Taranaki has excellent air quality.

OUR ATMOSPHERE

Clean fresh air is an important and valued part of Taranaki's environment and quality of life. To Māori, the air is a taonga and odours and other contaminants can affect wāhi tapu sites.

Overall, Taranaki has excellent air quality. This is because of Taranaki's windy and exposed nature, together with its dispersed and low population, absence of heavy industry and its low number of vehicles. However, air quality in some locations is reduced through point source discharges or diffuse discharges of contaminants to air.

Diffuse sources of emissions are the biggest contributors of emissions to air. These include natural sources (sea spray, vegetation, landcover and farm animals) and human sources such as industries, homes or motor vehicles. Natural sources emit far greater quantities than human sources.

Point source emissions such as from industry are more obvious than diffuse source discharges. Point source discharges in Taranaki come from a range of sources such as the petroleum industry, pig and poultry farming and abrasive blasting. Many point source emissions are located in the industrial parts of the region's urban centres, particularly New Plymouth and Hāwera. Increased levels of hydrocarbon exploration and production have led to increased consents for air discharges.

Emissions to air, in the form of odours, smoke, dusts or toxic contaminants, may affect air quality. The effects of such emissions range from visual effects and offensive odours to actual or potential effects on human and ecosystem health.

Greenhouse gases are gases such as carbon dioxide, methane and nitrous oxide, which have the ability to trap infra-red energy that would otherwise be radiated off the earth's surface.

There is now a very strong consensus of scientific opinion that the accumulation of greenhouse gases in the upper atmosphere is warming the lower atmosphere. Over time this will result in rising sea temperatures and sea levels, the melting of glaciers and ice caps (which will also increase sea level) and greater extremes in weather patterns such as storms of greater intensity and longer droughts. Paradoxically, some parts of the planet may in fact become cooler, as wind patterns and sea currents shift their distribution. Temperatures in New Zealand have increased by 0.3-0.7°C since 1950.

6.1 AIR QUALITY

6.1.1 WHAT IS THE STATE OF AIR QUALITY IN TARANAKI?

The relatively windy and exposed nature of Taranaki, together with its dispersed population and the absence of heavy industry and high motor vehicle densities, means that the region enjoys naturally high standards of air quality. The main influence on regional air quality is natural – sea spray drift from our energetic coastline and volatile emissions from vegetation.

In the past the Council monitored key indicators of ambient, or overall, air quality in the region at up to 30 representative sites, including urban areas, rural and coastal areas and pristine areas. The indicators reflected emission sources of particular interest in those areas. These included: sulphur oxides, nitrogen oxides, carbon monoxide, formaldehyde, suspended particulates and inhalable particulates.

Monitoring was reported on in detail in the *2003 State of the Environment Report*[1]. The results, indicating high air quality, have reduced the need for extensive air quality monitoring, and therefore over the past five years the Council has scaled down the state of the environment monitoring programme and concentrated instead on compliance monitoring. Information below on the current state of air quality in the region is therefore largely summarised from the 2003 report with additional comments from compliance monitoring undertaken since then. The categories used to describe air quality, and recommended actions for each category, are set out in Table 6.1.

Monitoring air quality in Stratford.

1 Taranaki Regional Council, 2003. *Taranaki – Our Place, Our Future. Report on the State of the Environment of the Taranaki Region.*

Table 6.1: Categories of regional air quality[2].

	Action	Alert	Acceptable	Good/Excellent
Definition	Above the guideline	66-100% of the guideline	33-66% of the guideline	Good: 10-33% of the guideline Excellent: 0-10% of the guideline
Action required	Achieve guideline value within shortest possible timeframe; investigate and monitor comprehensively	Reduce further, where practicable, and monitor	Maintain, reduce where practicable and monitor periodically	Maintain and monitor occasionally

(A) CURRENT STATE OF AIR QUALITY

Particles

Fine particles may come from smoke, mining and abrasive blasting, volcanic activity, wind-blown dust, and sea spray. Fine particles are called inhalable particulate materials (PM10) and can adversely affect human health. These particles are too small to see (about 10 microns in diameter (microns are micrometres or one millionth of a metre). Five would fit across the width of a human hair. These fine particles can penetrate the body's natural defences against dust, and enter the lungs. There they are associated with loss of lung function, respiratory distress and disease.

