Ministry for the Environment
Manatū Mō Te Taiao

AIR QUALITY (FOUR POLLUTANTS)

Environmental Report Card
May 2010

Key points

- In 2008, the national environmental standards were met for carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone.
- Between 2005 and 2008, there was a general downward (improving) trend in the maximum and annual average levels of carbon monoxide, but mixed trends across monitoring sites for nitrogen dioxide and sulphur dioxide. Ozone levels have remained low during this period.
- The year 2008 was the first year that there were no breaches of the national environmental standards for carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone at any monitoring sites in New Zealand since the standards were introduced in 2004 (six breaches occurred in 2005, 14 in 2006 and two in 2007).

Good air quality is fundamental not only to people's health and well-being but also to the quality of the natural and physical environment. This report card tracks air quality against national standards and guidelines that set acceptable levels for key pollutants. It presents information on ambient (outdoor) levels of carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone in areas where these pollutants are monitored. Particulate matter that is less than 10 microns in diameter (PM_{10}) is reported in a separate report card.

Introduction

New Zealand has good air quality in most locations for most of the time. However, emissions from transport, industry and solid fuel (wood and coal) used for home heating can cause problems in urban areas, particularly in winter.[1] Each year, about 1100 New Zealanders die prematurely from exposure to air pollution.[2]

Air pollutants can affect the quality of air we breathe. Carbon monoxide, nitrogen dioxide, sulphur dioxide, ozone and particulate matter are five such pollutants.

Carbon monoxide is produced mainly from the incomplete combustion of fuels such as petrol (from cars) and wood and coal (from home heating and industry). Natural sources of carbon monoxide include volcanoes and fires.

Carbon monoxide is readily absorbed by the lungs and interferes with the blood's ability to carry oxygen. The effects of carbon monoxide increase in severity as exposure increases.

Carbon monoxide can be both a local problem, around congested roads, and an urban problem (for example, where air conditions related to cool winter temperatures can trap carbon monoxide discharged from domestic fires and vehicles).

Nitrogen dioxide is produced directly from combustion processes and indirectly as a result of the reaction of oxides of nitrogen with other chemicals in the air.

The primary source of nitrogen dioxide in New Zealand is the combustion of fossil fuels (coal, gas and oil), especially petrol used in cars. In cities, cars contribute about 80 per cent of nitrogen dioxide levels.[3] Natural sources of nitrogen oxides include volcanoes and bacteria and viruses.

Nitrogen dioxide has been linked to increases in asthma symptoms and reduced lung development and function in children. Nitrogen dioxide can decrease the lungs' defences against bacteria, making them more susceptible to infections.

Nitrogen dioxide can be both a localised problem, around congested roads, and an urban problem.

Sulphur dioxide is produced mainly from the combustion of fossil fuels that contain sulphur, such as coal and oil (for example, coal being burnt for home heating and oil- and coal-fired boilers used by industry). Sulphur dioxide is also produced from some industrial processes, such as petrol refining, fertiliser manufacturing, aluminium smelting and steel manufacturing. Natural sources of sulphur dioxide include geothermal activity and volcanoes.

Sulphur dioxide can cause respiratory problems, such as bronchitis and can aggravate symptoms of people suffering from asthma or chronic lung disease.

Sulphur dioxide is typically a localised problem caused by specific industrial discharges.

Ozone at ground level is not directly emitted, but is formed by reactions of nitrogen oxides and volatile organic compounds in sunlight. Nitrogen oxides and volatile organic compounds are

produced from motor vehicle emissions, industrial combustion sources, and the industrial and domestic use of solvents and coatings.

Ozone at ground level affects the respiratory and cardiovascular system and can cause tissue damage to the lungs.

Because ozone at ground level forms over time, the highest concentrations are usually found downwind from areas, such as major cities, where most contaminants are released.

Particulate matter that is less than 10 microns in diameter (PM_{10}) is an air pollutant that regularly occurs at high levels in urban areas, and is linked to harmful health effects. As PM_{10} is a pollutant of particular concern for New Zealand and is monitored at many sites, PM_{10} levels in New Zealand are reported separately from this report. For information about PM_{10} levels in New Zealand, please see www.mfe.govt.nz/environmental-reporting/air/air-quality/pm10/index.html

Carbon dioxide is not reported in this report card. For more information about carbon dioxide levels in New Zealand, please see http://www.mfe.govt.nz/publications/climate/greenhouse-gas-inventory-2010-snapshot/index.html

Text box 1: What are environmental report cards?

Environment New Zealand 2007, the country's second national state of the environment report, provided information from around 115 national-scale environmental data sets. Its primary focus was to report on the 66 variables that constitute New Zealand's core set of environmental indicators.

A key focus of the Ministry for the Environment's national environmental reporting programme is to produce a series of 'report cards' to provide updated information on the indicators reported in *Environment New Zealand 2007*. This is one such report card.

Where does monitoring occur?

Regional councils are responsible for monitoring and managing the air quality of a region. This monitoring mostly occurs at 'hot spots' – sites in a region that are expected to have high levels of the pollutant being monitored. Monitoring at these sites can provide an early indication of when pollutant levels in an area may be nearing levels of concern.

Monitoring can also occur at 'background sites' (sites that are not expected to have high levels of the pollutant), which are usually located in areas with a high population or where people spend a lot of time outside.

A combination of hot spots and background sites can provide councils with sufficient data to estimate pollution levels and people's exposure to various air pollutants.

Improving New Zealand's air quality

National environmental standards and guidelines

In 2004, national environmental standards (NES) for ambient (outdoor) air quality were introduced in New Zealand to provide a guaranteed level of protection for the health of New Zealanders. National standards for the pollutants reported on in this report card are set out in table 1 below.

+ TABLE 1
NATIONAL AIR QUALITY STANDARDS (2004)

POLLUTANT	STANDARD – CONCENTRATION LIMIT	TIME AVERAGE	ALLOWABLE EXCEEDANCES PER YEAR
Carbon monoxide (CO)	10 mg/m^3	8-hours*	1
Nitrogen dioxide (NO_2)	200 µg/m^3	1-hour	9
Sulphur dioxide (SO_2)	350 µg/m^3 570 µg/m^3	1-hour 1-hour	9 0
Ozone (O_3)	150 µg/m^3	1-hour	0

* Running mean

Text box 2: Exceeding and breaching the standards

The standard for a pollutant is *exceeded* whenever a monitored result is above the concentration limits provided in table 1. A *breach* occurs when the standard is exceeded more than the number of allowable exceedances per year.

Before the introduction of the national environmental standards, air quality was measured against the national air quality guidelines. The national guidelines were developed in 1994 and revised in 2002 following a comprehensive review of international and national research and remain relevant. The national guidelines for the pollutants reported on in this report card (where they differ from table 1), are set out in table 2 below.

