Australian Government

Department of the Environment, Water, Heritage and the Arts


Alastair Betts


Michael Lindquist

John Baker


Greg Rippon

National Pollutant Inventory **Summary Report** 2005-06


Margaret E Brown

www.**npi**.gov.au

About this report

The National Pollutant Inventory (NPI) is the only nationwide, publicly accessible inventory of substance emissions in Australia.

By visiting **www.npi.gov.au**, the community, government and industry can explore a key source of information about pollution in Australia. The NPI program was established in 1998, to collect and collate the nation's emission data. It is a cooperative effort by the Australian, state and territory governments to help create a cleaner and healthier environment.

This summary report gives an overview of emissions reported during 2005-06. Data reported by facilities for that year were first published on the Internet (**www.npi.gov.au**) on 31 January 2007, with minor corrections being made on 31 March 2007.

Contents

This report uses the data available as at 31 March 2007.

It is important to understand that industry estimate their emissions using various methods, including direct monitoring, emission factors, mass balance and engineering calculations. Consequently, data accuracy varies according to the estimation technique used.

Contacts

Web: www.npi.gov.au
Email: npi@environment.gov.au
Phone: 1800 657 945

Trevor J Ierino

National Pollutant Inventory
Tracking pollution across Australia

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Outline

Welcome to the eighth summary report of the NPI.

This report presents an overview of emissions reported during 2005-06, together with examples of the types of information you can find on the NPI web site and tips on how to use the data.

The report also explains why substances are included in the NPI, and discusses the sources and paths of substance emissions to air, land and water.

Finally, this summary contains a set of useful links and contact details of government agencies involved with the NPI.

Key facts for 2005–06:

1 national inventory tracking pollution across Australia

3 times the number of facilities reported this year compared to the first year of reporting in 1998

8 years of facility emissions data

9 jurisdictions collected data for submission to the Australian Government

74 industry sectors reported emissions to the NPI

85 of the 90 NPI substances were reported

1120 facilities reported emission reduction activities

3890 facilities reported to the NPI

404 676 new users accessed the NPI web site

Why do we have the NPI?

Australia's NPI is one of many pollutant release and transfer registers (PRTRs) around the world. Others include Canada's National Pollutant Release Inventory (NPRI), the US Toxics Release Inventory (TRI) and the European PRTR (previously European Pollutant Emission Register).

Governments provide this tool to inform the community about potentially toxic substances being emitted into the environment. The community's right to know was the priority in the 1996 Organisation for Economic Cooperation and Development (OECD) recommendation that all OECD member countries provide public access to information concerning pollutant releases and transfers from various sources.

The legislative framework underpinning the NPI is called the NPI National Environment Protection Measure (NPI NEPM). This was the nation's first NEPM and was agreed to by the Australian, state and territory governments in 1998. NEPMs set out agreed national objectives for protecting or managing particular aspects of the environment.

The main purpose of the NPI is to collect and publish information about emissions of harmful substances on a geographical basis, to help environmental decision-making, to meet community right-to-know obligations and to promote the need for cleaner production and waste minimisation programs in industry, government and the community.

Desired environmental outcomes of the NPI NEPM

- Maintain and improve ambient air quality and ambient marine, estuarine and fresh water quality
- Minimise environmental impacts associated with hazardous wastes
- Improve the sustainable use of resources

National environment protection goals of the NPI NEPM

- Collect a broad base of information on emissions and transfers of substances on the reporting list
- Disseminate the information collected to all sectors of the community in a useful, accessible and understandable form

Find out more about the NPI NEPM – visit **www.ephc.gov.au/nepms/npi/npirev2002_intro.html**

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Sources of emissions

Facility sources

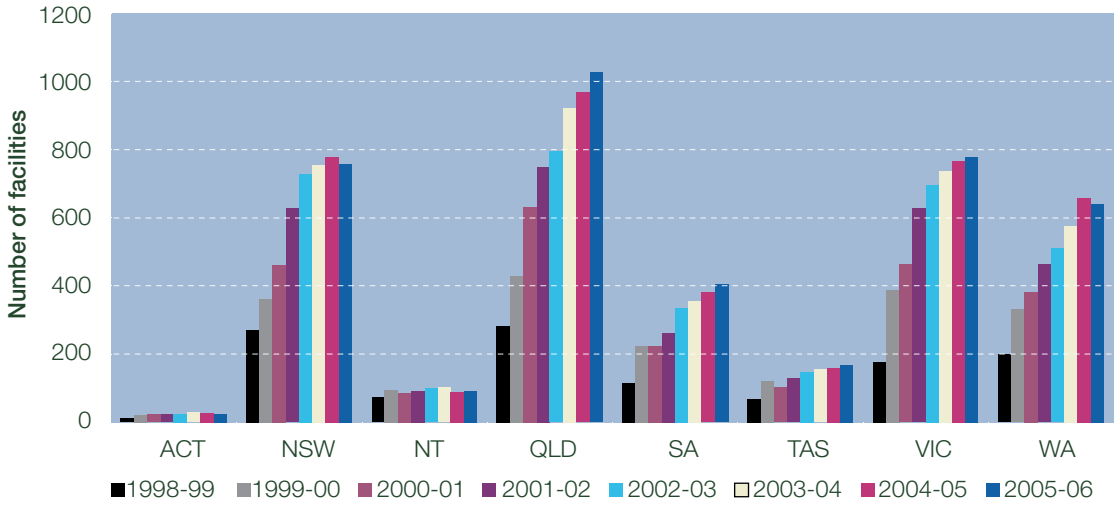
Every year, Australian industrial facilities that exceed specified thresholds of the 90 NPI substances must estimate and report their emissions directly to their state or territory environment agency. These agencies review all NPI reports for accuracy and forward the data to the Australian Government. The reports are then displayed on the NPI public web site at **www.npi.gov.au**

The NPI now contains eight years of facility data. The total number of reporting facilities in 2005-06 was 3890 compared with 3826 for 2004-05.