As part of a national state of the environment monitoring programme established by the Ministry for the Environment, the Council undertook monitoring of inhalable particulates over the winter of 2003[3].

The monitoring showed that all results met the acceptable category, and 80% of samples met the good/excellent category (refer Table 6.1). One cluster of results showed higher than expected results – potentially influenced by nearby roading works. Removing these samples from consideration, the average concentration (over 24 hours) measured in New Plymouth across all measurements was 20% of the Ministry's guideline and so was rated as good (as per criteria in Table 6.1).

There was a strong influence from sea salt. The average levels of PM10 were 66% higher during on-shore winds than during off-shore winds.

These results were consistent with earlier monitoring reported on in the *2003 State of the Environment Report* that concluded that Taranaki air quality in relation to ambient levels of fine particulates is rated as good/excellent.

Sulphur dioxide

Sulphur dioxide is primarily generated from the combustion of fossil fuels containing sulphur (e.g. coal, diesel). It also occurs naturally during volcanic and geothermal activity. Sulphur dioxide can cause throat and eye irritation and trigger asthma attacks and bronchitis. Its acidity can also affect paint, building materials and vehicles.

Previous monitoring of sulphur dioxide, reported on in the *2003 State of the Environment Report*, rated ambient levels of sulphur dioxide in Taranaki as excellent. Subsequent consent monitoring undertaken by the Council has confirmed these findings.

Nitrogen oxides

Nitrogen oxides are products of fossil fuel combustion. In humans they can reduce the body's resistance to infections and can affect breathing. Nitrogen oxides are also toxic to plants and contribute to brown haze and photochemical smog.

Previous monitoring of ambient levels of nitrogen oxide, described in the *2003 State of the Environment Report*, rated levels in Taranaki as generally excellent. Subsequent consent monitoring undertaken by the Council has confirmed these findings. The highest emission levels of nitrogen oxide were recorded in the middle of the Kāpuni petrochemical complex, but air quality there still met the good category.

Formaldehyde

Formaldehyde is a product of fossil fuel combustion (e.g. from motor vehicles). A suspected carcinogen, it is known to irritate the eyes, skin and mucous membranes of the upper respiratory tract.

Again, previous monitoring of ambient levels of formaldehyde, rated levels in Taranaki in the areas of highest traffic flows as excellent.

Carbon monoxide

Carbon monoxide is a product of incomplete fossil fuel combustion, for example, in motor vehicles or home heating. Carbon monoxide can affect concentration and physical performance. Higher concentrations cause dizziness, aggravate heart conditions and can be fatal. The Ministry for the Environment guidelines are based on the need to protect sensitive or vulnerable people.

Screens enclose St Andrews Church spire in New Plymouth during restoration work.

2 Ministry for the Environment. 2002. *Ambient Air Quality Guidelines.*
3 Taranaki Regional Council. 2004. *Inhalable Particulate (PM1 toring Programme Report 2003 Technical Report 2003–99.*

Previous monitoring of ambient levels of carbon monoxide, reported on in 2003, rated levels in Taranaki as excellent. Subsequent consent monitoring undertaken by the Council has confirmed these findings.

Dioxins and other organochlorines

Dioxins and other similar organochlorine substances (e.g. polychlorinated biphenyls (PCB), the pesticides DDT, aldrin, dieldrin, chlordane and lindane, and chlorophenols) are products or by-products of organic chemical synthesis, use, and combustion. Such substances pose a risk to human health due to their toxicity, carcinogenic risk and potential effects on reproduction and immunological systems.

National studies on dioxins and other organochlorines confirm that concentrations from these chemicals are not a significant issue in Taranaki and that the risks to the environment and human health are negligible. Levels in Taranaki are generally much lower than many other places in New Zealand[4]. Median levels in rural Taranaki (Te Wera) were about one-quarter of those in urban areas and less than one-twentieth of those in major industrial areas.

Levels of organochlorine pesticides, and the wood preservative PCP, in rural Taranaki were similar to other pristine and rural sites around New Zealand, and up to eight times lower than the country's main urban centres.

(B) EMISSION SOURCES

Point source discharges

The number of air discharge consents held in Taranaki has increased from 230, reported on in 2003, to 306. Applications for new consents to cover emissions during hydrocarbon exploration activities continue to be significant in number (Figure 6.1). The number of consents for emissions from hydrocarbon exploration has increased over the past five years from 76 to 145. Only a few of these are exercised at any one time, and most companies continue to hold consents for exploration sites after the initial drilling, in case they wish to return and drill further exploration wells. The main potential effect of exploration emissions is from flaring (smoke, odour, soiling).