+ TABLE 2
NATIONAL AMBIENT AIR QUALITY GUIDELINES (2002)

POLLUTANT	GUIDELINE – CONCENTRATION LIMIT	TIME AVERAGE
Carbon monoxide (CO)	30 mg/m^3	1-hour
Nitrogen dioxide (NO_2)	100 µg/m^3	24-hour
Sulphur dioxide (SO_2)	120 µg/m^3	24-hour
Ozone (O_3)	100 µg/m^3	8-hour

In 2006, the World Health Organization (WHO) published its first global air quality guidelines. The guidelines aim to improve air quality around the world to protect people's health and were developed by reviewing the information on the health effects of each pollutant. The WHO guidelines for the pollutants reported on in this report card (where they differ from tables 1 and 2), are set out in table 3 below.

+ TABLE 3
WORLD HEALTH ORGANIZATION GUIDELINES (2005)

POLLUTANT	GUIDELINE – CONCENTRATION LIMIT	TIME AVERAGE
Sulphur dioxide (SO_2)	20 µg/m^3	24-hour
Nitrogen dioxide (NO_2)	40 µg/m^3	1-year

Improving home heating

Assistance to reduce the ambient emissions caused by home heating has been offered through national and local initiatives. Some examples of this assistance include free home energy audits, subsidies for cleaner heating options and installation of insulation, and information on how to operate wood burners efficiently.

The national environmental standards for air quality include performance standards for new wood burners to ensure they are clean and efficient. Since 2005, this has required all new wood burners in properties less than 2 hectares to meet specifications outlined in the standards. At the time of publication of this report card, six regional councils and/or unitary authorities have additional, in some cases more stringent, rules for wood burners in their regional plans. These councils are Auckland Regional Council, Hawkes Bay Regional Council, Nelson City Council, Tasman District Council, Canterbury Regional Council and Otago Regional Council.

Improving emissions from vehicles

Since 2004, all vehicles entering New Zealand were required by the Vehicle Exhaust Emissions Rule to be manufactured to an approved emissions standard. The aim of the Rule was to reduce harmful exhaust emissions (carbon monoxide, oxides of nitrogen, hydrocarbons and particulates) from vehicles. In 2007, this rule was amended requiring vehicles entering New Zealand to meet more stringent emissions standards.[4]

Since 2006, as part of obtaining a warrant of fitness or certificate of compliance, all vehicles are required by the Vehicle Exhaust Emissions Rule to pass a visible smoke test.[5]

Improving fuel quality

In 2002, the New Zealand Petroleum Products Specifications Regulations were revised to reduce the sulphur content and the content of other pollutants in petrol and diesel fuels, with the aim of reducing harmful exhaust emissions from vehicles.

In 2004, 2006, and in 2009, the sulphur content of diesel was further reduced to a level where New Zealand's diesel fuel is now termed 'sulphur free'. Routine sampling of petrol and diesel occurs to ensure these fuels comply with the Regulations.[6]

The reductions in the sulphur content of diesel fuel have allowed newer diesel models that emit lower levels of pollutants into New Zealand's vehicle fleet. Previously these models could not cope with the high sulphur content of diesel fuel in New Zealand.

Text box 3: Public perceptions of air quality

In a national public perceptions survey conducted in 2008, those surveyed indicated they thought New Zealand had good air quality. However, survey results over time indicate that the public believe New Zealand's air quality has worsened over time, although the perception is that the management of air quality has improved. Those surveyed identified 'motor vehicles and transport' and 'industrial activities' as being the main pressures on air quality.[7]

About this report card

The national environmental indicator for ambient air quality reports on the number of exceedances of the national environmental standards and peak levels and annual averages for PM_{10}, carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone. This report card reports on this indicator for carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone. PM_{10} is reported in a separate report card.

The maximum levels of these four pollutants are reported against the national environmental standards and guidelines in areas where monitoring occurs. For some pollutants, supporting information is provided by reporting the maximum levels of these pollutants against relevant international guidelines (eg, WHO global air quality guidelines). This only occurs for pollutants where international guidelines differ to the national environmental standards or national guidelines. Information is also presented for annual averages as they take into account both peak and low pollution periods, giving an important long-term picture of air quality.

Results for selected monitoring sites are presented in figures throughout this report card. The selected sites are primarily urban, reflecting where people live and potential exposure to pollutants. The locations for the monitoring results presented are discussed in the key findings section for each pollutant. At least one site is presented for each region where regular monitoring occurs.

It is important to note that the weather has a strong influence on air quality and normal meteorological fluctuations that occur from year-to-year, can significantly affect monitoring results. For example, some weather conditions trap pollutants near ground level, having adverse effects on air quality. Conversely, particularly windy and unsettled weather can quickly disperse pollutants, having a beneficial effect on air quality.

Key findings

Carbon monoxide

Current situation

In 2008, all sites in New Zealand monitoring carbon monoxide met the 8-hour national standard and the 1-hour national guideline.

The Auckland (Khyber Pass Road), Rotorua and Wellington monitoring sites, the results of which are shown in figures 1, 2 and 3, are located close to major roads. This type of location is the most

In 2008, all sites in New Zealand monitoring carbon monoxide met the 8-hour national standard and the 1-hour national guideline.

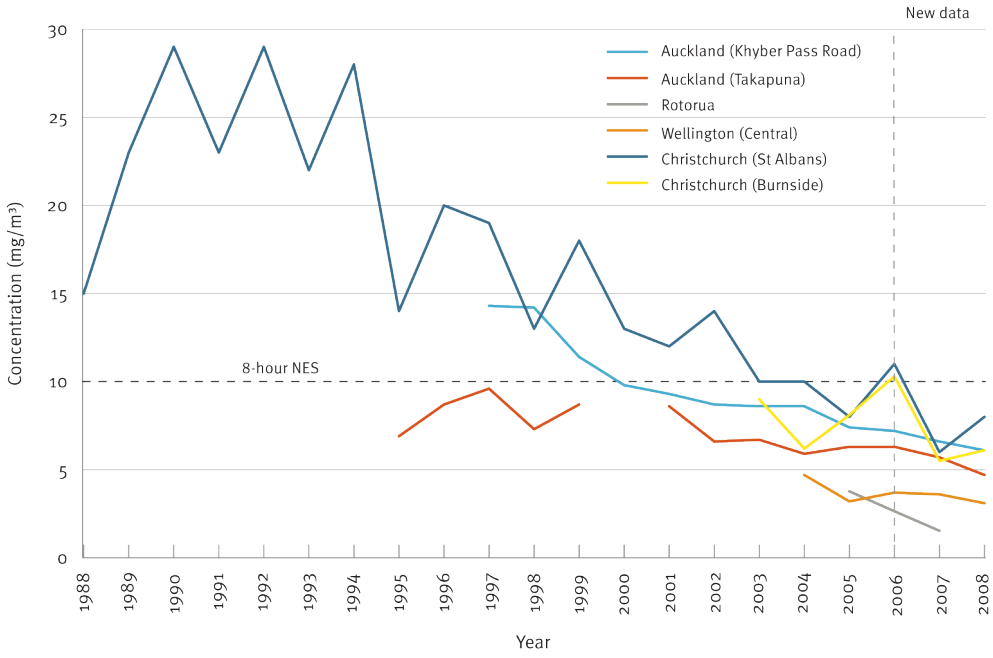
likely to be affected by elevated levels of carbon monoxide. The Auckland (Takapuna) and both Christchurch monitoring sites are located in residential areas.

