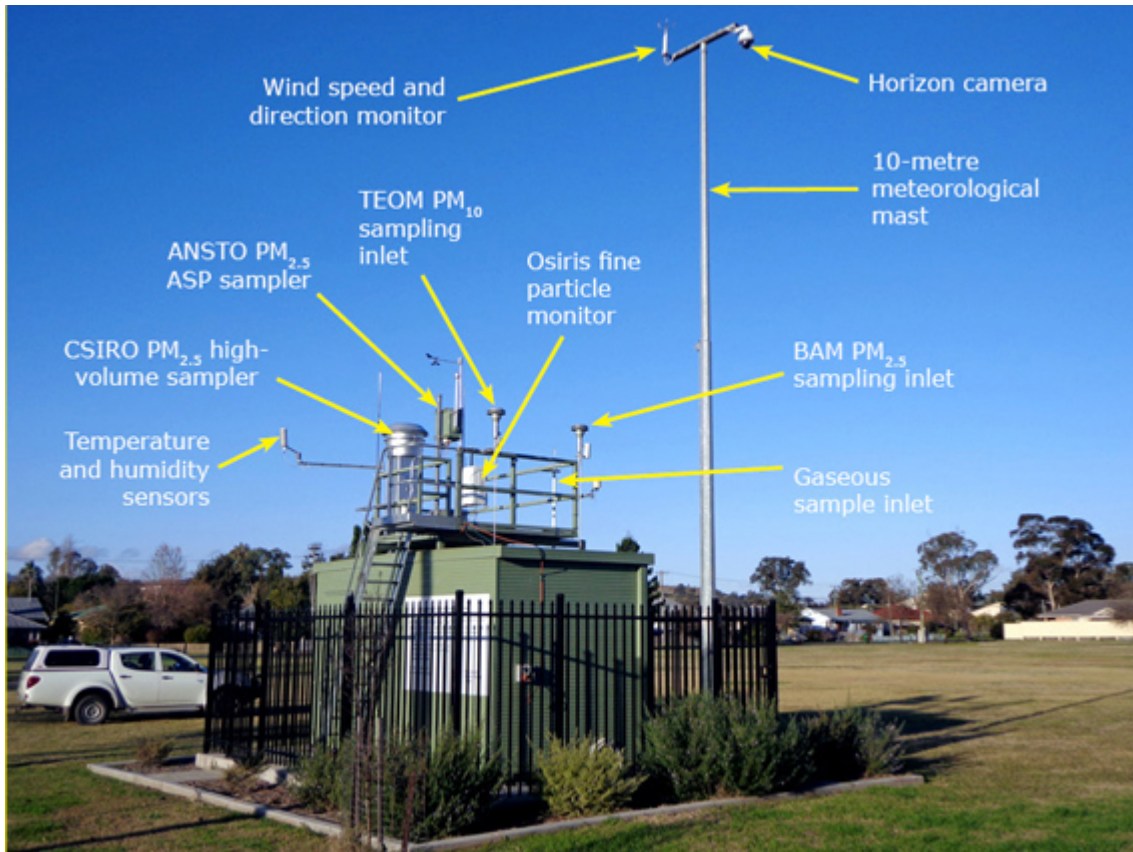
4.4.2 Upper Hunter Air Quality Monitoring Network

The Government has established the Upper Hunter Air Quality Monitoring Network, consisting of 14 air quality monitors strategically located across the Upper Hunter region. Completed in February 2012, the network provides near real time information to the community, industry and government, and will contribute to a broader understanding of regional air quality issues and trends. The network measures PM₁₀ levels for all stations and also measures PM_{2.5} for Muswellbrook, Singleton and Camberwell.

Data from the Upper Hunter and other air quality monitoring sites are available at www.environment.nsw.gov.au/aqms/aqitable.htm. Members of the public can also sign up to receive SMS air quality alerts, enabling people sensitive to pollution to take precautions when air quality is poor – see www.environment.nsw.gov.au/aqms/subscribe.htm.

Action 13: Reporting air quality data

The NSW Government will produce detailed annual reports on the Upper Hunter network, which will be available to the public and provide a comprehensive analysis of Upper Hunter air quality. This information will be provided to NSW Health to inform future research and health programs. It will also be used to inform planning decisions and programs designed to reduce harmful air emissions in the long term.



