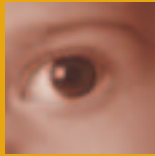
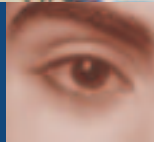




National Pollutant Inventory



Summary
Report of
Third Year
Data
2000-2001



www.npi.gov.au

Key points

This summary report is based on the third year National Pollutant Inventory (NPI) data published on 31 January 2002 and estimates of diffuse emissions from various regions. It is important to realise that the NPI is a database of estimated emissions and the accuracy of the data will vary according to the estimation technique used.

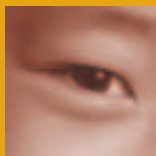
Household, transport, non-industrial and small facility emissions data (called diffuse source emissions data in this publication), unlike reporting facility data, are not estimated every year.

Comparative analysis of diffuse source emissions data is likely to be misleading because, at this early stage of implementation of the NPI, the techniques used are not consistent across all the jurisdictions. It would also be unwise to make comparisons between industries or facilities without first checking to ascertain the basis and extent of their reporting.

Some reporting facilities have included Internet links to their own pages in their facility reports. The views expressed in the pages reached through the facility hotlinks are not necessarily the views of the Commonwealth, Environment Australia nor the National Environment Protection Council.

- 2000-01 is the third year of reporting NPI facility data.
- The number of facilities reporting for 2000-01 is 2,374. This is 21% more than reported the previous year, and nearly double the number that reported in 1998-99, the first year of reporting.
- In 2000-01 136 industry sectors reported to the NPI.
- Motor vehicles are the major diffuse source of pollutant emissions. In capital city regions they contribute more than 50% of the total emissions of 11 substances.
- NPI data can be used to indicate whether facilities or diffuse sources are the major contributor to emissions of particular substances. For example, in major urban areas, facilities contribute the majority of total nitrogen to water, whereas in regional areas diffuse sources, such as agriculture, are the biggest contributors.
- NPI data indicates that an individual sector can be the major contributor of a substance to water but it is not necessarily the original source of the substance. For example, 'sewerage and drainage services' is the major sector emitting mercury & compounds to water because these substances are contained in the wastewater transferred from industries to sewage treatment facilities.
- Three quarters of the emissions of sulfur dioxide from reporting facilities comes from the electricity and basic non-ferrous metal manufacturing sectors combined.

Keep an eye on pollution today



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What the NPI does

- Provides emissions estimates and contact details for facilities that report.
- Lists pollutant sources in your postcode area.
- Provides a map showing an address and reporting facilities close by.
- Gives background information about each of the 90 substances on the NPI.
- Shows on a map the nutrient emissions to water for large parts of Australia.
- Provides estimates of emissions to air from diffuse sources for many urban and rural areas.
- Allows you to download detailed emissions estimates so you can analyse the data off-line.
- Provides details of the emissions estimation techniques used to estimate NPI data.
- Implements a National Environment Protection Measure (NEPM).



How the NPI could be used

The NPI is a valuable program with a wide range of potential uses.

Some specific uses of the program are:

- increasing the knowledge of industries regarding their processes and environmental performance in comparison to similar industries;
- as a benchmarking tool for companies to improve environmental performance and profits;
- as part of education programs about pollution in Australia;
- as a significant contributor to public environmental reporting by companies;
- as a data source for examining facilities for various licenses and approvals;
- providing emission data to assist in formulating new NEPMs; and
- as a data source for new government programs such as the National Dioxins Program (www.ea.gov.au/industry/chemicals/dioxins).

The NPI is an integral part of industry-based Public Environmental Reporting (www.ea.gov.au/industry/sustainable/per) and State of the Environment Reporting (www.ea.gov.au/soe).

If you are new to the NPI, the guide on the Internet is a good way of exploring the data and finding information.



Introduction and background

What is the National Pollutant Inventory?

The NPI is an Internet database (www.npi.gov.au). It provides all Australians with information on the types and amounts of pollutants emitted to the air, land and water around Australia.

The NPI provides pollutant emissions estimates from facilities like factories, and from other non-reporting facility sources (called diffuse source emissions) such as households, transport, non-industrial facilities and small facilities.

Facilities only report data when they exceed reporting thresholds related to the amount of different substances used, fuel or energy used or emissions of nutrients. Facilities estimate their own emissions using techniques outlined in industry-specific handbooks. State and Territory agencies estimate other sources as 'aggregated emissions data' (diffuse source data) for selected airsheds and water catchments, using specific manuals and the industry specific handbooks that are on the Internet. This diffuse source data, when combined with facility estimates, gives a more complete picture of pollutant emissions in Australia.

The NPI was created in February 1998 as the first NEPM by the National Environment Protection Council (www.ephc.gov.au).



The national environment protection goals established by the NPI NEPM are to assist in reducing the existing and potential impacts of emissions of substances and to assist government, industry and the community in achieving the desired environmental outcomes through:

- (a) the collection of a broad base of information on emissions of substances on the NPI reporting list to air, land and water; and
- (b) the dissemination of information collected to all community sectors in a useful, accessible and understandable form.

The NPI database is established to:

- (a) provide information to enhance and facilitate policy formulation and decision making for environmental planning and management;
- (b) provide publicly accessible and available information, on a geographic basis, about specified emissions to the environment, including those of a hazardous nature or involving significant impact; and
- (c) promote and assist with the facilitation of waste minimisation and cleaner production programs for industry, government and the community.

New features

During 2000-01, several new features have been introduced on the NPI Internet site to make data more accessible. The Internet site is updated and improved regularly and those who haven't seen it for a while are urged to keep an eye on it.

Interactive mapping on the Internet

The NPI provides an interactive map tool that can be tailored to your needs. This tool can help you find information on an Australia-wide scale or on the street you live in. The emission of substances from different sources within a particular area can be identified.

You can also draw a map that shows reporting facilities, roads, and water bodies. Details of the pollutants, such as toxicity and effects, can also be found on the NPI.