The past five years has seen a reduction in the number of consents for emissions from landfills (dust, odour, landfill gas) and from piggeries (odour). This follows closure of a number of municipal landfills and piggeries in the region.

Thermal power stations require air discharge consents. Nitrogen oxides are the main concern with thermal power emissions. Over the past five years consents have been granted for a second combined cycle station at Stratford, for emissions from a cooling tower at a 'peaking' station at Stratford (the main emissions from this station are covered by an existing consent), and a possible energy centre at Whareroa. The New Plymouth power station was closed in 2007, but partly reactivated in 2008. The air consent remains in force while an application for a second consent for this station for emergency firing of oil has been withdrawn.

Poultry farming continues to be a growth industry with a small increase in the number of consented emissions – odour and dust are the main concerns for these farms.

The National Environmental Standards for air quality[5] have forbidden the use of school incinerators unless a resource consent is held. Emissions from the incinerators give rise to concerns over products of incomplete combustion, smoke, and odour. Consequently, all schools in Taranaki (around 80) have ceased use of their incinerators having found better ways of managing their waste.

Unauthorised incidents

Air quality complaints recorded, and followed up, by the Council are another useful indicator of the state of air quality. The number of air incidents compared with the total number of other complaints is illustrated in Figure 6.2. It shows that the number of air pollution incidents has been relatively stable.

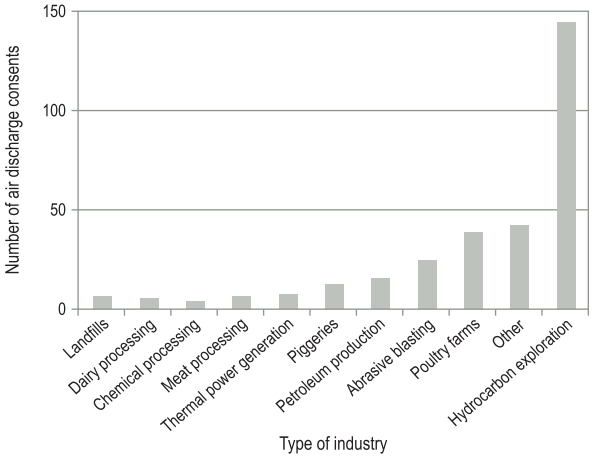


Figure 6.1: Air discharge permits held by industry type.

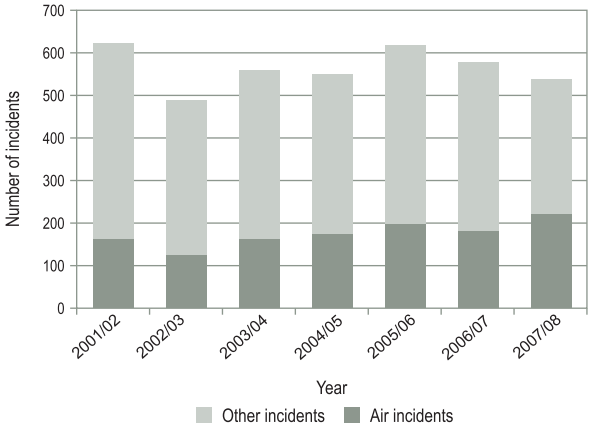


Figure 6.2: Number of air incidents over time compared to the number of incidents reported each year.

4 Ministry for the Environment, 1999. *Ambient Concentrations of Selected Organochlorines in Air.*
5 Resource Management (National Environmental Standards relating to certain air pollutants, dioxins and other toxics) Regulations 2004.

Table 6.2: Total number and top eight sources of air incidents from 2003-04 to 2007-08.