In a similar finding, shorter monitoring surveys conducted at peak traffic locations in the Hawke's Bay region in 2008 reported that carbon monoxide levels at these locations were well below the 8-hour standard and 1-hour national guideline.[8]

Figure 3 shows the annual averages for Auckland (Khyber Pass Road) are much higher than the other sites. This is due largely to the relatively constant carbon monoxide pollution from vehicles that occurs at this site.

+ FIGURE 1

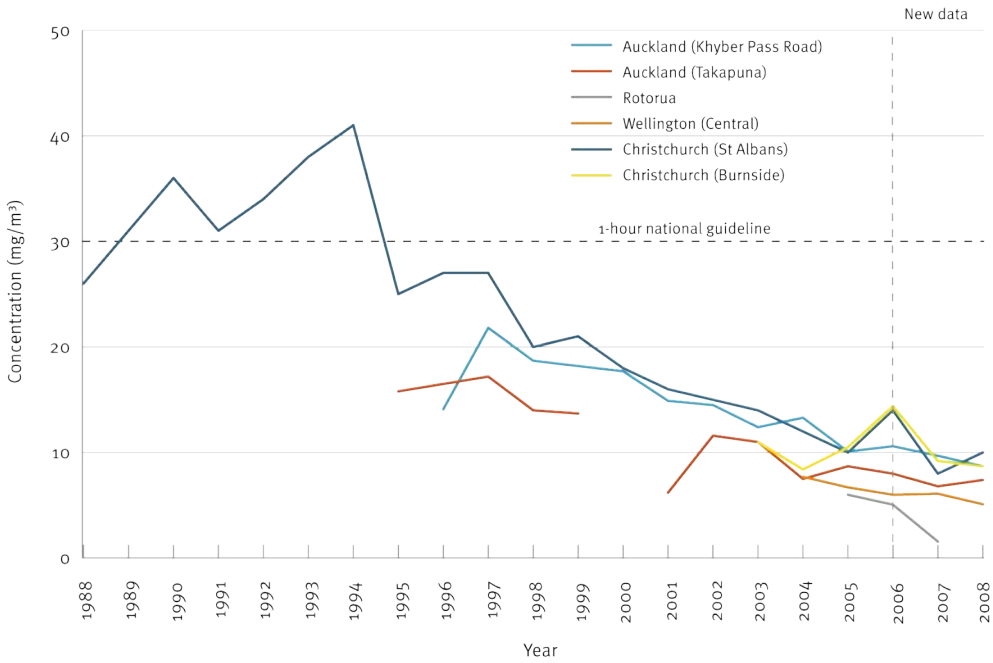
MAXIMUM CARBON MONOXIDE LEVELS, 8-HOUR AVERAGE, 1988–2008



Source: Auckland Regional Council,[9] Environment Canterbury,[10] Environment Bay of Plenty,[11] Greater Wellington.[12]

+ FIGURE 2

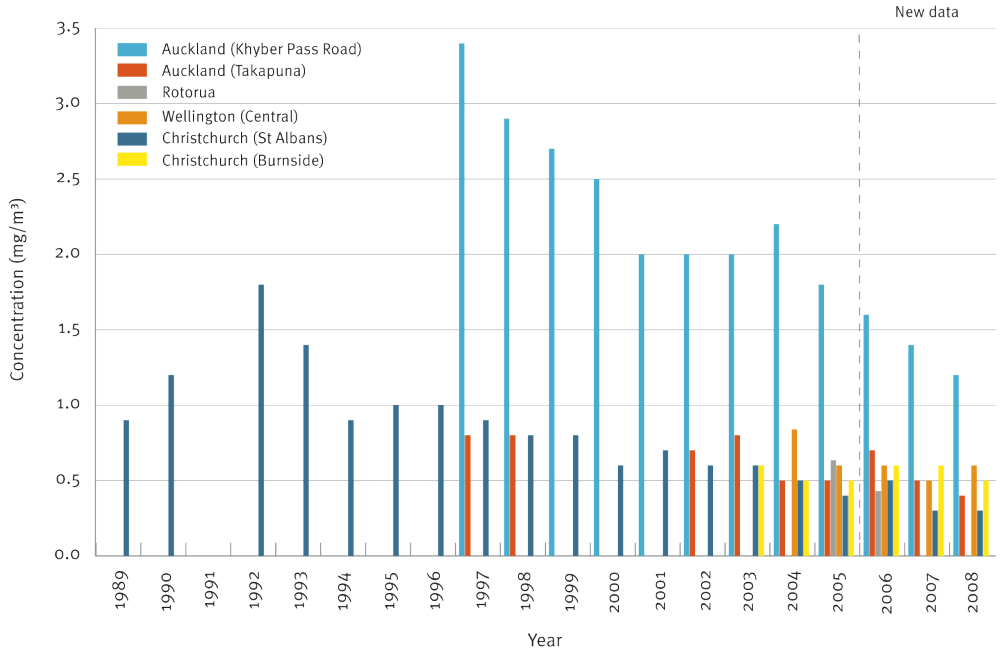
MAXIMUM CARBON MONOXIDE LEVELS, 1-HOUR AVERAGE, 1988–2008



Source: Auckland Regional Council,[9] Environment Canterbury,[10] Environment Bay of Plenty,[11] Greater Wellington.[12]

+ FIGURE 3

ANNUAL CARBON MONOXIDE LEVELS, 1989–2008



Source: Auckland Regional Council,[9] Environment Canterbury,[10] Environment Bay of Plenty,[11] Greater Wellington.[12]

Trend

Recent trend

Carbon monoxide was reported on in *Environment New Zealand 2007*. Since then, there has been a general decrease (improvement) in the 1-hour and 8-hour maximums, and the annual averages at most sites (see the new data presented in figures 1–3).

There have been no detected exceedances of the carbon monoxide 8-hour national standard at any monitoring site in New Zealand since 2006, when six exceedances and four breaches occurred. Five of the exceedances and all of the four breaches occurred at the St Albans's site in Christchurch during winter. The other exceedance occurred at the Burnside site in Christchurch, also during winter.

Long-term trend

The trends for long-term monitoring sites – Auckland (Khyber Pass Road and Takapuna) and Christchurch (St Albans) – also show a general decreasing (improving) trend in ambient carbon monoxide levels. This is largely due to improvements in New Zealand's vehicle fleet. In 1998, the removal of import tariffs made it cheaper to import vehicles from other countries.[1] Until recently, a used imported vehicle had better exhaust emissions control technology than the same vehicle purchased new in New Zealand. This was due to the imported vehicle being manufactured to more rigorous vehicle emissions standards in the country of origin.[13] In the late 1990s, a voluntary agreement resulted in many New Zealand new vehicles being fitted with emissions control technology.[14] Advancements in vehicle technology, the introduction and amendments of the Vehicle Exhaust Emissions Rule, and fuel quality requirements have also helped.