Selecting facilities on the map allows you to access individual facility reports. The tool will also map estimates of emissions from some diffuse sources.

The interactive map lets you look at:

- where the pollutants are emitted from;
- what pollutants are emitted; and
- which industry or diffuse sources emitted pollutants.

To use this tool from the NPI home page click 'Make a Map'. The help button provides user-friendly online instructions.

NPI National Reporting Tool

During the 2000-01 reporting year the NPI trialed a new electronic reporting tool to enable companies to discharge their NPI reporting responsibilities in a single email transaction. This National Reporting Tool (NRT) streamlines reporting by providing pre-filled administrative information, NPI data reported in previous years, and some automatic validation for facilities. It also streamlines data handling for jurisdictions. More details about this tool are on the NPI Internet site (www.npi.gov.au/nrt/index.html).

Companies have been enthusiastic about the use of the NRT and many have requested that its use be expanded to all jurisdictions. New companies or those that think they should be reporting, can use the NRT and should contact State or Territory NPI representative for more information. Companies that need to report for more than one State or Territory should contact the Commonwealth. Contact details are inside the back cover of this summary report.



NPI facility data

The NPI is expanding annually and covers five dimensions of information about pollutant releases:

- what was released – up to 90 different substances with contextual information;
- where it was released – see the NPI Interactive Map or facility address details;
- when it was released – 1998-99, 1999-00 or 2000-01;
- which source released it – individual facilities or diffuse sources; and
- where it ended up – air, land or water.

The primary individual contributions to information for the database come from facility reports, all of which are available through the NPI homepage (www.npi.gov.au).

Individual facility reports contain:

- estimates of emissions for each substance;
- estimation methods;
- “end-of-pipe” and source reduction activities (see page 28);
- location of the emissions including a map;
- company details; and
- previous facility reports to allow comparisons over time.

NPI substance categories

There are 90 substances on the NPI. Facilities were only required to report from a list of 36 substances in 2000-01. However, many facilities reported substances they were not required to. In 2000-01, 84 substances were reported from 2,374 facilities, compared to 83 substances that were reported last year. The substance classes are:

- organic compounds;
- total volatile organic compounds (these are included as a separate NPI substance due to the impact they have related mainly to their volatility. Most of the organic compounds on the NPI are volatile organic compounds);
- total nitrogen and total phosphorous;
- metals and their compounds;
- five of the six criteria pollutants (see page 18) as detailed in the Ambient Air Quality NEPM; and
- five air toxic substances (see page 18) being considered for the Air Toxics NEPM (www.ephc.gov.au/nepms/air/air_toxics.html).

The number of facilities reporting is increasing

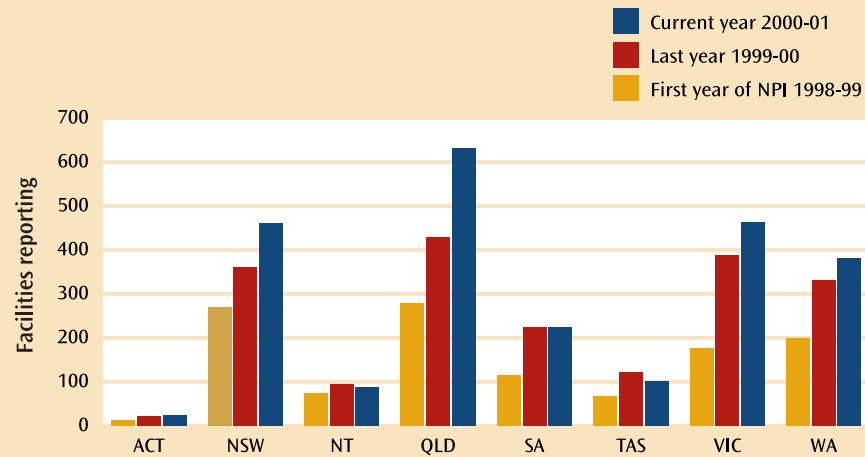
In 2000-01, 2,374 facilities reported to the NPI compared to 1,967 facilities in 1999-00. This is a 21% increase in the number of reporting facilities between 1999-00 and 2000-01. Australian Bureau of Statistics industry data indicate the number of facilities required to report could eventually be significantly higher than the number of reports this year. Facilities report to their State or Territory environment agencies (see inside back cover), most of which have legislation enforcing compliance with the NPI NEPM.

The table below shows the number of facilities reporting for major industry sectors in States and Territories and across Australia, for 2000-01.

| Major Industry Sectors | ACT | NSW | NT | QLD | SA | TAS | VIC | WA | Australia |
|---|-----------|------------|-----------|------------|------------|------------|------------|------------|--------------|
| Coal and non-metallic mineral mining | 0 | 51 | 1 | 47 | 6 | 1 | 13 | 26 | 145 |
| Electricity supply | 2 | 12 | 29 | 49 | 17 | 3 | 21 | 35 | 168 |
| Food and beverage manufacturing | 2 | 38 | 0 | 67 | 24 | 10 | 61 | 17 | 219 |
| Glass, ceramic, cement and related product manufacturing | 0 | 28 | 2 | 25 | 10 | 3 | 22 | 19 | 109 |
| Intensive livestock | 0 | 9 | 1 | 3 | 0 | 1 | 1 | 5 | 20 |
| Machinery and equipment manufacturing | 0 | 8 | 0 | 6 | 4 | 1 | 7 | 8 | 34 |
| Metal ore mining | 0 | 9 | 11 | 17 | 2 | 6 | 2 | 96 | 143 |
| Metal product manufacturing and metal production | 1 | 32 | 1 | 16 | 17 | 5 | 45 | 2 | 119 |
| Oil and gas extraction | 0 | 0 | 6 | 25 | 27 | 0 | 5 | 26 | 89 |
| Petroleum, coal, chemical and related product manufacturing | 0 | 44 | 2 | 45 | 9 | 2 | 71 | 23 | 196 |
| Paper product manufacturing and printing | 2 | 7 | 0 | 8 | 4 | 3 | 17 | 2 | 43 |
| Sewerage and drainage services | 2 | 51 | 4 | 49 | 13 | 26 | 50 | 4 | 199 |
| Wood product manufacturing | 2 | 8 | 0 | 21 | 8 | 12 | 4 | 8 | 63 |
| Water supply | 1 | 6 | 2 | 1 | 8 | 5 | 2 | 9 | 34 |
| All other sectors | 11 | 158 | 28 | 253 | 76 | 24 | 141 | 102 | 793 |
| TOTAL for reporting year | 23 | 461 | 87 | 632 | 225 | 102 | 462 | 382 | 2,374 |

Emissions to air

The chart below shows the number of reporting facilities in each State and Territory since the NPI commenced.