	2003-04	2004-05	2005-06	2006-07	2007-08	% of all air incidents 2003-04 to 2007-08
Total air incidents	162	176	199	182	222	
% of all incidents	29.0	31.9	32.2	31.5	41.1	
Abrasive blasting *dust*	7	8	10	10	7	4.5%
Fertiliser storage/use *dust, odour*	6	4	2	5	6	2.6%
Rendering *odour*	26	48	43	34	56	20.0%
Piggeries *odour*	8	5	14	16	17	5.5%
Poultry farming *odour*	2	11	2	6	15	5.3%
Dairy Farm *dust, odour*	5	3	29	13	9	5.7%
Vermiculture/composting *odour*	13	20	1	2	3	4.8%
Private housing	15	9	22	19	21	7.9%

Table 6.2 sets out the total number of air incidents over the past five years and shows the top eight sources of air incidents, which accounted for 56% or all air emission incidents over the period. The majority of air quality incidents relate to offensive odours. Other causes of complaint include suspended and deposited dust, smoke, and concern over toxicity or the type of smell.

Since the *2003 State of the Environment Report* landfills have ceased to be a source of emission complaints, with the extension of the New Plymouth landfill at Colson Road and the closure of the Stratford landfill. Complaints relating to specific meatworks and fertiliser works have also reduced, as have the number of complaints relating to poultry farming and composting. However, there has been a significant increase in the proportion of complaints generated by a rendering plant and an increase in the proportion of piggery-related complaints. Most sources of air quality complaints generate only one or two complaints in any one year. This suggests that the cause was just a one-off incident, or that follow-up action by the operator and Council resolved the cause of the complaint.

Diffuse sources

Diffuse sources are those that individually may not be significant in their immediate locality, but in combination with other identical sources or cumulatively across the region may impact upon air quality. Such sources include 'natural' sources such as the sea (suspended particulate and various chemical compounds), pasture (carbon dioxide and volatile organic compounds), the soil (dust, nitrous oxide), ruminant animals especially cows (methane), and bush (carbon dioxide and volatile organic compounds). Other sources include domestic heating by combustion (wood fires, gas heaters), the burning of vegetation on production land (carbon dioxide, organic compounds), and vehicles (nitrogen oxides, formaldehyde, carbon dioxide and other organic compounds).

By their nature it is extremely difficult to quantify the volumes of emissions from these sources. However, a study reported on in the *2003 State of the Environment Report* showed that diffuse sources far outweighed point sources in regard to emissions of contaminants in Taranaki[6]. Soil is the largest emitter of nitrous oxide (93% of the region's inventory), while plants emit significant quantities of non-methane hydrocarbons (97%) and other nitrogen oxides (27%). Animals are responsible for 99% of the region's methane emissions, while motor vehicles account for 71% of the carbon monoxide and 29% of the inhalable particulate. Home heating accounts for 56% of the inhalable particulate and 85% of the region's hydrocarbons.

Livestock emissions

In terms of trends in emissions from farm animals in Taranaki, the number of dairy cattle from 1996-2006 has decreased by 10%, from 531,953 to 479,238[7]. The number of beef cattle has decreased from 180,000 to 129,000 - a decrease of 28%, and sheep numbers fell from 874,000 to 688,000, or 21%[8]. Thus overall, emissions from animals have fallen.

Vehicle emissions

The number of vehicles that each Taranaki household has access to has substantially increased from 51,300 in 1996 to 60,900 vehicles in 2006, a 19% increase[9]. The number of households with access to one vehicle has fallen by more than 2,000 households, but the number of households with access to two vehicles has increased by 2,500 and the number with access to three or more vehicles has risen by 2,200.

6 Kuschel, G and Petersen, J, 2000. *Air Emissions for the Taranaki Region in 1998.* Prepared by NIWA for the Taranaki Regional Council.
7 LIC New Zealand Dairy Statistics.
8 Statistics NZ.
9 Statistics NZ.

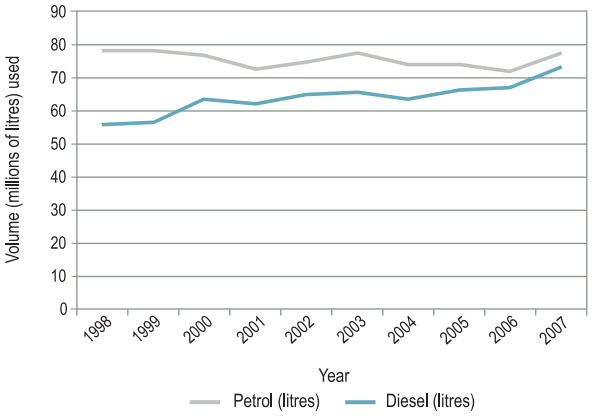


Figure 6.3: Annual volumes of petrol and diesel used in Taranaki.