In 2005-06, 210 facilities reported for the first time while 239 facilities that reported the previous year did not do so. Facilities may fall below the NPI reporting thresholds where previously they were above them because they have:

- introduced cleaner production methods
- changed production levels or practices, *or*
- closed the facility.

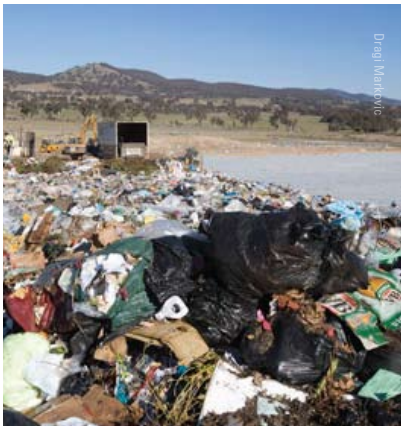
Number of facilities reporting



Who reports to the NPI?

Australian industrial facilities that meet the reporting criteria are required by law to report to the NPI. The criteria are based on how much fuel, electricity and how many NPI substances they have used. More information about reporting to the NPI can be found in the NPI Guide at

http://www.npi.gov.au/handbooks/guidetoreporting.html



Industry sector sources

Facilities are grouped into industry sectors using the Australian and New Zealand Standard Industrial Classification (ANZSIC) codes. This enables each facility to compare its results against other facilities in the same ANZSIC code, and for the community and decision makers to track emissions from different industries.

This reporting year 74 industry sectors reported to the NPI and some sectors showed improvement in certain areas. For example, the metal ore mining sector has recorded significant reductions in reported emissions of copper and compounds, cyanide (inorganic) compounds and nickel and compounds. The water supply, sewerage and drainage services sector has also reduced reported emissions of fluoride compounds, hydrogen sulfide, oxides of nitrogen and zinc and compounds.

The public order and safety services sector mainly reports municipal solid waste to landfill. Reported emissions from this sector have risen this year contributing more than 8% of emissions across all industry, representing a 14% increase from 2004-05. Emissions of carbon monoxide, oxides of nitrogen and sulfur dioxide increased significantly from the previous year.

The chart on page 5 shows the 10 industry sectors that had the highest substance emissions in 2005-06.

These ten sectors produced about 77% of total substance emissions from industry.

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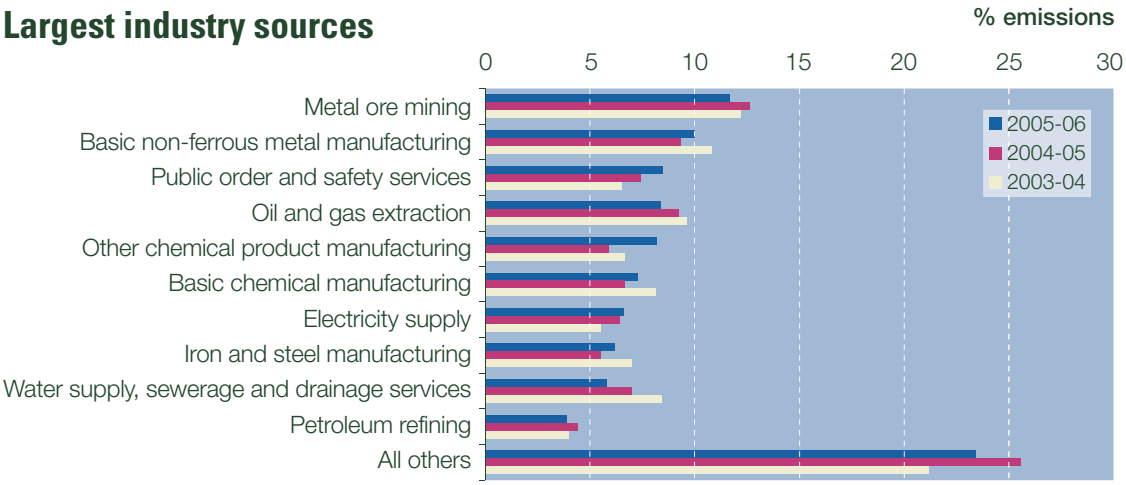
Some sectors, such as basic non-ferrous metal manufacturing, are comprised of large industrial sites and by their nature are large emitters. Other sectors have many facilities reporting to the NPI but contribute relatively little to substance emissions. For example, the beverage and malt manufacturing sector has a high proportion of NPI facilities but does not contribute significantly to total emissions. Large industry emissions do not necessarily mean poor environmental performance.

Largest industry sources



Note: Substances are not added together in this graph. For each substance a sector emits, the percentage of the sector's emission to the national total for that substance is calculated and an average is taken. This calculation does not account for any variation in toxicity or ground level concentration of these substances. A similar approach is used for the location reports on the NPI web site.

Case study – a major industry sector reporting to the NPI – oil and gas extraction

The NPI database can be used to generate a report for a specific industry sector such as the oil and gas extraction sector. Its facilities are engaged in oil and gas exploration, drilling and production, both on and offshore.

A total of 101 facilities reported on 39 substances emitted in the 2005-06 reporting year. This sector is a major emitter of volatile organic compounds (VOCs) such as benzene, cyclohexane, ethylbenzene, glutaraldehyde, hydrogen sulfide, phenol, n-hexane and toluene, as well as hydrogen sulfide. In the past year overall reported emissions decreased from the oil and gas extraction sector, particularly for benzene, toluene, total volatile organic compounds (TVOCs) as well as 21 other substances. Reported emissions increased for some other substances such as phenol, glutaraldehyde and total nitrogen.

Changes in reported emissions can be due to improved environmental performance, increases and decreases in production, changes to the process, installation of pollution control equipment such as fabric filters, the reporting of a substance for the first time and updated emission calculation techniques.