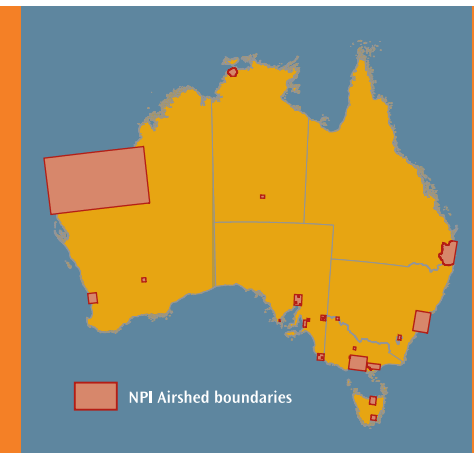
Diffuse sources

The NPI emissions to air comprise reporting facility emissions, which are estimated annually by facilities, and diffuse source emissions that are estimated less frequently by jurisdictions. This is because changes in diffuse emissions of pollutants are usually related to social and behavioural changes of the people within the airshed and usually occur over time frames of three years or more.

The 19 core categories of diffuse sources are in the table below.

| | |
|--|---|
| Aircraft | Motor Vehicle Refinishing |
| Architectural Coating | Paved and Unpaved Roads |
| Barbeques | Printing and Graphical Arts |
| Cutback Bitumen | Railways |
| Prescribed Burning and Wildfires | Commercial Ships/Boats and Recreational Boats |
| Domestic/Commercial Solvents and Aerosol Use | Domestic Solid Fuel Burning |
| Dry Cleaning | Service Stations |
| Domestic Gaseous Fuel Burning | Fuel Combustion (Sub-Threshold) |
| Domestic Lawn Mowing | Use of Industrial Solvents |
| Motor Vehicles | |

The map shows the regions where diffuse source emission estimates have been made.



Airsheds where diffuse source emission estimate studies have been undertaken

The NPI includes 30 airsheds across urban and rural locations, an increase of one from last year. Most airshed studies were completed in 1999-00. Victoria added the Bendigo Region airshed during 2000-01.

The size and location of airsheds is determined in line with State and Territory priorities. The airsheds include all capital city areas and cover more than 75% of Australia's population.

Specific substance reports

Information about three listed substances – oxides of nitrogen, sulfur dioxide and carbon monoxide – is presented in this summary report. These substances have been chosen because excessive exposure to these substances has demonstrated adverse health effects. These substances are classified as criteria pollutants as defined by the Ambient Air Quality NEPM.

In addition, motor vehicle emissions to air, the emission of mercury & compounds to air, and air pollution reduction at one large facility are included in this section to show the kinds of reports that can be produced from the NPI database.

Oxides of Nitrogen

Oxides of nitrogen (NO_x) are often referred to as nitrogen oxides and are formed as by-products of combustion and from some biological sources. They play a major role in the formation of photochemical smog. Excessive levels of oxides of nitrogen can kill plants and increase the acidity of rain.

Data from three airshed regions, Sydney-Newcastle-Wollongong, Canberra and Kalgoorlie have been chosen to illustrate that the proportion of oxides of nitrogen emissions depends on the degree of urbanisation and industry within a region. The pie charts do not include emissions from non-reporting facilities in the 'other diffuse sources' category. These estimates are in the 'other industry' category.

Sydney-Newcastle-Wollongong airshed region

The total emissions for the region are approximately 190 million kilograms annually, and motor vehicles contribute nearly two-thirds of these emissions. The airshed contains several large coal-fired power stations in the Hunter region, contributing approximately 51 million kilograms per year. It should be noted that electricity produced in the region goes to many parts of the state outside the region.

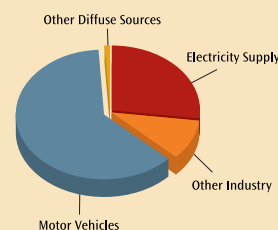
Canberra airshed region

Some capital city airshed regions, such as Canberra, are dominated by emissions from motor vehicles as the airsheds do not have industries such as electricity providers. More than 90% of oxides of nitrogen emissions in the region are sourced from motor vehicles, which contribute approximately 7.4 million kilograms annually.

Kalgoorlie airshed region

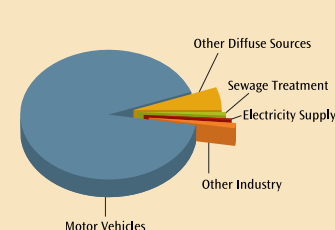
Non-capital city industrial regions such as Kalgoorlie in Western Australia have a different profile of oxides of nitrogen emission sources. Due to significant industrial activities and electricity production, the region has total oxides of nitrogen emissions of approximately 6.1 million kilograms per year. Compared to the more densely populated Sydney-Newcastle-Wollongong region, Kalgoorlie has approximately half the emissions per square kilometre, but four times the emissions per capita. The major contributor to 'other diffuse sources' is biogenics, i.e. emissions from natural biological sources such as vegetation. Such emissions from natural biological sources are not included as a diffuse source in most of the airsheds.