Over the past decade petrol use in the region has remained constant, with an average of 77.9 million litres used annually in the two-year period 1997-99 and an average of 74.6 million litres used annually over the 2005-07 period (Figure 6.3).

However, diesel use has increased 25% in the same period, from an average of 56.4 million litres used a year in 1997-99, to an average of 70.1 million litres used annually in 2005-07. In the 2006-07 year, the highest volume of diesel was used to date (73.2 million litres). Diesel fuel is associated with emissions of sulphur dioxide and particulate matter. While the sulphur content of New Zealand fuel diesel has been reduced recently, it is still higher than for petrol.

Household heating emissions

The method used for household heating can cause different levels of air emissions. The use of solar energy, electricity, or gas is better for local air quality than coal or wood. Changes in methods used to heat households within the Taranaki region from 1996 to 2006 are shown in Table 6.3.

Almost all of the shift from electricity to wood for heating purposes has occurred within the past five years. To comply with the 2004 National Environmental Standards for air quality, almost all wood burners on the market now comply with the certification standard for efficiency and reduced air emissions, thus reducing the adverse air quality effects (when compared with gas or electricity) of burning wood.

While there has been a fall in the number of households using mains gas, the number of households using bottled gas has risen sharply (more than matching the decline in use of electricity and mains gas combined). This suggests that the connection costs of mains gas are acting as a disincentive to its continued use. Indoor air quality can suffer with the use of bottled gas unless it is properly exhausted to the outside.

The use of coal in the region has declined sharply (the biggest fall in percentage terms of any method of household heating), and the use of solar heating has increased sharply (the biggest uptake in percentage terms of any method of heating). From the perspective of local air quality, both these trends are to be welcomed. However, in both cases the number of households concerned is small in absolute terms.

6.1.2 HOW IS AIR QUALITY MANAGED IN TARANAKI?

(A) THE REGIONAL AIR QUALITY PLAN

The *Regional Air Quality Plan for Taranaki* was made operative in 1997. The plan has a 10-year life and is therefore now undergoing a process of review. The existing plan contains policies, methods and rules for addressing air quality management, with the objective of maintaining and enhancing air quality in the region.

The plan contains rules setting out environmental standards and conditions for all industrial and trade premises (including intensive pig and poultry farming and waste management processes), agrichemical spraying on farmland and public amenity areas, and burning. The plan also contains codes of practice for piggeries and poultry farming, agrichemical spraying, vegetation burn-off and industrial process chimney heights.

Rules in the plan provide for special consideration to be given to protect areas particularly sensitive to discharges to air (e.g. residential areas, parks and reserves or wāhi tapu sites). Some activities such as the burning of waste oil and tyres and burning at landfills – activities that are potentially significant source of dioxins – are prohibited.

The new plan is likely to reflect advances in technology and improved industry practice, the 2004 National Environmental Standard for air quality, and increasing knowledge and awareness of the implications for human health of air pollution from various sources. For example, it is now considered that no 'absolutely safe' concentrations exist for contaminants such as inhalable particulate matter and dioxins. Therefore future air quality management will focus on reducing levels of these to the lowest practicable level, even if existing air quality is otherwise already generally good.

Table 6.3: Trends in methods of home heating 1996-2006.

Method	Elect	Gas Mains	Gas Bottled	Wood	Coal	Solar	None	Total households
% change from 1996	-5.7%	-7.4%	+43%	+6.5%	-22%	+51%	+31%	1996 38769
Number change from 1996	-1254	-1131	+2781	+1092	-309	+124	+138	2006 40281 (+3.9%)

(B) NATIONAL ENVIRONMENTAL STANDARD

National environmental standards for air quality were established in 2004[10]. These regulations apply across the whole of New Zealand and set receiving environment limits for several toxic gases. They ban outright the burning of tyres, landfilled wastes, bitumen, and coated wire, and oil in open air. They ban the use of incinerators at schools unless resource consent has been granted, and they ban the operation of high-temperature incinerators (other than crematoria and the incinerator used by Dow AgroSciences in New Plymouth). Wood-burner heaters on residential sections and small lifestyle blocks are allowed only if certified as meeting a particular standard.