Emissions of some NPI substances from the oil and gas extraction sector

Substance emitted to land, air and water	2004-05 (kg/year)	2005-06 (kg/year)	Change
Emission to air			
Benzene	1 300 000	840 000	▼ 35% decrease
Cyclohexane	960 000	520 000	▼ 46% decrease
n-Hexane	2 600 000	1 600 000	▼ 38% decrease
Total volatile organic compounds	54 000 000	40 000 000	▼ 26% decrease
Emission to water			
Hydrogen sulfide	220 000	200 000	▼ 9% decrease
Phenol	40 000	39 000	▼ 2.5% decrease
Ethylene glycol	130 000	93 000	▼ 28% decrease
Total nitrogen	130 000	220 000	▲ 69% increase
Emission to land			
Glutaraldehyde	14 000	25 000	▲ 64% increase
Xylenes	9 400	8 900	▼ 5% decrease

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Diffuse sources

Diffuse emissions from sources such as aircraft and motor vehicles, as well as from activities such as heating and lawn mowing are estimated by state and territory agencies. Emissions from facilities in some industry sectors that do not reach the threshold levels required for reporting, such as small commercial printers and spray painters, are also included in the diffuse emissions estimates.

Most of the 90 NPI substances are considered when estimating diffuse emissions to air in airshed studies. However, in estimating diffuse emissions to most water catchments only total nitrogen and total phosphorus are determined.

The boundaries of NPI airsheds are selected by government agencies. A total of 33 studies were completed by the end of 2005-06, covering all capital cities and many urban regions in Australia.

The boundaries of water catchments are determined by the drainage of interconnected river systems, which sometimes cross state or territory borders. To date, 32 catchment studies have been completed for the main urban and rural areas in Australia.

What is an airshed ?

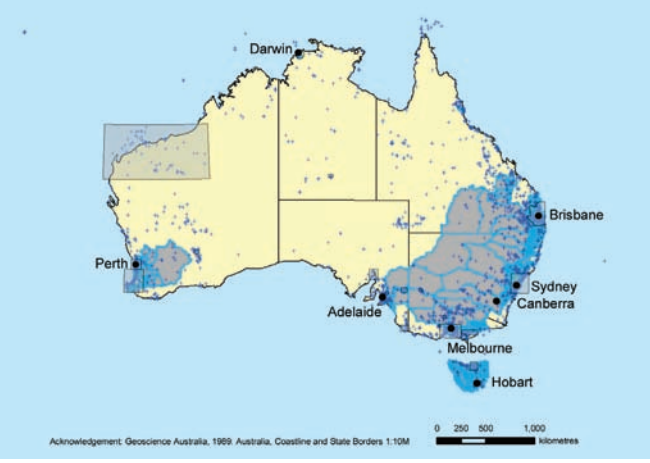
An airshed is a body of air, bounded by meteorology and topography, in which substance emissions are contained. For example, the Launceston airshed study area in Tasmania is 4800 square kilometres comprising a population of approximately 100 000 people.

Click here to see the Launceston airshed emission report

What is a catchment ?

A catchment is the land area drained by a creek or river system. For example, the Johnstone River catchment in Queensland covers 2325 square kilometres.

Click here to see the Johnstone River catchment emission report



Key

- • Capital cities
- \+ NPI reporting facilities (2005-06)
- NPI airsheds – non reporting facility emissions to air
- NPI catchments – nutrient emissions to water

The blue crosses on the map left show NPI reporting facilities for 2005-06, as well as the locations of completed diffuse emission studies for water catchments and airsheds. Regions included in diffuse studies cover more than 75% of Australia's population.

The top ten substances and the major diffuse sources of these emissions to the environment are listed in the following table overleaf. The most significant diffuse source across the nation is motor vehicles. >>

What are biogenics ?

Biogenic emissions are from natural sources including vegetation and soil. Most vegetation emits a range of organic compounds into the atmosphere.

Top ten substance emissions from diffuse sources

Substance	Total from all airsheds (tonnes)	Major diffuse source	% of total diffuse emissions for substance from major source
Carbon monoxide	4 500 000	Motor vehicles	48%
Total volatile organic compounds	3 000 000	Biogenics	80%
Oxides of nitrogen	660 000	Motor vehicles	56%
Particulate matter 10.0um	610 000	Burning/wildfires	36%
Sulfur dioxide	71 000	Fuel combustion – sub reporting threshold facilities	58%
Ammonia (total)	35 000	Agriculture (livestock)	86%
Toluene	30 000	Motor vehicles	60%
Xylenes	22 000	Motor vehicles	64%
Benzene	15 000	Motor vehicles	67%
n-Hexane	7 500	Motor vehicles	43%

Note: diffuse data is not collected annually and may be from varying years.

Emission reduction activities

A 'facility' is defined as any building or land from which a substance may be emitted, and includes the machinery and equipment used to carry out work at the facility. One of the main goals of the NPI is to encourage facilities to use cleaner production techniques to reduce emissions. Reporting facilities can report on cleaner production activities and pollution control developments undertaken during the reporting year. Provision of this information is voluntary.

A total of 1120 facilities have provided information on their emission reduction activities since the start of NPI reporting.

The most common reduction techniques reported include: improving maintenance scheduling, record-keeping or procedures, and implementing inspection or monitoring programs for potential spill or leak sources. The most common types of pollution control equipment reported were scrubbers and fabric filters which are used to reduce emissions of particles.

As noted earlier, changes in reported emissions can be due to improved environmental performance, increases and decreases in production, changes to the process, installation of pollution control equipment such as fabric filters, the reporting of a substance for the first time and updated emission estimation techniques.

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What one company is doing to reduce emissions

The NPI web site contains some case studies to illustrate how facilities have used innovative solutions to reduce their emissions.

Case study – Tumut particle board mill

The Carter Holt Harvey particle board mill in Tumut, New South Wales has implemented several emission reduction activities resulting in decreased emissions and better management of waste.