Sydney-Newcastle-Wollongong



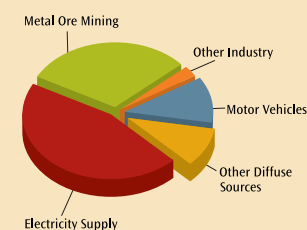
Total Emissions 190,000,000 kg/year

Canberra



Total Emissions 8,100,000 kg/year

Kalgoorlie



Total Emissions 6,100,000 kg/year

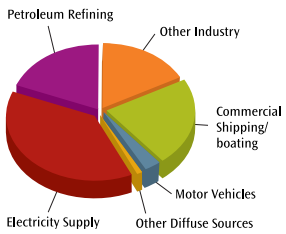
Sulfur Dioxide

Sulfur dioxide (SO₂) is a by-product of a wide range of combustion processes such as electricity production, paper manufacturing and other industries that utilise fuel combustion. The major source of sulfur dioxide in most urban airsheds is from industry with diffuse sources being a minor component.

Emission levels are related to the sulfur content of fuels and the type of emission abatement equipment used by industries. Three regions, SE Queensland (including Brisbane), Hobart and Bendigo, were chosen to illustrate that the proportion of sulfur dioxide emissions in these airsheds depends on the level and type of industrialisation in the region. The pie charts do not include emissions from non-reporting facilities in the 'other diffuse sources' category. These estimates are in the 'other industry' category.

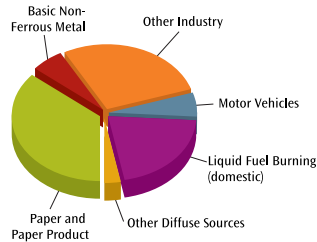
An interesting aspect of the Bendigo region is that the industry emissions are mainly from facilities that do not report directly to the NPI, but are estimated as part of diffuse source estimates.

SE Queensland



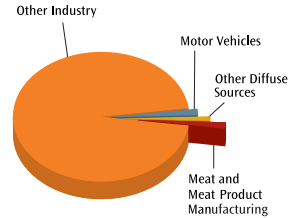
Total Emissions 32,000,000 kg/year

Hobart



Total Emissions 1,600,000 kg/year

Bendigo



Total Emissions 1,700,000 kg/year



Carbon Monoxide

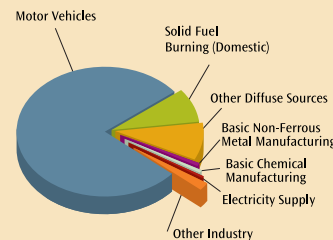
Carbon monoxide (CO) emissions are also a product of combustion processes. Three regions, Perth, Darwin and Berri in South Australia, highlight that for most regions the major sources of carbon monoxide are diffuse sources. The pie charts do not include emissions from non-reporting facilities in the 'other diffuse sources' category. These estimates are in the 'other industry' category.

In cities such as Perth, motor vehicles are the largest carbon monoxide contributor.

The major source of emissions in the Darwin airshed is burning and wildfires.

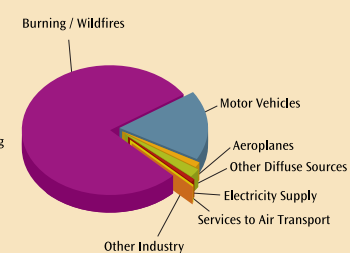
Wood combustion in homes is a significant contributor of carbon monoxide in cooler climate areas as illustrated for the Berri airshed. Nearly all diffuse emissions studies were completed before 2000-01.

Perth



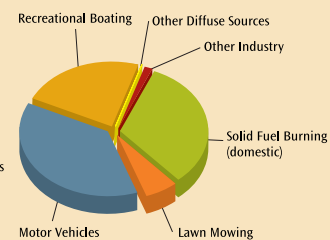
Total Emissions 250,000,000 kg/year

Darwin



Total Emissions 62,000,000 kg/year

Berri (SA)



Total Emissions 810,000 kg/year



Changes in emissions to air from the previous year

The NPI can provide reports for other environmental reporting purposes, for example, State of the Environment (SoE) reporting at either a national or a State and Territory scale. The table below reports on some of the substances that are examined in national SoE reporting.

At present, five air toxics are being considered for inclusion in the Air Toxics NEPM because of their potential impact on human health. These substances are benzene, formaldehyde, polycyclic aromatic hydrocarbons, toluene and xylenes. Emissions of these substances are reported through the NPI.

The table below shows that for many substances the number of facilities reporting has increased from last year and yet the emissions have decreased. Because emissions are estimated, a reduction may be due to a number of reasons including the installation of new equipment, better estimation of emissions, and changes in facility operations.

Estimated emissions from motor vehicles are used to give a sense of scale to the facility emissions information.

Small changes in estimates of emissions may not be significant due to the accuracy of the pollutant emissions estimates.

Motor vehicles emissions to air for capital cities

Emissions from motor vehicles have been estimated for all NPI airsheds and comprise exhaust emissions and fuel tank emissions. For more information on how these emissions are estimated see the Emission Estimation Technique Manual for Aggregated Emissions from Motor Vehicles. The estimates use base data from throughout the 1990s and, for some airsheds, data were estimated more recently.