(C) RESOURCE CONSENT MANAGEMENT

As described above, 306 air discharge consents are currently held in Taranaki. Figure 6.4 illustrates the number of air consents granted since 1997. The large numbers of consents granted in 1997-98 were due to consents being required for certain industries once the *Regional Air Quality Plan for Taranaki* became operative (largely for piggeries and poultry farms). 2004-05 was an especially busy year for air discharge consents from the hydrocarbon exploration industry.

The Council assesses the effects of air discharges and places conditions on consents to control effects on the environment. Applicants are advised to consult with affected parties, including tangata whenua, and these parties are involved in the consent process and in discussions on consent conditions.

The resource consent process has enabled the Council to promote significant upgrades in emission controls or production technologies used by major air discharge permit holders. These improvements have involved significant investments in emission controls or production technology. Over the past five years, region-wide capital investment in air quality control almost doubled from $14 million (1997-2002) to $27.5 million (2002-07)[11]. Such investment has included the installation of biofilters and new driers at rendering plants in Taranaki to reduce odour emissions, the installation of wet scrubber systems at dairy processing/manufacturing plants and engineering sites to reduce odour and dust emissions and the upgrade of a gas turbine for electricity generation to reduce CO_2 emissions.

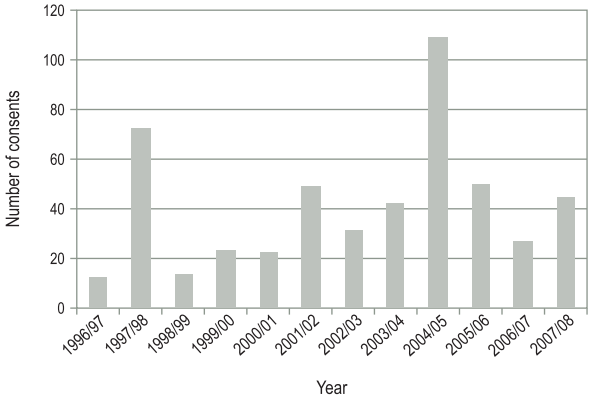


Figure 6.4: Number of air discharge permits granted over the past 10 years.

(D) MONITORING

When the Council grants a consent for a significant activity, it implements an annual compliance monitoring programme to ensure the consent holder meets the conditions set out on the consent. These conditions usually relate to the manner of operation, the quality of the discharge, and the permitted extent of effects in the receiving environment. In the 2007-08 year, the Council undertook 51 individual monitoring programmes that had an air quality component. Sites included sewage plants, petrochemical and petroleum production facilities, landfills, composting and vermiculture sites, milk factories, metal smelting and galvanizing plants, meatworks, rendering plants, wood and coal-fired boilers, fertiliser storage and distribution centres, asphalt plants, feedmills, abrasive blasters, quarries, crematoria, agrichemical formulation facilities, piggeries, poultry farms, and gas-fired power generation stations. In some cases a monitoring programme will incorporate multiple sites within a single catchment programme for efficiency.

The Council employs a variety of techniques for air quality monitoring, including inspections of process and operational records, odour surveys, public odour diaries, stack (discharge) sampling for suspended dust and chemical constituents, deposition monitoring, ambient (downwind) gases and particulate monitoring, and video recording (e.g. of smoke and dust sources and cooling tower plumes). In the 2006-07 year the

There has been a significant increase in the poultry industry in Taranaki.

The Vector Kāpuni gas treatment plant.

10 Resource Management (National Environmental Standards relating to certain air pollutants, dioxins and other toxics) Regulations 2004.
11 Wu, J; Sanderson, K. 2008. *Community Investment in Environmental Improvements in Taranaki*. Prepared by Business and Economic Research Limited for Taranaki Regional Council.

Calibrating nose sensitivity.

THESE NOSES KNOW WHAT A BAD SMELL IS

If you complain about an offensive odour in Taranaki, not just any old nose is likely to investigate.

Taranaki Regional Council inspectorate and technical staff have had their noses calibrated to allow them to make objective assessments of odour complaints.

The noses thus measured include that of Compliance Manager, Bruce Pope, who was found to be in the mid-range rather than having a highly sensitive nose or a 'dead' one.

"The calibration involves a two-hour test in which the nose is exposed to gradually increasing amounts of n-butynol gas," Bruce said. "The odour laboratory staff at Lincoln Ventures Limited, based at Lincoln University in Canterbury, can assess and calibrate nose sensitivity from the sniffer's reaction."