Waste management

- Particle board products manufactured at the mill are made from plantation pine timber as well as recycled wood shavings and sawdust. Around 50 per cent of the materials used in the manufacturing process were previously going to landfill or incinerated as waste.
- Waste wood products from the Tumut and Oberon mills are used as fuel for the heat plant at the Tumut mill. This reduces the amount of solid waste going to landfill, and reduces the use of fossil fuels for energy.
- Baghouse equipment collects 95 per cent of particulate emissions from the sawing and sanding of the particle board.
- The site has installed stormwater first flush interceptors, which are designed to stop potential pollutants, for example oil or other potential spills, from reaching waterways around the site.
- Resin waste is contained in lined concrete pits. The solid waste is disposed of in an accredited landfill. The site has an on-going waste reduction program to minimise waste.

Installation of wet electrostatic precipitator

In 2002 the company installed a wet electrostatic precipitator (WESP) which cuts smoke emissions by up to 90 per cent. The device acts as a type of magnet by means of electro grids and traps small particles and droplets, preventing them from escaping through its stack into the atmosphere. This was the first unit used at a particle board manufacturing plant in Australia.

Since the installation of the WESP, reported emissions of particulates to the NPI have decreased by about 50 per cent.

Community consultation

Carter Holt Harvey has engaged the local community in improving its environmental management by introducing a consultative committee made up of members of the local community, the local council, the NSW Department of Environment and Climate Change and the company's environmental manager. The committee meets regularly to address issues of concern and allows the company to address complaints as they arise.

Outcomes for the company

- The relationship between the particle board mill and the community has improved with Carter Holt Harvey actively working towards changing community perceptions.
- The benefit from the installation of pollution control equipment is the reduction of emissions to the local environment.
- A reduction in the amount of solid waste generated through the reuse and recycling of wood products contributes to the continuous improvement of the company's environmental sustainability.

Government initiatives to reduce emissions

Australian, state, territory and local governments work cooperatively on initiatives to protect our environment. Some of these initiatives include reducing smoke from wood heaters, and developing programs to achieve target reductions in pollution from pollutants such as heavy metals, sewage, excess nutrients, waste oil and chemicals, and from sources such as transport emissions.

Coastal Catchments Initiative

The Coastal Catchments Initiative (CCI) seeks to deliver significant reductions in the discharge of pollutants to agreed coastal water quality hotspots, which are associated with matters of National Environmental Significance and identified through agreement with the relevant jurisdictions. The CCI supports the development and implementation of Water Quality Improvement Plans (WQIPs) for those hotspots. WQIPs implement the requirements of the National Water Quality Management Strategy through a public consultation process, including:

- identification of the environmental values of water
- determination of water quality objectives and load targets for pollutants of concern
- development of environment flow objectives and environmental water provisions
- implementation of catchment based management actions, including measures to reduce agricultural diffuse sources, market-based instruments and adaptive management strategies, *and*
- application of predictive models and ambient monitoring programs.

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The CCI also supports alternate water quality projects that assist with development of the WQIP, help address key water quality threats, and establish systems for WQIP implementation. Interim projects include implementation of water sensitive urban design practice, establishment of ambient water quality monitoring programs, characterising and implementing non-point source controls and development of predictive models. WQIPs are also the primary catchment-scale vehicle for delivering water quality objectives under the Reef Water Quality Protection Plan (Reef Plan). The Reef Plan seeks to halt and reverse the decline in water quality entering the Great Barrier Reef by 2013.


Sarah Wheaton

Reducing smoke from wood combustion

In addition to these efforts to reduce pollution in coastal catchments, other sources of pollution such as wood smoke have been targeted. The Australian Government is working with state, territory and local governments to reduce the amount of wood smoke in our urban areas.


Michael Lindquist

This work includes community education on the correct operating practices for wood heaters, sponsoring research to improve our understanding of wood heater emissions, developing more stringent emission standards and test methods, and collaboration with industry to implement a robust certification procedure to promote compliance with wood heater standards.


C Burke

At the local level, the Australian Government has been working to reduce wood smoke in Launceston in Tasmania, which continues to experience elevated levels of particle pollution during the cooler months. The Australian Government has provided grants to four industrial facilities under the Launceston Clean Air Industry Program to assist them to make technological changes to reduce pollutant emissions. This three-year, $1 million programme has built on a previous grants program that helped approximately 2240 householders in Launceston replace wood heaters with less polluting alternatives. Together these initiatives will help to continue the current trend toward lower levels of particle pollution in the Tamar Valley.

The NPI and you

The NPI is a starting point to learn about emissions in your local community, your state or the nation. NPI data shows what is being released from an emission source, but whether emissions of a substance cause pollution to air, land or water depends on additional factors - such as the amount of substance emitted, where it is emitted, the weather conditions at the time and the topography of the land.

States and territories are responsible for pollution control. To report pollution incidents contact your relevant state or territory environment agency. For more information, see the contact details at the end of this report.

How to use the NPI data

- The NPI contains two types of data – emissions from facilities and emissions from diffuse sources such as motor vehicles. Facilities estimate or monitor their emissions and provide this data annually to the NPI. Diffuse data shows the contribution of non-industrial sources, such as transport and industry that does not trip a threshold, to Australia's emissions. The diffuse data is not collected annually and so is not necessarily for the particular facility reporting year being examined. For example, diffuse data may be from a study completed in 2003-04 and the facility data from 2005-06; however it is the most up-to-date information available.
- NPI substances range in toxicity. For example, a small amount of a highly toxic substance may be more significant than a larger emission of a less toxic substance.
- As NPI substances have differing properties and toxicities, it is meaningless to add together emissions of different substances. The NPI does not provide a measure of total pollution.
- The NPI is made up of emissions that have been estimated using a variety of techniques. The accuracy of these estimates may vary according to the technique used.


Alastair Betts

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The NPI web site

Visit the NPI at www.npi.gov.au.

The NPI web site had 404 676 new users in 2005-06, compared to 205 769 new users in the previous year. This is a new user increase of 97% in 2005-06[1].

Amendments to the NPI web site are ongoing. In May 2006, information was gathered about user expectations and the effectiveness of the NPI web site. Focus groups were conducted with a range of user groups, including primary, high school and tertiary students and the general public. This information will be used to make improvements to the web site.