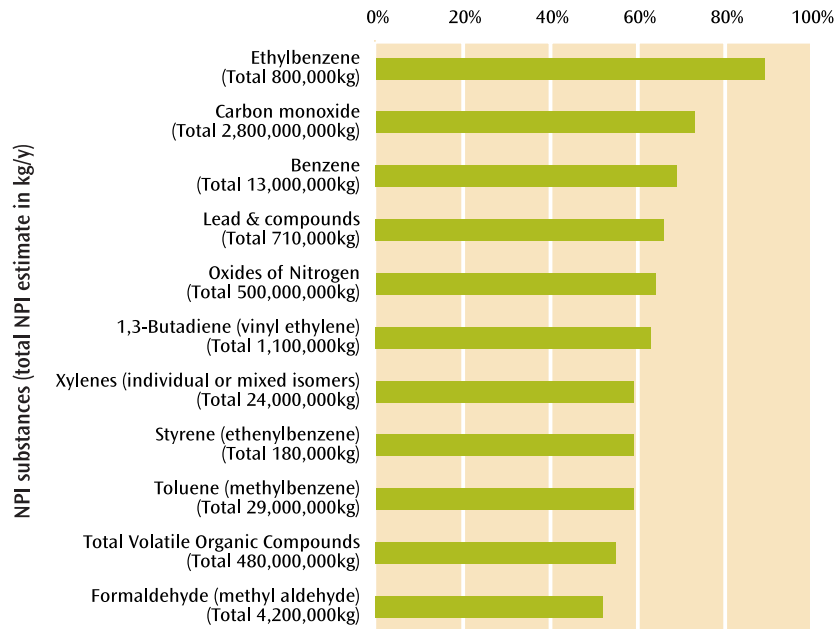
Motor vehicles emit a wide range of pollutants, and in the chart on the next page, the emissions estimated from various airshed studies are compared to the emissions from other airshed sources and 2000-01 facilities. The contribution of motor vehicles for 11 substances is highlighted.

Motor vehicle emissions are projected to decrease significantly due to the new fuel emissions standards, despite an increase in the motor vehicle fleet and vehicle kilometres travelled. Modelling of the impact of new fuel standards and improving engine technology predicts reductions in hydrocarbons by 20-25%, oxides of nitrogen (NOx) by 34%, particulate matter by 25%, benzene by 51% and carbon monoxide by 45-51% by 2010. (see www.ea.gov.au/atmosphere/transport/fuel)



| Criteria Pollutants | Emissions from motor vehicles (kg) for indicative purposes only | Emissions from NPI reporting facilities (kg) | | Indicative Change | Number of reporting facilities emitting substance | |
|--|---|--|---------------|-------------------|---|---------|
| | | 1999-00 | 2000-01 | | 1999-00 | 2000-01 |
| Sulfur dioxide | 9,900,000 | 1,500,000,000 | 1,300,000,000 | ↓ | 982 | 1,218 |
| Lead & compounds | 490,000 | 710,000 | 500,000 | ↓ | 562 | 675 |
| Particulate matter 10 microns or less in diameter | 14,000,000 | 330,000,000 | 380,000,000 | ↑ | 991 | 1,249 |
| Carbon monoxide | 2,100,000,000 | 620,000,000 | 690,000,000 | ↑ | 1,063 | 1,340 |
| Oxides of Nitrogen | 320,000,000 | 610,000,000 | 690,000,000 | ↑ | 1,030 | 1,283 |
| Additional substances reported in SoE 2001 | | | | | | |
| Total Volatile Organic Compounds | 260,000,000 | 36,000,000 | 25,000,000 | ↓ | 789 | 1,066 |
| Benzene | 8,700,000 | 1,800,000 | 1,700,000 | ↓ | 653 | 733 |
| Additional substances being considered for inclusion in the Air Toxics NEPM | | | | | | |
| Formaldehyde | 1,900,000 | 92,000 | 120,000 | ↑ | 70 | 97 |
| Polycyclic Aromatic Hydrocarbons | 160,000 | 380,000 | 210,000 | ↓ | 694 | 876 |
| Toluene | 30,000,000 | 4,300,000 | 4,000,000 | ↓ | 731 | 853 |
| Xylenes | 23,000,000 | 2,600,000 | 3,100,000 | ↑ | 758 | 899 |
| Other substances | | | | | | |
| Arsenic & compounds | 8 | 450,000 | 170,000 | ↓ | 533 | 674 |

Contribution of motor vehicles as a percent of total NPI diffuse emission estimates and facility emission estimates for 2000-01 for some substances in NPI capital city airshed regions



Mercury & compounds emissions to air

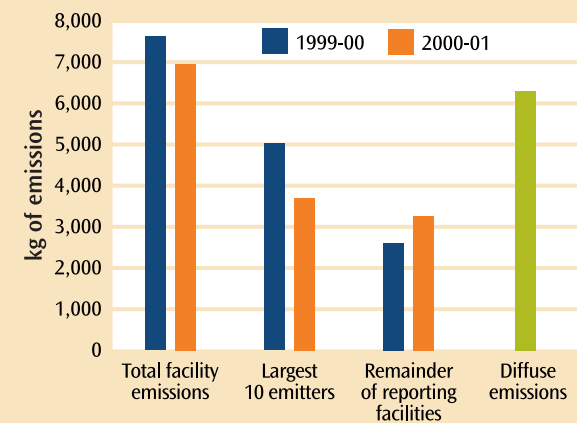
Last year's summary report examined mercury & compounds emissions to air. This section updates the information.

The following chart illustrates that mercury & compounds emissions to air from facilities has decreased compared to last year, despite a 36% increase in the number of facilities reporting mercury & compounds to air.

The reduction in total emissions is almost completely accounted for by the Mt Isa Mines Ltd facility at Mount Isa reducing its emissions by more than two-thirds from 2000kg in 1999-00 to 640kg in 2000-01. Some other facilities also decreased their emissions of mercury & compounds to air compared to the previous year. See Cleaner Production Activities Section on page 28 for more details about cleaner production in relation to the NPI.

The chart also indicates that for diffuse sources of mercury & compounds emissions to air the contribution is about the same as from reporting facilities.