Odour panellists can generally detect the n-butanyl at between 20 and 80 parts per billion. With nose calibration certified, Council staff are able to offer odour-intensity evidence of a standard acceptable in a court of law.

Geoff Warren, of Lincoln Ventures, said it could be useful to have a range of nose sensitivity among a group of environmental inspectors. "Line up several calibrated individuals around an odour nuisance site and while Bruce may represent the 'average' individual, it may be that even the less sensitive nose can detect the odour, or that it appears very strong even to the more sensitive person."

Of the 540 environmental incidents investigated by Taranaki Regional Council officers in 2007-08, a total of 222, or 41%, related to air quality. A quarter of these centred on meat and by-product processing operations and around 10% related to activities at private houses. Other complaints involved piggeries, poultry farming and building construction.

"When we get a complaint about odour, we look at its source and do a 360-degree check around the site to get an idea of the characteristics," said Bruce. "We also look at how people nearby are reacting to it."

He said it was a good idea to keep an 'odour diary' if you were experiencing repeated problems from the same source.

Bruce said most incidents were resolved without the need for enforcement action. "Very often, we find that people become so de-sensitised to the odour at their workplace that they are completely unaware of how offensive it is to others."

Council undertook approximately 170 analyses of air in conjunction with site-specific compliance monitoring. 42% of all sites monitored under a site-specific programme achieved a high level of environmental performance and consent compliance, while another 51% showed a good level i.e. 93% of all sites had, at worst, a minor (short-term and inconsequential) environmental effect, and a positive and co-operative attitude towards compliance.

In the *2003 State of the Environment Report* it was noted that 80% of all sites were achieving a 'good' or 'high' level of environmental performance. Despite increasingly stringent consent conditions, the overall compliance and environmental performance of consent holders has improved in the past few years. Nineteen out of 20 consent holders operate their activities well in any year.

(E) RESOURCE INVESTIGATIONS

In April 2005 and again in April 2006, Council staff conducted visual surveys of the eastern ring plain to determine the environmental significance of the burning of vegetation on production land. In particular, farmers may burn stubble from forage crops and trimmings from shelter belt pruning and tree clearance. While on most surveys one or two fires could be observed, the practice was not so widespread or offensive that regulatory intervention was required.

(F) UNAUTHORISED INCIDENTS

When consent holders advise the Council of unauthorised emissions, or complaints are received from the public, or inspections show that consent conditions or rules in the *Regional Air Quality Plan* are breached, Council staff assess the incident and seek to resolve the situation in conjunction with the responsible party involved. Enforcement action is taken where appropriate. Enforcement action may involve the issuing of abatement notices, infringement notices and/or prosecution. Incidents are recorded on the Council's register.

(G) INFORMATION, EDUCATION AND ADVICE

Information and advice are intended to raise awareness of issues and problems and provide simple cost-effective solutions enabling resource users to make well-informed decisions that prevent or minimise the effects of emissions that impact on air quality.

Table 6.4: Summary of progress implementing objectives and policies on air quality.

Issue	What do we want to achieve?	What are we doing about it?	Where are we at?
• Loss of air quality when contaminants are discharged • Emissions from industrial and trade premises • Unwanted effects of using agrichemicals • Unwanted effects of burning vegetation • Emissions from domestic sources • Emissions from vehicles	• Maintenance and enhancement of Taranaki's existing high air quality. • Dealing with effects involving health risk, offensiveness, and other effects. • Provision of special protection to human health, enjoyment, sensitive ecosystems, sensitive areas, crops and animals, and other important places. • Management of use of agrichemicals. • Reduction in the possibility of smoke affecting people and soiling property. • Reduction in effects on people and property.	• Implementing the *Regional Air Quality Plan* 1997 • Issuing and monitoring resource consents for discharges to air. • Requiring improvements in process and abatement technologies through resource consent processes. • Monitoring the general air quality in Taranaki including in pristine, rural and urban areas and high traffic movement areas. • Monitoring air pollution events in Taranaki and their causes. • Providing information and advice. • Monitoring the number of air discharge permits for agrichemical application and complaints caused by their misuse. • Advocating improvements in vehicle emissions.	• Preparing for review of *Regional Air Quality Plan* in 2008 • Taranaki's air quality is rated 'excellent' according to MfE categories. • Significant improvement made in process and pollution abatement technologies. • Resource consents monitored. 93 % of air permit holders routinely achieve a 'good' or 'excellent' performance (up from 80% in 2003). • Air pollution events monitored, causes investigated and actions taken. • Information and advice provided and guidelines prepared. • Advocacy undertaken on air quality issues. • Few problems experienced with agrichemical use over the past six years. • Fuel usage monitored.