Nitrogen dioxide

Current situation

In 2008, all sites in New Zealand monitoring nitrogen dioxide met the 1-hour national standard and the 24-hour national guideline. The Auckland (Queen Street) site was the only site not to meet the annual WHO guideline.

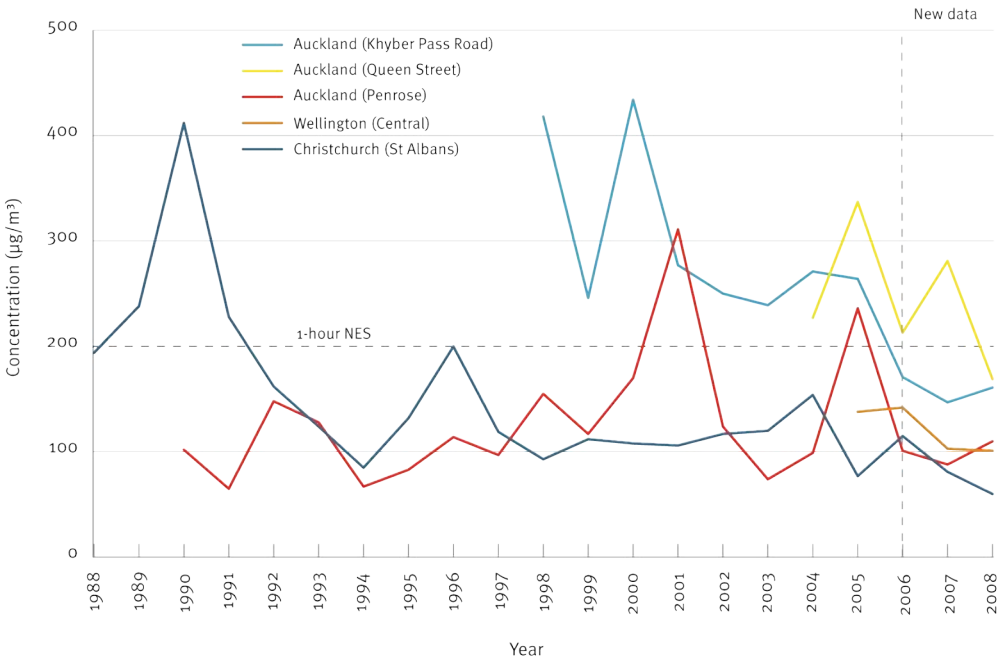
The Auckland and Wellington monitoring sites, the results of which are shown in figures 4, 5 and 6, are located close to industry and/or major roads. These types of locations are the most likely to be affected by elevated levels of nitrogen dioxide. The Christchurch monitoring site is located in a residential area.

In 2008, all sites in New Zealand monitoring nitrogen dioxide met the 1-hour national standard and the 24-hour national guideline.

Similarly, shorter monitoring surveys conducted at peak traffic locations in the Hawke's Bay region in 2008 reported that nitrogen dioxide levels at these locations were well below the 1-hour standard and the 24-hour guideline.[8]

+ FIGURE 4

MAXIMUM NITROGEN DIOXIDE LEVELS, 1-HOUR AVERAGE, 1988–2008

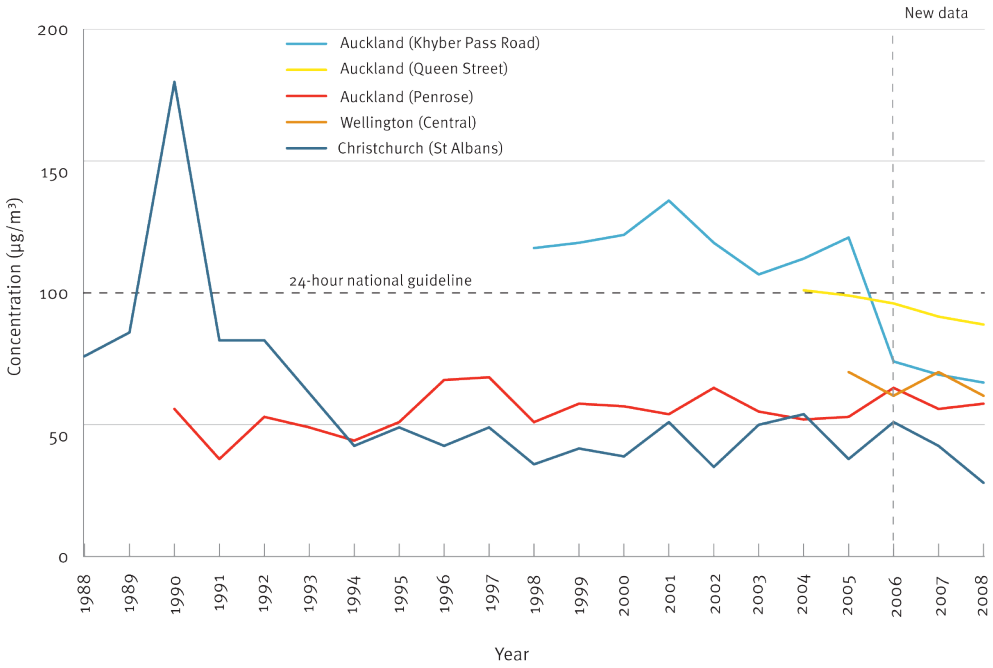


Source: Auckland Regional Council,[9] Environment Canterbury,[10] Greater Wellington.[12]

Note: Due to some data limitations the 2007 and 2008 values for Christchurch may not reflect the maximum concentration experienced at this site.