NPI emissions of mercury & compounds to air



Emissions to water

The table below shows the major facilities emitting mercury & compounds to air.

| Facility | Mercury & compounds reported emission estimates (kg/year) | | CHANGE |
|--|---|---------|--------|
| | 1999-00 | 2000-01 | |
| Mount Isa Mines Limited, Mount Isa | 2,000 | 640 | ↓ |
| Worsley Alumina Pty Ltd, Collie | 450 | 550 | ↑ |
| Alcoa of Aust Ltd, Pinjarra Alumina Refinery | 390 | 420 | ↑ |
| WMC Resources Ltd, Kalgoorlie Nickel Smelter | 0.1 | 340 | ↑ |
| Alcoa of Aust Ltd, Kwinana Alumina Refinery | 320 | 320 | – |
| Alcoa of Aust Ltd, Wagerup Alumina Refinery | 300 | 320 | ↑ |
| Macquarie Generation, Bayswater Power Station, Muswellbrook | N/A | 300 | – |
| Smorgon Steel Group Ltd, Commonwealth Steel Company Ltd, Waratah | 280 | 280 | – |
| Stanwell Corp, Stanwell Power Station, Gracemere | 230 | 280 | ↑ |
| Western Power Corp, Muja Power Station, Collie | 220 | 200 | ↓ |
| Emissions from 10 facilities above | 4,190.1 | 3,650 | ↓ |
| Total mercury & compounds emissions from all facilities | 7,600 | 6,700 | ↓ |
| Facilities estimating mercury & compounds emissions to air | 555 | 757 | ↑ |

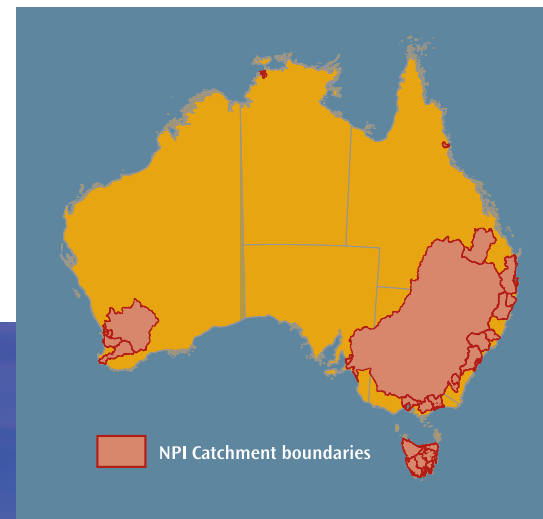
Air pollution reduction at Mount Isa Mines (MIM) Ltd

An example of significant reductions of estimated facility emissions is for the MIM facility at Mount Isa in Queensland. Mount Isa Mines Ltd has reported pollution reduction activities to reduce the air emissions between 1999-00 and 2000-01. Decreased estimates of emissions of sulfur dioxide in particular were largely due to the installation of an acid plant. The acid plant converts sulfur dioxide gas to sulfuric acid, which is used to manufacture fertiliser at a phosphate deposit in the region.

The information below is publicly available through the NPI (www.npi.gov.au) using the facility search for Mount Isa Mine.

| Pollutant | 1999-00 Emission | 2000-01 Emission | % reduction |
|---------------------|------------------|------------------|-------------|
| Sulfur Dioxide | 660,000,000 kg | 320,000,000 kg | 52% |
| Lead & Compounds | 550,000 kg | 230,000 kg | 58% |
| Mercury & Compounds | 2,000 kg | 640 kg | 68% |
| Oxides of Nitrogen | 1,500,000 kg | 440,000 kg | 71% |

Emissions to water estimates on the NPI comprise both diffuse source and reporting facility emission estimates. Emission estimates for 67 substances are reported from 577 facilities. Diffuse estimates for total nitrogen and total phosphorus based on land use are provided for 23 water catchments across Australia, shown on the map. The number of water catchments included is the same as last year.