[1] In 2005-06, the Department of the Environment and Water Resources (DEW) changed the statistical application used to measure the quality and effectiveness of its web sites.

The NPI web site provides you with:

- quick postcode and facility searches
- easy access to reports and maps for the whole country
- a regular NPI newsletter available by email subscription
- details of individual facilities reporting to the NPI
- a ranking of substance emissions from a particular facility compared with the largest emission from any facility for that year
- substance sources and emissions for your postcode, local area, state or the nation
- interactive maps showing substance sources and destinations
- diffuse emissions estimated in airsheds or water catchments
- a downloadable spreadsheet of emissions that can be analysed off-line
- health and environmental fact sheets about the 90 NPI substances
- tips on what you, government and industry can do to help reduce pollution, *and*
- information and materials to assist industries to estimate and report their emissions.

Substance emissions

The 90 substances on the NPI list have been chosen because of their potential impacts on health and the environment. A panel of technical experts, the Technical Advisory Panel (TAP), was formed to recommend inclusion of substances on the NPI. The TAP used a risk-based approach for recommending which substances should be on the reporting list.

Each year, the NPI gives an annual nationwide snapshot of these substance emissions. This information then helps policy makers and the community to find information on specific substances and to monitor their changes over time.

In any one year, the NPI data presents a mixed picture with some emissions increasing and others decreasing compared with the previous year. In the 2005-06 reporting year, 85 substances were reported: 37 substances increased in total national emissions and 48 decreased.

What was the big picture for emissions in 2005-06 compared to the previous year (2004-05) ?

- Reported emissions of air pollutants, such as carbon monoxide, oxides of nitrogen and sulfur dioxide this year were similar to those last year. There was a slight increase of emissions of PM_{10} and lead and compounds.

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- Reported emissions of air toxic pollutants, such as benzene, toluene and xylenes decreased. There was a slight increase in emissions of polycyclic aromatic hydrocarbons, and reported emissions of formaldehyde rose by 28%.
- Substances that had a significant decrease in reported emissions and a similar number of reporting facilities as last year include: copper and compounds mainly from basic non-ferrous metal manufacturing; cyanide (inorganic) compounds mainly from gold ore processing and total volatile organic compounds mainly from oil and gas extraction.
- Substances that had a significant increase in reported emissions and a similar number of reporters as last year include formaldehyde and arsenic and compounds, both mainly from basic non-ferrous metal manufacturing.


Acetone
Rank 22 of 90 substances
fact sheet

Changes in reported emissions can be caused by changes in facility operations, increases or decreases in production, improved emission estimation techniques and the installation of new pollution control equipment.

Looking for more information on NPI substances?

The NPI web site contains fact sheets on 90 NPI substances that are emitted to the environment.

The purpose of the substance fact sheets is to provide background information about individual substances and their health and environmental effects.

The fact sheets also describe how you might be exposed to a substance, common uses and sources of emissions, and physical and chemical properties.

Links to the fact sheets are available at:

http://www.npi.gov.au/database/substance-info/profiles/index.html

Report card on ethanol

Typical information available from the NPI fact sheets on substances and their effects is provided in the following example.

Ethanol is one of the 90 NPI substances. Ethanol, also known as ethyl alcohol, is best known as the alcohol found in alcoholic beverages.

Ethanol is present in low levels in the environment – it is a natural product that results from the fermentation of plants. Exposure to ethanol can be from the intake of food or beverages containing alcohol or from a wide range of consumer products containing ethanol. Ethanol can enter the body by ingestion, inhaling fumes or by absorption through the skin. Symptoms of exposure to a high concentration of ethanol vapours may include irritation of the eyes, skin and respiratory tract, loss of coordination and unconsciousness.

What is ethanol used for?

Ethanol is present in many products that we use every day. It can be found in alcoholic beverages, a wide range of cosmetic and personal grooming products, household cleaners and polishes, pharmaceutical products, disinfectants and insecticides, paints and paint products, products made from particle board, lubricating oils, household and industrial inks and pet products.

Ethanol is also produced as a result of manufacturing a range of consumer goods such as food, bakery products, motor vehicles and vehicle parts, plastic products, beverages and basic chemicals.

Ethanol is used as a petrol additive. Fuel suppliers who supply petrol containing ethanol must comply with the ethanol fuel quality information standard (labelling standard). The labelling standard is in place to inform consumers that the fuel they are purchasing contains ethanol. The Australian Government capped the level of ethanol that can be added to petrol at 10% in July 2003.

Ethanol is emitted mainly to air with smaller emissions to land and water.

The primary source of ethanol emissions is domestic and commercial solvents and aerosols followed by the printing and services to printing sector. Ethanol emissions reported from industry slightly declined by around 2% over the past year. The number of facilities reporting ethanol in the 2005-06 reporting year increased by 5%.

Industry accounts for 46% of all the estimated emissions of ethanol based on airshed studies to date. In 2005-06, the largest source of industrial ethanol emissions was the printing and services to printing sector, followed by the other chemical product manufacturing sector. The major industry sources of ethanol are shown overleaf in the following pie charts: >>

Industry sources of ethanol emissions

What are emissions and where do they go?

For NPI reporting purposes, emissions are defined as the release of an NPI substance to the environment – whether in pure form or contained in other matter and/or in solid, liquid or gaseous form. It includes the release of substances to the environment from landfill, sewage treatment plants and tailings dams. All emissions are separated into emissions to air, land and water.