+ FIGURE 5

MAXIMUM NITROGEN DIOXIDE LEVELS, 24-HOUR AVERAGE, 1988–2008

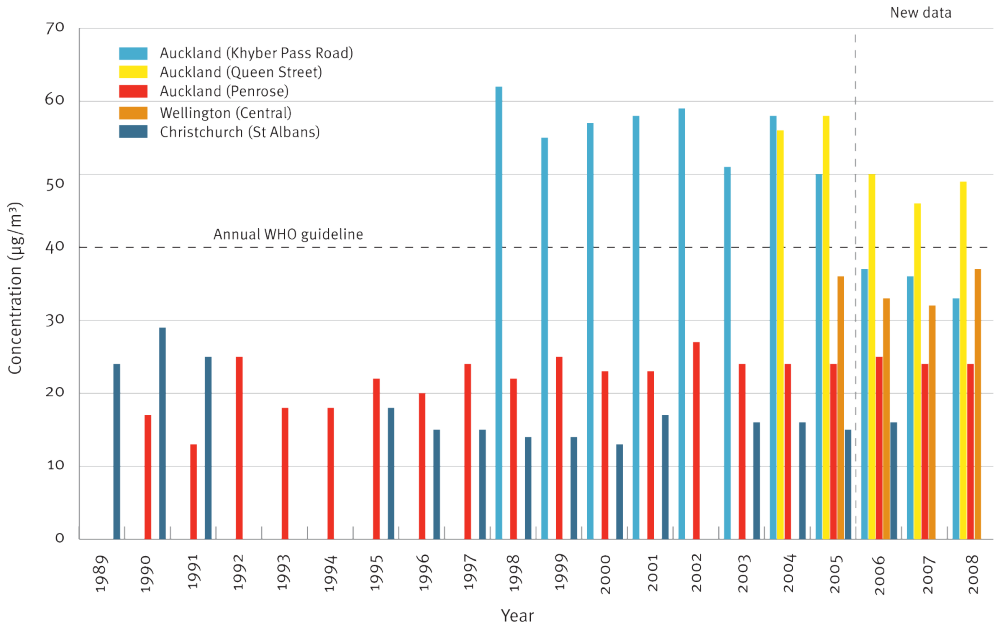


Source: Auckland Regional Council,[9] Environment Canterbury,[10] Greater Wellington.[12]

Note: Due to some data limitations the 2007 and 2008 values for Christchurch may not reflect the maximum concentration experienced at this site.

+ FIGURE 6

ANNUAL NITROGEN DIOXIDE LEVELS, 1989–2008



Source: Auckland Regional Council,[9] Environment Canterbury,[10] Greater Wellington.[12]

Note: Annual averages are not presented for some sites in some years due to data limitations.

Trend

Recent trend

Nitrogen dioxide was reported on in *Environment New Zealand 2007*. Since then, there have been fluctuations in the 1-hour and 24-hour maximums, and the annual averages at most of the five sites (see the new data presented in figures 4–6).

In 2007, 11 exceedances and two breaches of the 1-hour national standard for nitrogen dioxide occurred. These all occurred at the Queen Street site in Auckland, mostly during autumn and winter. These exceedances were probably due to road works occurring in Queen Street at the time. In 2006, the only exceedance of the 1-hour national standard for nitrogen dioxide also occurred at the Queen Street site in Auckland. All other sites monitoring nitrogen dioxide in New Zealand met the 1-hour national standard in recent years.

The 24-hour national guideline for nitrogen dioxide was met by all sites monitored in New Zealand in recent years. However, the Auckland (Queen Street) site has not meet the 24-hour WHO guideline in recent years.

Long-term trend

There is no clear trend in ambient levels of nitrogen dioxide at the long-term monitoring sites at Auckland (Penrose and Khyber Pass Road) and Christchurch. Maximum levels have fluctuated since 1990 and annual averages for all three sites show no discernible trend.

Sulphur dioxide

Current situation

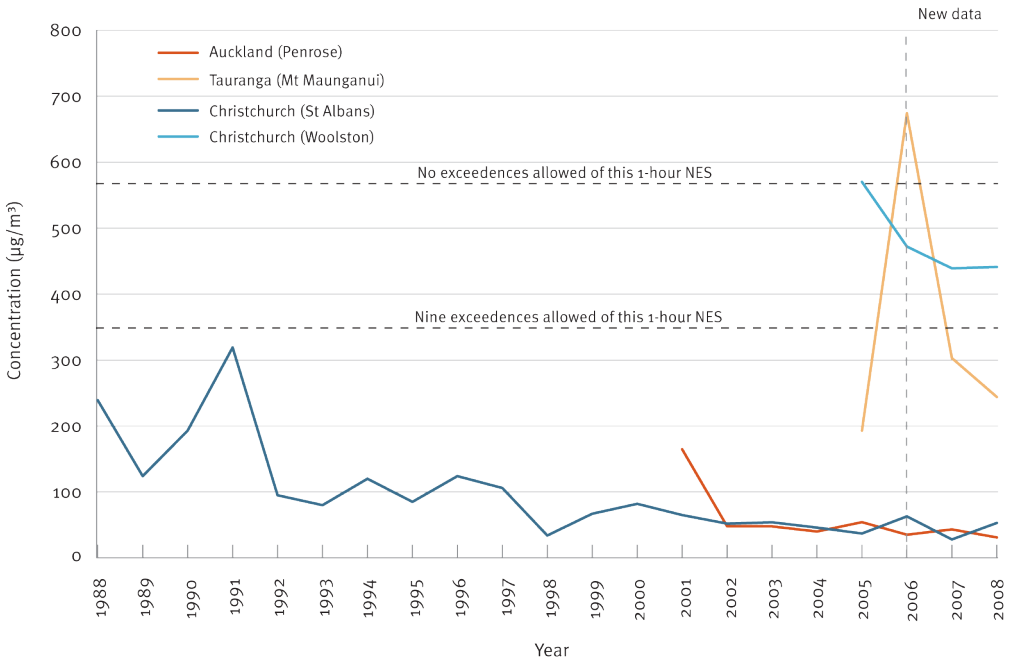
In 2008, the only site to exceed (but not breach) the 1-hour national standard for sulphur dioxide was Christchurch (Woolston). All other sites in New Zealand monitoring sulphur dioxide did not exceed the 1-hour standard. The 24-hour national guideline was met by all sites monitored in New Zealand, however, the Tauranga and Christchurch (Woolston) sites did not meet the 24-hour WHO guideline.

The Christchurch (Woolston), Auckland and Tauranga sites, the results of which are shown in figures 7, 8 and 9, are located close to industry. Industry locations are likely to be affected by elevated levels of sulphur dioxide. The Auckland site is also located close to major roads. The Christchurch (St Albans) monitoring site is located in a residential area.

In 2008, the only site to exceed (but not breach) the 1-hour national standard for sulphur dioxide was Christchurch (Woolston).