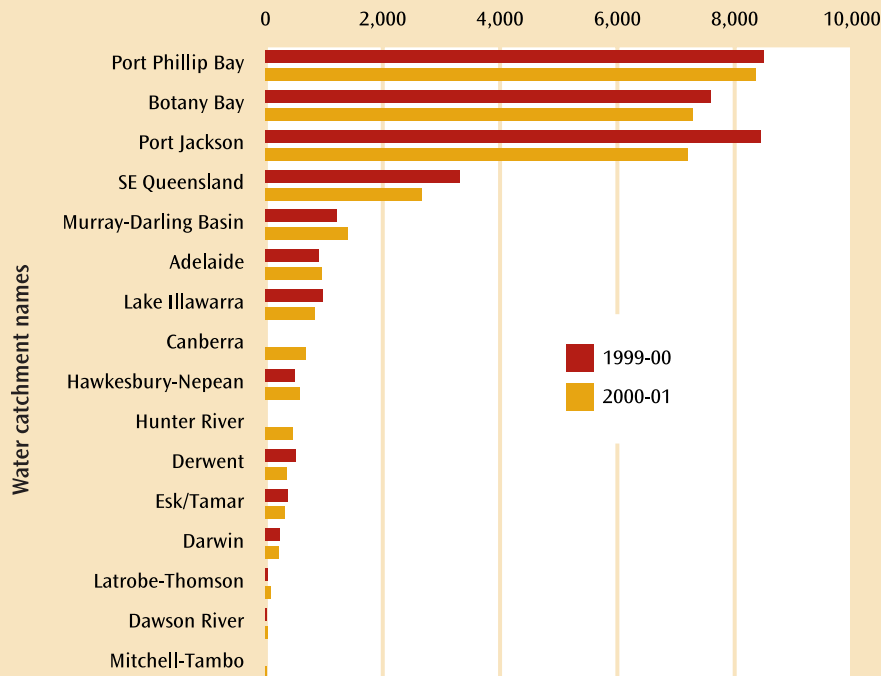


Catchment substance reports – total nitrogen

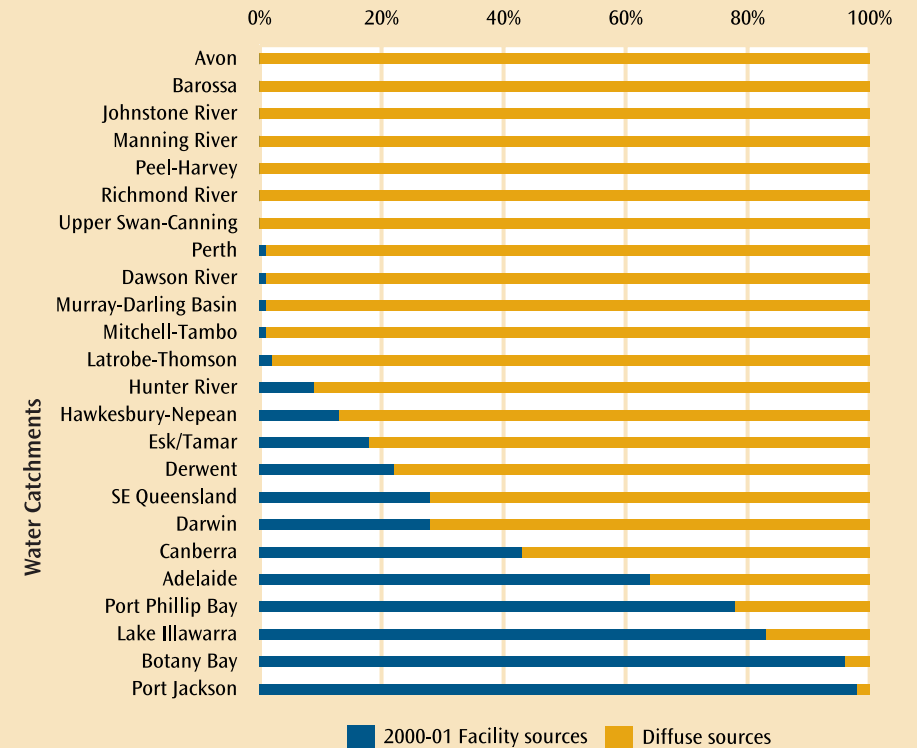
The chart on page 25 indicate that the sources of total nitrogen in a catchment varies depending on the major land uses. For example, the diffuse source emissions in the Murray-Darling Basin far exceed the contribution from facilities. In contrast, in the Port Jackson and Port Phillip Bay catchments, which contain densely populated areas, facility sources of total nitrogen emission estimates dominate.

Often the point of release from facilities, particularly sewage and wastewater treatment, are away from human settlement. For example, many sewage and wastewater treatment facilities in Sydney have ocean outfalls three kilometres from shore. For some catchments there are only a few facilities and they do not impact the entire catchment area. Facilities within two water catchments, Canberra and Hunter River, did not report emissions of total nitrogen for 1999-00.

Reporting facility total nitrogen emissions to water



Split of total nitrogen emissions between 2000-01 facility and diffuse sources



Eutrophication and algal blooms occur when the major plant nutrients – total nitrogen and total phosphorus - accumulate in water. For inland waters, non-facility sources or diffuse emissions generally contribute 65-95% of these nutrients. In populous areas facilities have a significant impact on local catchments.

NPI data shows that 90% of facility emissions of total nitrogen and total phosphorus originate from sewerage and drainage services (ANZSIC industry code 3702). However, where there are only a few facilities in a catchment, they may not impact the entire catchment area.

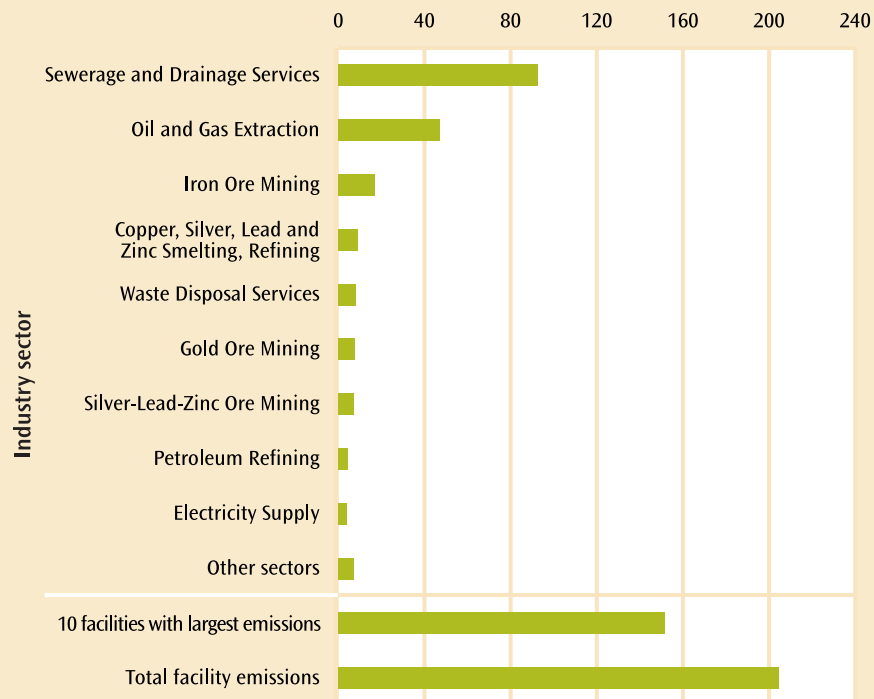
For most catchments there is a decrease in the emissions estimates of total nitrogen from facility sources compared to the previous year, as shown in the chart on page 24.

Emissions of mercury & compounds to water

The chart below shows some of the sectors that emit mercury & compounds to water from facilities. The sewerage and drainage services sector had nine facilities reporting mercury & compounds to water and six of these were among the 10 facilities with the largest estimated emissions.

For the 37 facilities that reported for both 1999-00 and 2000-01 years, mercury & compounds emissions to water increased. For 2000-01, 205 kg of mercury & compounds were emitted from 106 facilities, while 140 kg were emitted from 68 facilities in the previous year.

2000-01 mercury & compounds emissions to water (kg/year)



Relatively few facilities report significant emissions to land. Emissions to land include seepage into groundwater, as well as accidental spillage and leaks from storage facilities to land. No diffuse estimates of emissions to land have been made. Unlike many similar programs overseas, transfers are not included in the NPI, so no indication is provided about substances transferred to landfills. Instead, emissions from the landfills are reported, irrespective of where the substances came from.