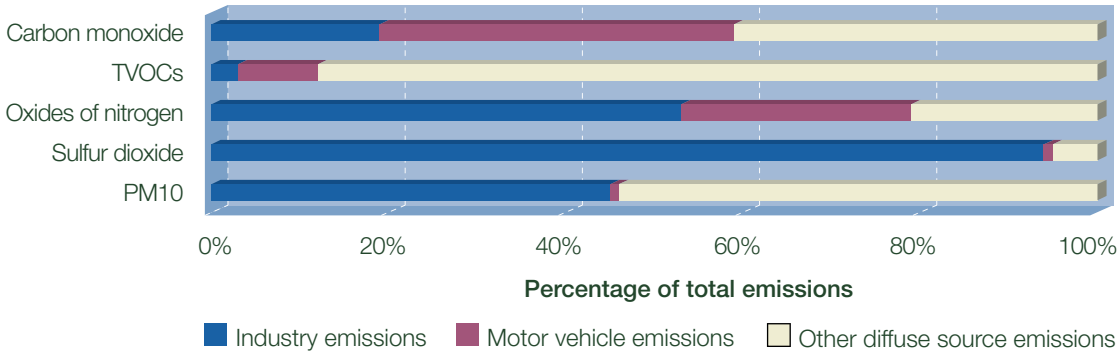
Emissions to air

The NPI categorises air emissions as either point source or fugitive emissions. Point source air emissions are emitted through a single point such as a vent or a stack. A facility can often have many separate point sources.

Fugitive emissions are emissions that are not released via a stack or vent. Some examples of fugitive emissions include dust from stockpiles, volatilisation of vapour from vats, open vessels, spills and materials handling.

In 2005-06, 83 of the 90 NPI substances were released to air, making them the major component of all NPI emissions.

2005-06 top 5 substances to air



Top five NPI substances emitted to air

The five NPI substances with the largest estimated emissions to air for 2005-06 from all Australian sources are listed on the graph above. Industry emissions are compared with motor vehicle and other diffuse sources as a percentage of total emissions for each of the five substances.

Note: Industry emissions are for the 2005-06 reporting year. The diffuse and motor vehicle data are not collected annually and so is not necessarily for the particular facility reporting year being examined.

Reported industry emissions of the most commonly known pollutants, such as carbon monoxide, sulfur dioxide and oxides of nitrogen remained steady this year. Reported emissions of PM_{10} have shown an increase of about 6% while TVOCs have decreased by about 14% compared to the previous year.

John Baker

Alastair Betts

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Emissions to water

The NPI defines emissions to water as discharges to surface waters such as lakes, rivers, dams and estuaries, coastal or marine waters and stormwater runoff. Diffuse emissions are estimated within defined water catchments and usually (but not always) only include estimates of the macronutrients - total nitrogen and total phosphorus.

The following section gives an overview of emissions to water and some information from the 2005-06 facility data.

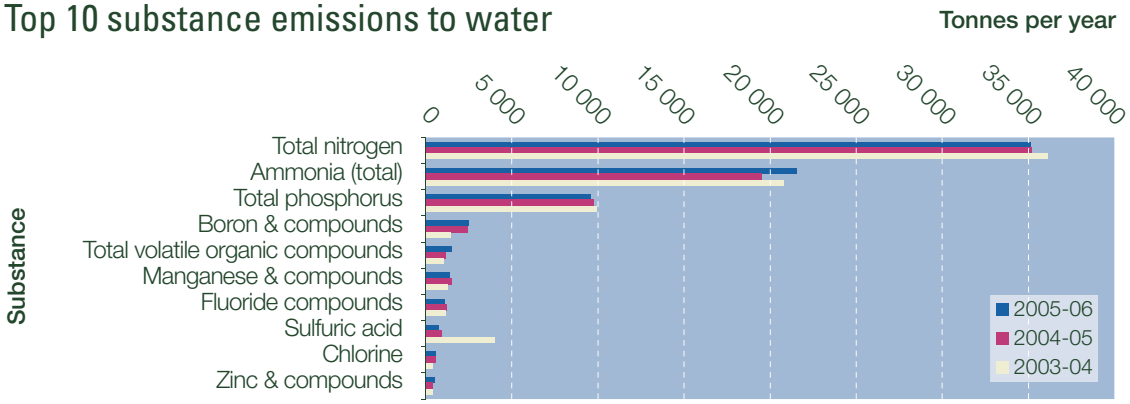
Substances emitted to water

In 2005-06, more than 550 industry facilities reported emissions of 55 NPI substances to water.

The following chart shows the major substances emitted to water in 2005-06 and compares them to the previous two years. Most substances to water had similar reported emissions this year.

The water, sewerage and drainage sector is the largest emitter of substances to water, followed by the basic chemical manufacturing and metal ore mining sectors.

Top 10 substance emissions to water



Total nitrogen emissions to water

Nitrogen is an essential nutrient for life. Total nitrogen is defined for the NPI as compounds that give rise to nitrate and nitrite ions. This is a very broad group including many natural and man-made substances, either containing nitrates or nitrites or decomposing into either or both of them.

A general concern in relation to total nitrogen is its environmental effects, where elevated levels of nitrogen (and phosphorus) can cause enhanced algal growth. This may eventually manifest itself as blue-green algal blooms which can affect human health through contact or consumption. The major diffuse source of total nitrogen is from catchment runoff and is typically derived from soil, plant and animal material associated with agricultural land uses.

In 2005-06, 219 facilities (6% of all NPI reporting facilities) reported 35 000 tonnes of total nitrogen emissions to water. Reported emissions of total nitrogen to water from industry have not changed despite the decrease in the number of facilities reporting the substance in 2004-05. Total nitrogen emissions vary among the sectors from year to year with the water, sewerage and drainage sector making up most of the national facility emissions.

Top industry sector and diffuse source emissions of total nitrogen to water

Total nitrogen to water	2003-04 (kg/year)	2004-05 (kg/year)	2005-06 (kg/year)
Water supply, sewerage and drainage services	33 000 000	32 000 000	32 000 000
Basic chemical manufacturing	960 000	880 000	1 300 000
Iron and steel manufacturing	460 000	450 000	360 000
Public order and safety services	330 000	250 000	290 000
Metal ore mining	210 000	260 000	240 000
All others	1 040 000	1 160 000	810 000
Number of facilities reporting	227	233	219
Total emissions	36 000 000	35 000 000	35 000 000
All diffuse source emissions			210 000 000

Total phosphorus emissions in the Murray Darling Basin

Like nitrogen, phosphorus is an essential nutrient for all forms of life. It is most commonly used as phosphate in inorganic fertiliser. While having some phosphorus in our rivers, lakes and oceans is necessary, high total phosphorus levels together with high total nitrogen levels can lead to algal growth and deterioration in water quality. This can impact on its use for drinking water and other purposes.