OEH's monitoring station and equipment in Muswellbrook (Photo: OEH)

4.4.3 Industry funding for air quality monitoring

Up to the end of 2012, operators of coal mines and coal powered electricity generators in the Singleton, Muswellbrook and Upper Hunter Shire local government areas funded the Upper Hunter air quality monitoring network under voluntary deeds of agreement.

The EPA has amended the provisions of the Protection of the Environment Operations (General) Regulation 2009 to ensure ongoing funding is available. This regulation now requires any industry bodies conducting coal mining and electricity generation in the Upper Hunter to pay a levy towards the ongoing operation of the network. Public consultation on the amendments was undertaken in 2012. The levy is calculated based on the amount of emissions (particles, sulfur dioxide and oxides of nitrogen) emitted and, for coal mines, additionally on the amount of materials moved at the mine. The amendment to the Regulation came into effect in February 2013.

Action 14: Regulate ongoing industry funding of monitoring network

The EPA will implement the amendment to the Protection of the Environment Operations (General) Regulation 2009 to ensure that industry bodies undertaking coal mining and electricity generating activities in the Upper Hunter continue to fund the Upper Hunter Air Quality Monitoring Network.

4.4.4 NSW Air Emissions Inventory

The NSW Air Emissions Inventory is the most comprehensive study of air emissions in Australia and is an important tool for calculating emission levels, understanding air pollution problems and pinpointing major emitters. Data is gathered from a wide range of industry and government sources and through domestic surveys. The EPA updates the inventory every five years.

Information from the inventory is available on the EPA website at www.environment.nsw.gov.au/air/airinventory.htm.

For information by local government area (LGA), download the *Emissions to area report analysis for criteria pollutants* instructions and workbook from the above link and select the relevant LGA (see www.environment.nsw.gov.au/air/airinventory2008.htm).

Action 15: Updating the NSW Air Emission Inventory

The EPA will update the NSW Air Emissions Inventory for the calendar year 2013. The update will include information for the local government areas of Muswellbrook and Singleton and provide a comparison and trends when referenced against the existing 2003 and 2008 air emissions inventories.

4.5 Improve understanding of particles

4.5.1 Chief Health Officer's Air Pollution Expert Advisory Committee

An Air Pollution Expert Advisory Committee was established in 2010 to advise the NSW Chief Health Officer. This committee provides expert advice on the current scientific evidence relating to air pollution and public health, which complements the ongoing policy and research work undertaken by NSW Health. Committee members are experts in the fields of respiratory health, epidemiology (population health impacts), toxicology and air quality. The committee's work has included advising on the establishment of the Upper Hunter Air Quality Monitoring Network – see also www.health.nsw.gov.au/PublicHealth/environment/air/apeac.asp.

Action 16: Independent air quality advice to the Government

The Independent Air Pollution Expert Advisory Committee to continue to provide expert advice to Chief Health Officer as required in relation to impact of air pollution on public health.

4.5.2 Upper Hunter Fine Particle Characterisation Study

To improve understanding of fine particles in the Upper Hunter, OEH and NSW Health funded CSIRO and the Australian Nuclear Science and Technology Organisation (ANSTO) to undertake the *Upper Hunter fine particle characterisation study*. Commenced in 2012, the study involves sampling and analysis of airborne particles (PM_{2.5}) to determine their composition and identify key sources in the Upper Hunter. Further detail is at www.environment.nsw.gov.au/aqms/uhaqmfpcs.htm.

Action 17: Release the results of the Upper Hunter fine particles study

The results of the *Upper Hunter fine particle characterisation study* will be publicly released following completion of the study and peer review of the results.

4.5.3 Developing a model of PM_{2.5} in the Upper Hunter airshed

Airshed models are a tool used to simulate the dispersion and transport of air pollutants. Models can be used to prioritise emission reduction actions and to examine their effectiveness. To improve understanding of PM_{2.5} pollution in the Upper Hunter, the EPA will develop a model of the sources and transport primary PM_{2.5}. The model will quantify major contributors to annual average PM_{2.5} concentrations in Singleton and Muswellbrook for a base year and estimate emissions for projected years, taking into account projected future growth in coal mining and potential emission abatement scenarios. This will inform future measures to improve air quality in these population centres in the long term.