Lead & compounds emissions to land

The table below indicates there has been an overall increase in facility emission estimates of lead & compounds to land, together with a small increase in the number of reporting facilities.

Most of the emissions to land for 2000-01 were from a single facility, which did not report the previous year. Of the three facilities reporting the highest lead & compounds emissions to land, only one of them reported for 2000-01 and the previous year. This facility, a sewage and waste water treatment facility, had a 24% decrease in lead & compounds emissions to land. This may be due to a year to year variation of emissions or to decreased lead & compounds in the urban environment and hence decreased lead & compounds being transferred to the facility. Estimated emissions can also vary from year to year due to changes in the estimation techniques used.

| Facility emissions to land (kg) | Lead & compounds | |
|--|------------------|---------|
| | 1999-00 | 2000-01 |
| Total emissions from all sources | 45,900 | 57,000 |
| Emissions from three facilities with the largest emissions | 38,800 | 52,900 |
| All other facility emission estimates | 7,100 | 4,100 |
| Number of facilities reporting lead & compounds to land | 101 | 106 |

In addition to MIM Ltd's reduction in air pollution (see page 22) the company also significantly decreased its estimated emissions to land of lead & compounds. In 1999-00 the estimate was 2,200 kg and in 2000-01 it was 630 kg. This suggests that improving an industrial process can lead to better environmental performance in a range of areas.

Cleaner production activities

An important aspect of the NPI is that facilities have the opportunity to report cleaner production activities. Cleaner production activities are reported either as source reduction, such as the use of 'cleaner' raw or source materials, improved maintenance regimes or end-of-pipe activities such as filtration.

These data are reported on a voluntary basis, so analysis needs to be undertaken with care.

The following tables are indicative only and provide examples of the kinds of activities that can decrease emissions. Further information and examples of cleaner production techniques can be found at the Eco-Efficiency and Cleaner Production homepage of Environment Australia - www.ea.gov.au/industry/eecp.

| Cleaner Production Techniques | 1998-99 | 1999-00 | 2000-01 |
|---|---------|---------|---------|
| Improved Maintenance scheduling, record keeping, or procedures | 89 | 539 | 594 |
| Inspection or monitoring program for potential spills or leaks | - | 449 | 474 |
| Improved procedures for loading, unloading and transfer operations | - | 325 | 323 |
| Dust suppression - e.g. water sprays, chemical suppression, wind breaks | - | 419 | 556 |
| Use of "cleaner" raw materials | - | 77 | 105 |
| Modified process e.g. layout, piping, vapour recovery, new alarms | 33 | 797 | 787 |
| Change from solvent based to aqueous based raw materials | - | 67 | 70 |
| Changed product specifications | 1 | 60 | 71 |
| Remainder of cleaner production techniques | 1,681 | 673 | 596 |

End of pipe reduction techniques relate to equipment designed to remove or treat hazardous materials before they leave the facility. End of pipe techniques do not usually involve fundamental process changes such as the cleaner production techniques outlined above.

| End of Pipe Reduction Technique | 1999-00 | 2001-01 |
|---|---------|---------|
| Fabric filter, scrubber, cyclone, electrostatic precipitator | 464 | 571 |
| Incineration | 60 | 51 |
| Lean/staged combustion, low NOx burner, flue gas recirculation, water/steam injection | 128 | 145 |
| Activated carbon filter, selective catalytic reduction | 38 | 37 |
| Biofilter, oil/water separation | 43 | 50 |
| Remainder of end of pipe techniques | 204 | 257 |

Other environmental performance information

- 1 The State of Environment 2001 report provides information of a wide range of environmental issues. Australian State of Environment reports are available at www.ea.gov.au/soe/index.html
- 2 States and Territories are responsible for a range of environmental issues. Contact details are on the inside back cover and the NPI Internet site provides links at www.npi.gov.au/contacts/index.html
- 3 Greenhouse gas emissions; including carbon dioxide, methane and ozone. See the Australian Greenhouse Office www.greenhouse.gov.au/inventory
- 4 Ozone Depleting Substances. See Environment Australia at www.ea.gov.au/atmosphere/ozone

Coming soon

The NPI 'Make a Map' tool will be upgraded to allow better integration of maps with web reports and improve presentation of facility and diffuse emissions data. The upgrade will also result in improved search techniques. Improvements to the tool will give a better picture of the location and level of estimated emissions of NPI substances.

New tools for displaying summary data on the Internet site in visually stimulating and non-numeric formats are provided – sound fascinating? Check the Internet site for changes and an interesting look at the world of pollutant emissions www.npi.gov.au



Contacts

Inquiries regarding emissions data on the National Pollutant Inventory should be directed to the State or Territory agency from where the data originates. States and Territories undertake the collection of data from facilities and complete aggregated emissions data estimates.

Questions relating to the database itself, or policy issues can be directed to the Commonwealth.

The contacts for the NPI are:

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Abbreviations used

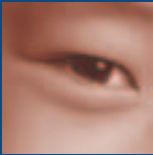
| | |
|------|---|
| EA | Environment Australia |
| NEPC | National Environment Protection Council |
| NEPM | National Environment Protection Measure |
| NOx | Oxides of Nitrogen |
| NPI | National Pollutant Inventory |
| NRT | National Reporting Tool |
| SoE | State of Environment |
| TVOC | Total Volatile Organic Compounds |



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- A. Dunn: page 16
- Alastair Betts: pages 4 and 17
- Arthur Mostead: pages 6, 18 and 23
- Department of Foreign Affairs and Trade: cover and pages 7 and 9
- Environment ACT: pages 12 and 20
- Geoscience Australia, 1990: Australia, Coastline and State Borders 1:100,000 – Maps on pages 13 and 23
- Stephen Garnett: page 3





Department of the Environment and Heritage