+ FIGURE 7

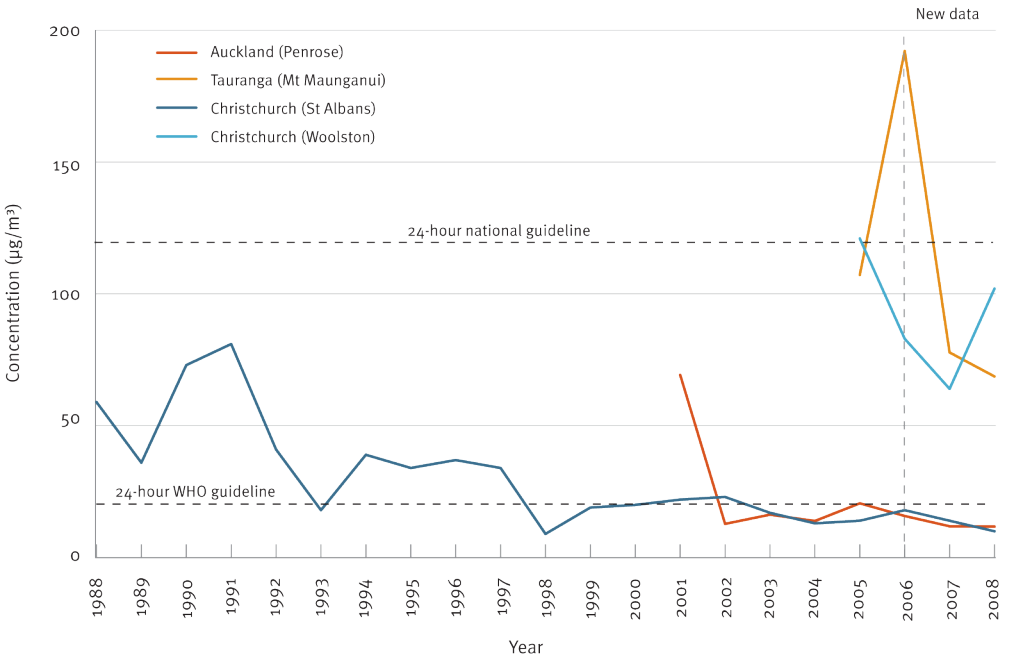
MAXIMUM SULPHUR DIOXIDE LEVELS 1-HOUR AVERAGE, 1988–2008



Source: Auckland Regional Council,[9] Environment Bay of Plenty,[11] Environment Canterbury.[10]

+ FIGURE 8

MAXIMUM SULPHUR DIOXIDE LEVELS 24-HOUR AVERAGE, 1988–2008



Source: Auckland Regional Council,[9] Environment Bay of Plenty,[11] Environment Canterbury.[10]

Trend

Recent trend

Sulphur dioxide was reported on in *Environment New Zealand 2007*. Since then, results for the 1-hour and 24-hour maximums and annual averages for the Auckland and Christchurch (St Albans) sites have been relatively constant while results for the Tauranga and Christchurch (Woolston) sites have fluctuated (see the new data presented in figures 7–9).

In 2006, there were 24 exceedances and 11 breaches of the 1-hour national standard for sulphur dioxide. Twenty-one of the exceedances and all 11 of the breaches occurred at the Tauranga site.

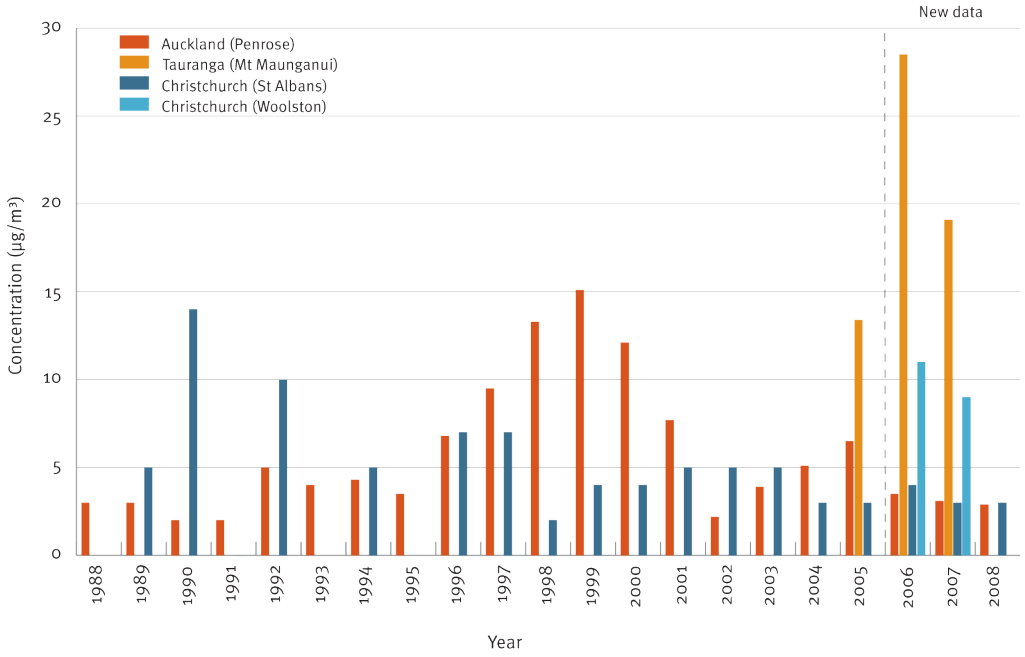
The remaining three exceedances occurred at the Christchurch (Woolston) site. In 2006, the 24-hour national guideline was not met by the Tauranga site on six occasions.

In 2007, there were two exceedances of the 1-hour national standard for sulphur dioxide. Both these exceedances occurred at the Christchurch (Woolston) site.

In recent years the Tauranga and Christchurch (Woolston) sites have not met the 24-hour WHO guideline.

All other monitoring sites in New Zealand have not exceeded the 1-hour national standard or national and WHO guidelines for sulphur dioxide in recent years.

+ FIGURE 9
ANNUAL SULPHUR DIOXIDE LEVELS, 1988–2008



Source: Auckland Regional Council,[9] Environment Bay of Plenty,[11] Environment Canterbury.[10]

Notes:

(1) Annual averages are not presented for some sites in some years due to data limitations.

(2) The methodology used at the Auckland site changed in 2000. The trend of the annual average at this site remains comparable.

Long-term trend

Annual levels of sulphur dioxide at the Christchurch (St Albans) site show a general decreasing (improving) trend. This reflects the continuing reductions in the amount of sulphur in diesel fuel and coal use over this period.

The annual levels at the Auckland site have fluctuated over this period. The increasing levels at this site in the mid- to late-1990s coincided with an increase in the registration of new and used diesel vehicles and levels subsequently decreased with the improvement in fuel quality.

Text box 4: Global air quality guidelines for sulphur dioxide

In October 2006, the World Health Organization (WHO) published its first global air quality guidelines. WHO's new guidelines reduced the 24-hour average sulphur dioxide guideline from 120 micrograms per cubic metre to 20 micrograms per cubic metre. New Zealand's ambient guideline (2002) is set at 120 micrograms per cubic metre. Most of New Zealand is likely to meet the new WHO guideline. However, some areas, particularly those downwind of refineries, coal-burning industrial plants, and ports, may exceed the WHO guideline over a 24-hour period.

In 2008, all monitoring sites met the 1-hour national standard and 8-hour national guideline for ground-level ozone.