Action 18: Develop a model of PM_{2.5} in the Upper Hunter

The EPA will develop a model for PM_{2.5} in the Upper Hunter in 2013.

5 Further information

Air Quality Emissions Inventory: www.environment.nsw.gov.au/air/airinventory.htm

Chief Health Officer's Air Pollution Expert Advisory Committee
www.health.nsw.gov.au/PublicHealth/environment/air/apeac.asp

Department of Planning and Infrastructure – compliance policy and guidelines and activity reports, including for the Upper Hunter: www.planning.nsw.gov.au/compliance

EPA air quality: www.environment.nsw.gov.au/air/

NSW air quality hourly measurements, including for the Upper Hunter:
www.environment.nsw.gov.au/aqms/aqitable.htm

NSW EPA particles (PM_{2.5}) factsheet:
[www.environment.nsw.gov.au/air/particlepollutionPM_{2.5}.htm](http://www.environment.nsw.gov.au/air/particlepollutionPM2.5.htm)

NSW Health air quality:
www.health.nsw.gov.au/publichealth/environment/air/air_pollution.asp

NSW Trade & Investment – Division of Resources and Energy – rehabilitation of mine sites:
www.resources.nsw.gov.au/community-information/mining

Subscribe to free air quality alerts: www.environment.nsw.gov.au/aqms/subscribe.htm

Upper Hunter air quality map: www.environment.nsw.gov.au/aqms/uhunteraqmap.htm

Wood smoke information: www.environment.nsw.gov.au/woodsmoke/index.htm

World Health Organisation air quality and health fact sheet – updated September 2011:
www.who.int/mediacentre/factsheets/fs313/en/index.html

Appendix 1

Upper Hunter Strategic Regional Land Use Action Plan September 2012 Mining and air quality related actions

	Actions	Lead agencies	Timeframe
7.1	Develop a cumulative impact assessment methodology to manage the cumulative health and amenity impacts of mining and coal seam gas proposals. This methodology will consider whether cumulative impact thresholds or tipping points can be adequately described and predicted. It will also address cumulative impacts on agricultural lands and water resources.	Department of Planning and Infrastructure; Office of Environment and Heritage; and Department of Primary Industries	March 2013
7.2	Require all new coal mines and applications seeking to modify existing approvals to benchmark their proposals against best management practice defined in the <i>NSW coal mining benchmarking study: international best practice measures to prevent and/or minimise emissions of particulate matter from coal mining</i> (2011) and ensure they incorporate all reasonable and feasible measures to reduce their dust emissions. Director-General's Requirements and development assessments will reflect these requirements.	Department of Planning and Infrastructure	Immediate / ongoing
7.3	Continue to place legally binding pollution reduction programs on all existing coal mines requiring them to assess their current operations against best management practice and ensure they are using all reasonable and feasible measures to reduce their dust emissions.	Environment Protection Authority	Immediate / ongoing
7.4	Require open cut coal mines to develop strategies to manage and minimise blast fumes.	Department of Planning and Infrastructure	December 2012
7.5	Commence review of the Industrial Noise Policy, including consultation with all key stakeholders, and consider a wide range of options for addressing noise impacts from emerging mining precincts within rural areas.	Environment Protection Authority	2013 (has commenced)
7.6	Review the <i>Synoptic plan: integrated landscapes for coal mine rehabilitation in the Hunter Valley of NSW (1999)</i> in conjunction with the development of the Upper Hunter Strategic Biodiversity Assessment and in consultation with government agencies, the NSW Minerals Council and community stakeholders to ensure best practice rehabilitation and visual impact management for closed mines.	Department of Planning and Infrastructure	Mid 2014
7.7	Review the <i>Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects (2007)</i> in consultation with government agencies, the NSW Minerals Council and community stakeholders to ensure it remains relevant and reflects best practice.	Department of Planning and Infrastructure	June 2013
7.8	Prepare a development assessment guideline for impacts on human health from dust generated by mining and other activities. The guideline will include maximum thresholds for both incremental and cumulative dust emissions.	NSW Health; Department of Planning and Infrastructure; and Office of Environment and Heritage	June 2013

Source: [Upper Hunter Strategic Regional Land Use Plan](#), pp 61–62.