In 2005-06, eighteen facilities reported 76 000kg of total phosphorus to water in the Murray Darling Basin, a reduction of 20% from the previous year. Industry, the community and government have continued their solid effort to improve the water quality of the Murray Darling Basin.

It has been estimated that 12 million kilograms of total phosphorus were emitted to the Murray Darling Basin from diffuse sources.

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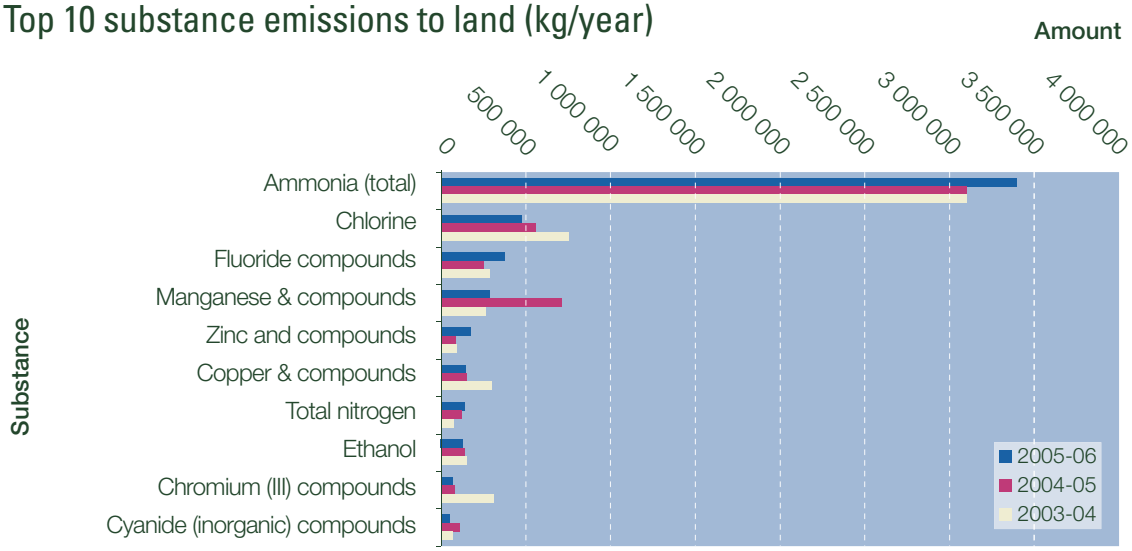
Emissions to land

Emissions to land are substance emissions onto a facility's site which include solid wastes, slurries and sediments, as well as accidental spills, and leaks from facilities. Emissions to land from diffuse sources are not included in the NPI.

The following section gives an overview of emissions to land and some information from the 2005-06 facility data.

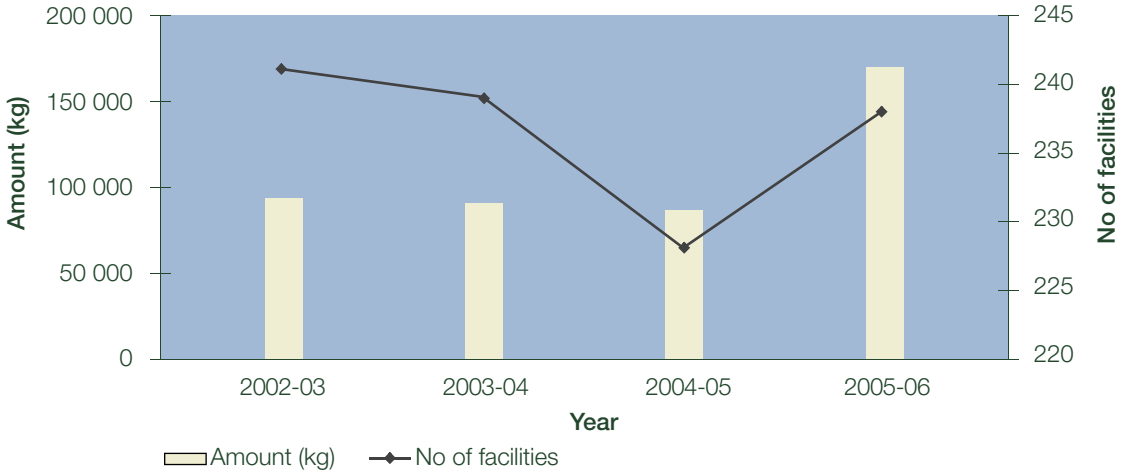
The following chart shows the major substances emitted to land in 2005-06 and compares them to the previous two years.

Top 10 substance emissions to land (kg/year)



- A total of 54 NPI substances were reported as being emitted to land in 2005-06. The top five were ammonia (total), chlorine, fluoride compounds, manganese and compounds, and zinc and compounds.
- Emissions of ammonia to land were mainly from water supply, sewerage and drainage services and meat and meat product manufacturing.
- Chlorine emissions were mostly from landfill. Landfill emissions can be found on the NPI database by looking at the waste disposal sector or the public order and safety services sector.
- Fluoride compounds were emitted from a range of sources, however most emissions to land were from salt production.

Zinc and compounds emissions to land



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Zinc and compounds emissions to land

- Zinc is an essential element for all living organisms from bacteria to humans. However, too much or too little zinc can harm your health.
- The seriousness of health effects can be expected to increase with both level and length of exposure.
- Zinc and compounds emitted to land can remain in the environment for years and build-up in fish if the substance seeps into lakes or rivers.
- The largest industry source of emissions of zinc and compounds to land is zinc smelting and refining.
- 238 facilities emitted 170 000 kilograms of zinc and compounds to land during the 2005-06 reporting year. Emissions increased by 95% compared to the previous year, chiefly due to an increase in production from a large mining facility.