Ozone

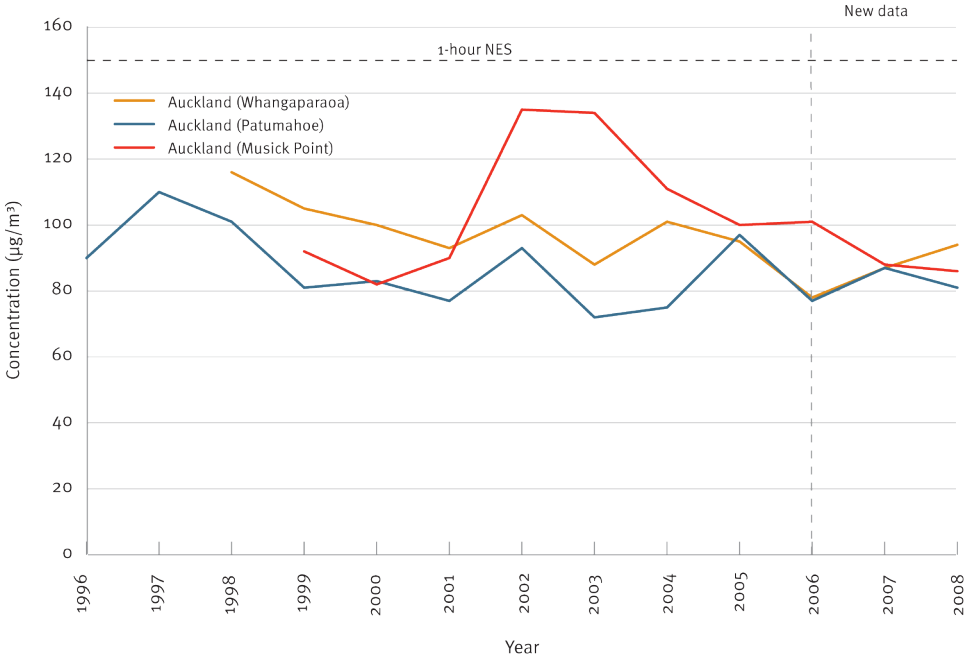
Current situation

Ground-level ozone is only monitored continuously in Auckland. In 2008, all monitoring sites met the 1-hour national standard and 8-hour national guideline for ground-level ozone (figures 10 and 11).

Short monitoring surveys conducted in Coromandel in 2008[15] and in Christchurch (Lincoln) in 2007[10] reported that ozone levels at these locations were well below the 1-hour national standard and 8-hour national guideline.

+ FIGURE 10

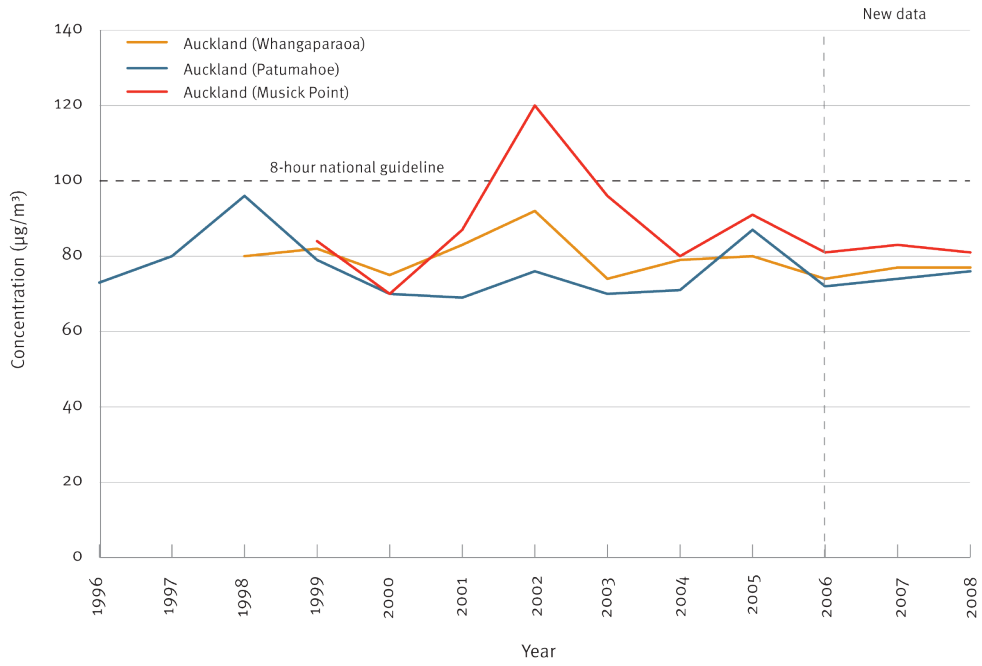
MAXIMUM OZONE LEVELS, 1-HOUR MAXIMUM, 1996–2008



Source: Auckland Regional Council.[9]

+ FIGURE 11

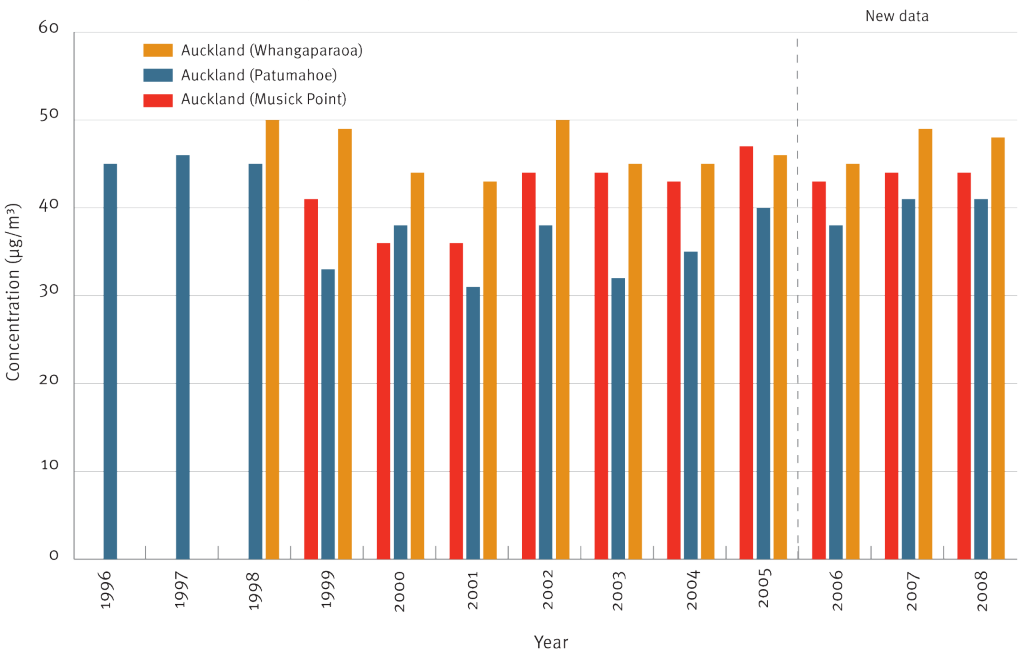
MAXIMUM OZONE LEVELS, 8-HOUR AVERAGE, 1996–2008



Source: Auckland Regional Council.[9]

+ FIGURE 12

ANNUAL OZONE ANNUAL LEVELS, 1996–2008



Source: Auckland Regional Council.[9]

Trend

Recent trend

Ozone was reported on in *Environment New Zealand 2007*. Since then, ozone levels in Auckland have remained relatively constant. There have been no detected exceedances of the 1-hour national standard or the 8-hour national guideline at any monitoring site in New Zealand in recent years (see the new data presented in figures 10–12).

