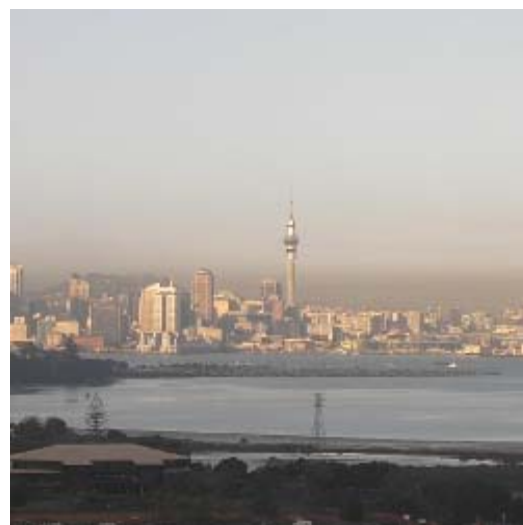


The Air We Breathe

November 2006

Every Aucklander breathes on average 11,000 litres of air every day (based on a typical resting breathing rate of 7.5 litres per minute), which is staggering when you think each individual only drinks 2-3 litres of water per day. Our breathing rate while walking is approximately 30 litres per minute and our breathing rate during strenuous exercise is as high as 80 litres per minute. This means that an active person will breathe more than 14,000 litres per day¹.

New Zealand's air quality is relatively good but, despite this, we have the worst asthma death rate in the OECD². Asthmatics are particularly sensitive to poor air quality which, in Auckland, is caused primarily by pollution from motor vehicles and domestic fires. In the Auckland region, one child in four are asthmatic (25%) and overall 13% of Auckland's population have the condition – this is one of the highest rates in the world.



How is air quality monitored?

To manage air quality and reduce pollutant discharges, it is essential the Auckland Regional Council (ARC) have a sound scientific understanding of pollutant levels, trends and sources. ARC monitors several pollutants at 14 sites around the Auckland region. These sites represent a variety of sources and exposures from suburban residential areas to peak traffic areas. The most common pollutants in Auckland are similar to everywhere else in the world. These include:

- Carbon Monoxide (CO) – a colourless, odourless gas formed by both natural processes (such as volcanic activity) and human activities (primarily from motor vehicles).
- Nitrogen Dioxide (NO₂) – a brown, acidic gas formed by the combustion of fossil

¹ ARC (1997), *Ambient Air Quality: Monitoring Results for the Auckland Region 1964 – 1995* Auckland Regional Council Technical Publication 88, prepared by Auckland Regional Council

² Kelley, E., & Hurst, J., (2006), *Health Care Quality Indicators Project: Initial Indicators Report*, OECD Health Working Papers No. 22, prepared by Organisation for Economic Co-operation and Development (OECD)

fuels (coal, oil and gas). Motor vehicles are a large source of NO₂ in urban areas.

- Fine particles (PM₁₀) – these particles are smaller than 10 microns in diameter that are suspended in the air and aren't visible to the human eye. Fine particles are produced naturally (from pollen, bushfires etc) and from human activities (domestic fires, industries and motor vehicles).
- Ozone (O₃) – a colourless gas naturally found in the outer atmosphere but also formed at ground level from reactions with other pollutants produced by motor vehicles, industrial and domestic sources.
- Sulphur Dioxide (SO₂) – a colourless, acidic gas largely produced by industrial processes, but also from diesel vehicles.
- Hydrocarbons (HCs) – these are hydrogen and carbon based compounds that react with other compounds to form some of the pollutants mentioned above. Examples of HCs are oil, petrol and solvents.

Note: NO₂, O₃ and SO₂ have characteristic pungent smells at high concentrations.

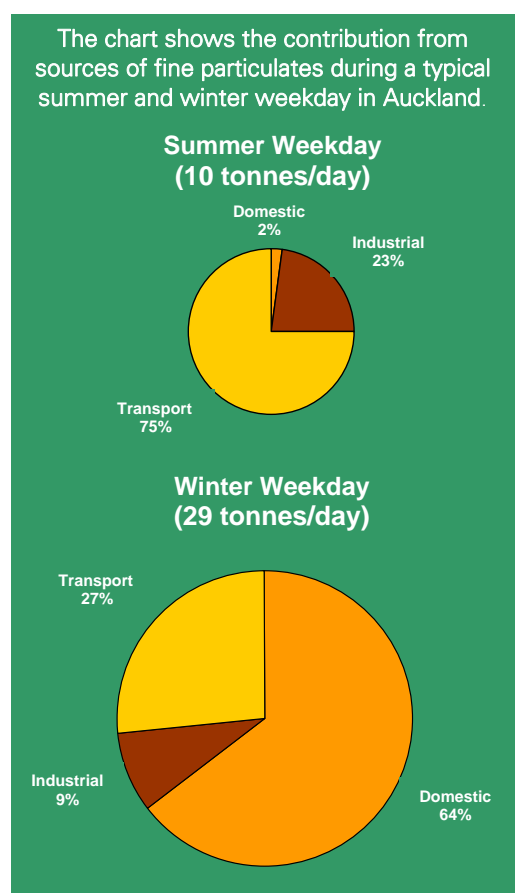
Sources of pollution in the Auckland region

- 750,000 motor vehicles that travel about 11,400 million kilometres in total every year.
- 140,000 domestic fires that primarily operate during the months of June, July and August.
- 300 industrial activities that require air discharge consents.
- Other air discharges from consented and unconsented activities, including backyard burning.

These sources of pollution produce tonnes of toxic pollutants each year made up of:

- 6,000 tonnes of fine particles (which is equivalent to over five hundred bags of cement a day)
- 35,000 tonnes of nitrogen dioxides,
- 64,000 tonnes of hydrocarbons,
- 171,000 tonnes of carbon monoxide.