The graph at the bottom of page 14 shows the emissions of zinc and compounds to land for the reporting years 2002-03 to 2005-06 and the number of facilities reporting the substance to the NPI. Emissions of zinc and compounds were not required to be reported for the first three reporting years (1998-2001).

Enhancements to the NPI program

The Department of the Environment, Water, Heritage and the Arts is working in partnership with state and territory governments to improve the NPI.

Key features of improvements to the program include:

- variation of the NPI NEPM to make the program more effective – read more about the **NPI NEPM variation - http://www.npi.gov.au/about/review/index.html**
- building an online reporting system to simplify the process by which industry reports their emissions to the NPI, as well as provide improved validation; this will feed into an enhanced database system allowing for more effective auditing by jurisdictions of emissions data
- progressively updating emission estimation technique manuals to reflect changes in emission factors, as well as industrial processes, *and*
- redesigning the NPI web site to improve the database search function, update fact sheets, and provide additional contextual data.

For more information

- For information on the **National Pollutant Inventory**, including access to the emissions data - visit **www.npi.gov.au**
- The **links page** on this web site **(at www.npi.gov.au/contacts/npi-links.html)** can connect you to international pollutant inventories, consumer and business tips for helping the environment and other helpful sites.
- To find out how you can help **reduce pollution –** see **www.npi.gov.au/about/reduce.html**
- For further information on **air, land and water quality**, refer to state or territory agencies – see **www.npi.gov.au/contacts/index.html**
- For information on the **industry, business and government sustainability activities** of the Department of the Environment, Water, Heritage and the Arts – visit **www.environment.gov.au/settlements/index.html**
- The *Australia State of the Environment 2006* Report provides information on a wide range of **environmental issues** - visit **www.environment.gov.au/soe/index.html**
- The Australian Government's greenhouse gas initiatives can be viewed at **www.greenhouse.gov.au/index.html**
- For more information about **NEPMs** - see the Environment Protection and Heritage Council's web site at **www.ephc.gov.au**

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The NPI - tracking pollution across Australia – it's your right to know.

NPI contacts

Australian Government

NPI Team
Department of the Environment, Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601
P: 1800 657 945
E: npi@environment.gov.au
W: **www.npi.gov.au**

Australian Capital Territory

ACT NPI Coordinator
Department for Territory and Municipal Services
PO Box 144
LYNEHAM ACT 2602
P: (02) 6207 2157
E: npi@act.gov.au
W: **www.tams.act.gov.au/live/environment**

New South Wales

NPI Project Manager
Department of Environment and Climate Change
PO Box A290
SYDNEY SOUTH NSW 1232
P: 131 555
E: npi@environment.nsw.gov.au
W: **www.environment.nsw.gov.au**

Northern Territory

Compliance Officer
Office of Environment and Heritage
Department of Natural Resources, Environment and the Arts
GPO Box 1680
DARWIN NT 0801
P: (08) 8924 4046
E: npi.officer@nt.gov.au
W: **www.nt.gov.au/nreta/environment/npi**

Queensland

NPI Team, Industry Reporting
Queensland Environmental Protection Agency
PO Box 15155
CITY EAST QUEENSLAND 4002
P: (07) 3404 3330
E: npi@epa.qld.gov.au
W: **www.epa.qld.gov.au**

South Australia

NPI Team
South Australia Environment Protection Authority
GPO Box 2607
ADELAIDE SA 5001
P: (08) 8204 8525
E: npi@epa.sa.gov.au
W: **www.epa.sa.gov.au**

Tasmania

NPI Project Leader
Department of Tourism, Arts and the Environment
GPO Box 1751
HOBART TAS 7001
P: (03) 6233 2066
E: tony.port@environment.tas.gov.au
W: **www.dpiw.tas.gov.au**

Victoria

NPI Team
EPA Victoria
GPO Box 4395QQ
MELBOURNE VIC 3001
P: (03) 9695 2502
E: npi.victoria@epa.vic.gov.au
W: **www.epa.vic.gov.au**

Western Australia

Emissions Inventories Section
Department of Environment and Conservation
Locked Bag 104
Bentley Delivery Centre
PERTH WA 6893
P: (08) 6467 5287
E: npi@dec.wa.gov.au
W: **www.dec.wa.gov.au**

NPI Summary Report 2005-06
www.npi.gov.au/year8summaryreport

Abbreviations and definitions

ANZSIC – Australian and New Zealand Standard Industrial Classification

Emission – release or discharge of a substance to the environment whether in pure form or contained in other matter and whether in solid, liquid or gaseous form

Emission data – an estimate of the amount of the substance emitted in a reporting period that identifies:

(a) the medium to which the substance was discharged (for example, air, land, or water); and

(b) the estimation technique used

DEW – Department of the Environment and Water Resources (Now known as Department of the Environment, Water, Heritage and the Arts **DEWHA**)

Facility – any building or land together with any machinery, plant, appliance, equipment, implement, tool or other item used in connection with any activity carried out at the facility, and includes an offshore facility. The facility may be located on a single site or on adjacent or contiguous sites owned or operated by the same person

NEPM – National Environment Protection Measure

NPI – National Pollutant Inventory

PM10 – Particulate matter 10 micrometres or less in diameter

TAP – Technical Advisory Panel

TVOC – Total volatile organic compounds

Transfer – the transport or movement, on-site or off-site, of substances to a mandatory reporting transfer destination or a voluntary reporting destination; but does not include the transport or movement of substances contained in overburden, waste rock, uncontaminated soil, uncontaminated sediment, rock moved in construction or road building, or soil used for the capping of landfills

More definitions in the NPI glossary – visit **www.npi.gov.au/epg/npi/contextual_info/glossary.html**

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Margaret E Brown