Long-term trend

Levels of ozone have remained relatively constant. The two exceedances of the 8-hour national guideline at Musick Point in 2002 are assumed to be the result of pollution from fires in Sydney, Australia.[16]

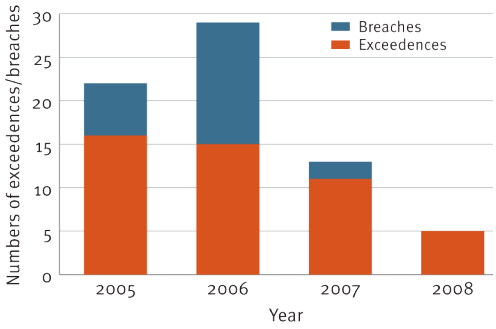
Compliance with national environmental standards

The year 2008 was the first that there were no breaches of the national standards for carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone at any monitoring sites in New Zealand since the standards were introduced in 2004 (figures 13–15). Therefore, the national environmental standards were met for each of these pollutants.

However, there were five exceedances (but no breaches) of the 1-hour national standard for sulphur dioxide in 2008.

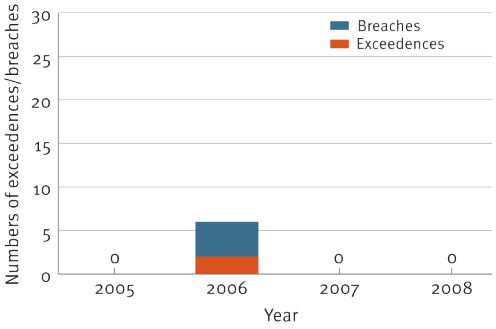
+ FIGURE 13

TOTAL BREACHES AND EXCEEDANCES FOR THE FOUR POLLUTANTS, 2005–2008



+ FIGURE 14

CARBON MONOXIDE BREACHES AND EXCEEDANCES, 2005–2008

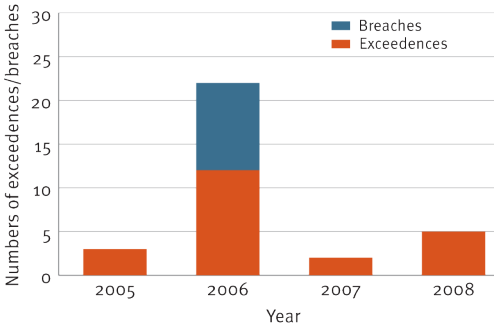


+ FIGURE 15

NITROGEN DIOXIDE BREACHES AND EXCEEDANCES, 2005–2008

+ FIGURE 16

SULPHUR DIOXIDE BREACHES AND EXCEEDANCES, 2005–2008



Source: Northland Regional Council,[17] Auckland Regional Council,[9] Environment Waikato,[14] Environment Bay of Plenty,[11] Hawkes Bay Regional Council,[8] Greater Wellington,[12] Environment Canterbury.[10]

Notes:

(1) Between 2005 and 2008, monitoring ceased at seven sites. The recorded levels of pollutants at each of these sites before ceasing had never exceeded the standard. Monitoring began at 20 new sites during this period.

(2) Ozone is not presented as there were no exceedances or breaches of this pollutant between 2005 and 2008.

Future watch

Many of the benefits from the examples provided in the 'Improving New Zealand's air quality' section of this report card may take some time to have an effect on New Zealand's air quality.

For example, the Vehicle Exhaust Emissions Rule amendment 2007 is expected to decrease the harmful exhaust emissions of new and used imported vehicles by requiring them to meet specific emission standards. In 2007, imported vehicles added around 5 per cent more vehicles to the New Zealand fleet and a similar percentage of vehicles, mainly older, were scrapped. As the Vehicle Exhaust Emissions Rule amendment 2007 only affects imported vehicles from 2008, it will take a number of years for significant reductions in harmful exhaust emissions to occur in the fleet as a whole.[13]

Another example is the 'Warm Up New Zealand: Heat Smart' programme (which superseded the EnergyWise Home Grants scheme), which is expected to decrease the home heating emissions of pollutants from residential dwellings by providing subsidies for clean and efficient heating options. Just over 6000 households have already had a clean heating option installed since the launch of this initiative in mid-June 2009.[18] It is expected that approximately 80,000 homes across New Zealand will be heated cleanly and efficiently over the coming years as a result of the programme.[19] Therefore, it will take a number of years for significant reductions in home heating emissions to occur.

Vehicle kilometres travelled by road in New Zealand are expected to gradually increase in line with population increases and growth in the economy. However, the emissions from the vehicle fleet are expected to continue to gradually improve, due to improved engine technology, the Vehicle Exhaust Emissions Rule, and increased consumer demand for lighter, smaller, more fuel-efficient vehicles.[13] As a result, expected increases in vehicle kilometres travelled may not result in increased emissions and air pollution in the near future.[13] For more information about changes in travel by road, please see the *Vehicle Kilometres Travelled by Road* report card.

Further information

Information about the national environmental standards for air quality and their current review, can be found on the Ministry for the Environment's website at: www.mfe.govt.nz/laws/standards/air-quality-standards.html and www.mfe.govt.nz/laws/standards/review-nes-air-quality.html

Car owners can obtain more information on how to reduce vehicle exhaust emissions at: www.transport.govt.nz/news/media/Pages/Choke-the-Smoke-Campaign-Details.aspx and www.sustainability.govt.nz/transport

Information on changing your home heating source, installing a new clean heating source, adding insulation to your home and grants for doing these things, can be found at: www.energywise.govt.nz or visit your regional council's website.

Technical notes

Limitations

Health impacts of air quality

This report card is primarily focused on tracking air quality against the national environmental standard for carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone. Although localised studies on air quality are able to provide more detailed information on the human health effects of air pollution, this report card does not report on or quantify the specific human health effects of poor air quality at a national scale.

Furthermore, this report card does not show the effects from exposure to two or more air pollutants in the environment. This is relevant because most combustion processes give rise to several pollutants simultaneously.

Variations in weather and climate

This report card presents information on the state of air quality over time, but does not allow for the influence of variations in weather and climate from year-to-year. This makes it difficult to assess whether changes in air quality are caused by changing environmental pressures – for example, a reduction in the emission of air pollutants – or meteorological variations, such as changes in wind patterns.

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FOR MORE INFORMATION:

- about the state of New Zealand's environment see www.mfe.govt.nz/environmental-reporting
- about the Ministry for the Environment's reporting on New Zealand's air quality contact Josh Fyfe at josh.fyfe@mfe.govt.nz

The national environmental reporting programme is committed to improving the quality, consistency and coverage of environmental data in New Zealand.

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