These estimates are based on the Auckland Air Emissions Inventory: 2004³.



Motor vehicles

Thousands of tonnes of toxic air pollutants are produced by vehicles travelling in the Auckland region – particularly CO and NO₂. The amount of pollutants produced by vehicles increases when the engine is idling, cold or not working efficiently.

³ ARC (2006), *Auckland Air Emissions Inventory: 2004*, Auckland Regional Council Technical Publication 292, prepared by Auckland Regional Council

An Australian study⁴ found that the most poorly maintained vehicles emit up to five to 10 times the exhaust emissions of well maintained vehicles of the same age. An Auckland study also found that the best maintained older vehicles often have lower emissions than poorly maintained newer vehicles⁵. Vehicle exhaust emissions could be reduced considerably if everybody tuned their vehicles every six months.

Reducing the number of car trips each week also reduces air pollution. Try using public transport or, if you are travelling only a short distance, walk instead of driving. Vehicles create more pollution during the first 3 kilometres of a trip.



Domestic fires

In the Auckland region, smoke from domestic fires is the highest source of air pollution in the winter months and the second highest source during the other months.

There are some simple ways you can reduce pollution from domestic fires:

- remove your fireplace or wood burner, or
- ensure your wood burner meets the National Environmental Standards (NES) for air quality,
- burn only dry, seasoned wood and
- use your fire correctly.

Chemicals and fine particles produced from wood smoke can seriously affect human health. All wood burners installed after 1 September 2005 must comply with the NES for air quality. See page 4 for more details about the NES.

Outdoor burning



In 2005, the ARC and local councils in the Auckland region received more than 1,300 complaints about the open burning of rubbish or garden waste (i.e. backyard rubbish fires). This is approximately 70% of the total number of complaints received about air pollution in the region.

Burning of rubbish and garden waste produces tonnes of CO and fine particles every year, adding to the air pollution problem and endangering our health. Fires also produce a range of other toxic and cancer causing compounds, including dioxins that can accumulate in human tissue and affect human metabolism.

⁴ Federal Office of Road Safety (1996), *Motor Vehicle Pollution in Australia: A report on the national in-service vehicles emissions study*, Australian Government Publishing Service

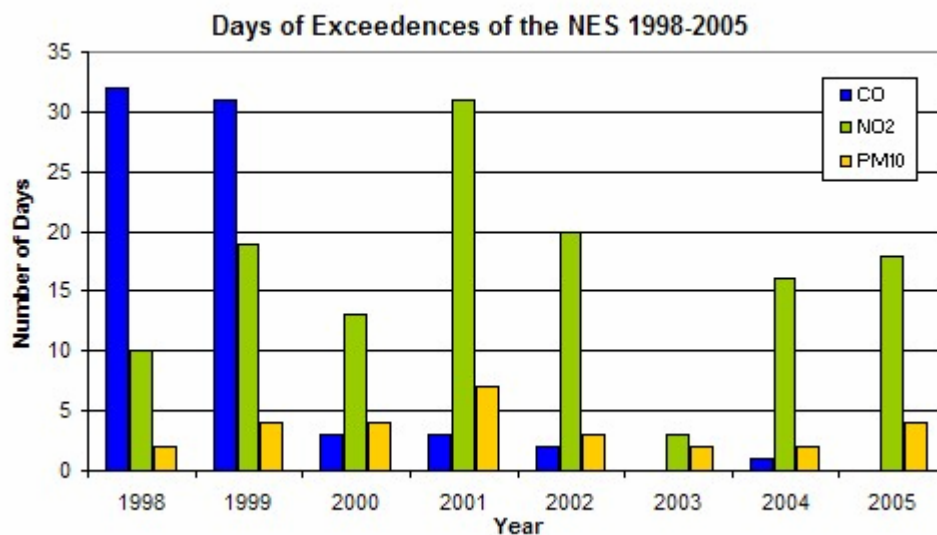
⁵ ARC (2003), *On-road remote sensing of vehicle emissions in the Auckland Region*, Auckland Regional Council Technical Publication 198, prepared by NIWA for Auckland Regional Council

Health and amenity effects

- Air pollution can make asthma, and lung and heart conditions worse. Every year air pollution causes more than 400 premature deaths, 750,000 reduced activity days, increased hospital visits and higher use of medication in the Auckland region.
- Smoke and odours from fires affect our quality of life. It can also cause soiling of houses and laundry. About 18% of air pollution complaints concern odour and 4% concern dust.
- To lower the impact of air pollution on your health do not exercise or spend long periods of time near busy or congested roadways.

National Environmental Standards

The Ministry for the Environment (MfE) has set National Environmental Standards (NES) to improve air quality and protect the health of the general public. The ARC monitors pollutant levels and exceedences based on these standards. The chart below shows the number of days per year each pollutant exceeded the NES in the Auckland region:



- CO - Levels of CO have dropped significantly in recent years with maximum concentrations generally lower than the NES at urban monitoring sites.
- NO₂ - NO₂ concentrations are generally less than 66% of the NES at urban monitoring sites but exceed the standards at roadside monitoring sites. NO₂ concentrations have increased over the past decade due to an increase in motor vehicles on the roads.
- PM₁₀ - Concentrations of PM₁₀ regularly exceed the NES at urban monitoring sites around Auckland.

For further information on Auckland's Air Quality, visit www.arc.govt.nz or phone 09 366 2000.

FOR WAYS TO HELP THE ENVIRONMENT, JOIN THE BIG
CLEAN UP, www.arc.govt.nz OR PHONE 0800 JOIN IN
(56 46 46)