The Council has produced:

- a guide to the requirements of the *Regional Air Quality Plan for Taranaki* for all farmers in the region. The guide covers effluent disposal, burning, spraying, fertiliser applications and pig and poultry farming;
- information on air quality included in its *Environmental Management Guide* for businesses and industries;
- guidelines for spray painters, commercial kitchens, and the design and operation of small domestic and school incinerators;
- guides for small industry and the oil and gas industry on plan requirements; and
- information on its web pages.

The public notification of the *Proposed Regional Air Quality Plan* will be accompanied by a publicity campaign.

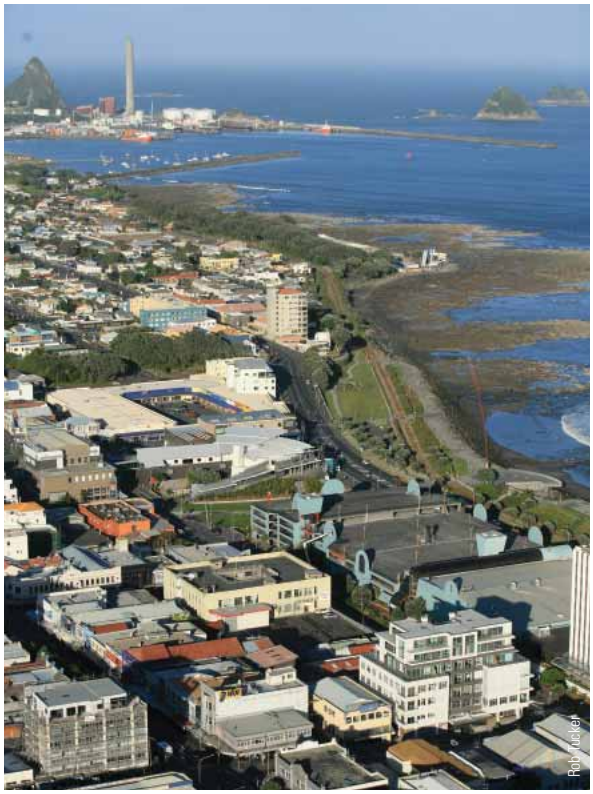
(H) SUMMARY OF PROGRESS

A summary of progress, assessed against the issues and desired outcomes set out in the *Regional Air Quality Plan*, is provided in Table 6.4.

6.1.3 HOW DOES TARANAKI AIR QUALITY COMPARE?

In the national study on levels of particulate material described above, the air in New Plymouth (taken as representative of the air across the ring plain of Taranaki) was shown to be excellent to good according to the categories used by the Ministry for the Environment.

In terms of the effects of air quality upon human health, a study released in 2007 has established that Taranaki is one of the healthiest regions in New Zealand[12]. The study assessed and quantified the health risks due to exposure to air pollution in 67 urban areas of New Zealand, covering



Clear sky over New Plymouth.

73% of the country's population. New Plymouth and Hāwera were two of the areas investigated.

The study found that air pollution-related deaths varied from a rate of 0.18 per 1,000 people per year in New Plymouth (low pollution levels

12 Ministry for the Environment, and Ministry of Transport. 2007. *Health and Air Pollution in New Zealand,* Joint report for Health Research Council of New Zealand.

due to its very exposed location) to a rate of 0.74 per 1,000 people in central Christchurch (due to its sheltered meteorology and high rate of wood burner use). Nationally, one in 20 people (4.8%) die earlier than they would have because of air pollution compared to one in 30 people (2.9%) in New Plymouth or one in 9 people (11.8 %) in Christchurch.

Of the 67 urban centres studied, Hāwera also made the top 10 in terms of low air pollution-related mortality, behind New Plymouth with the lowest.

Nationally, the greatest single cause of premature mortality is fine particulate levels (sourced from combustion). It is estimated that each year an average of 1,100 people die prematurely due to exposure to air pollution across New Zealand.

Under the national environmental standards, regional councils are obliged to establish air management areas or airsheds for areas that do not meet the ambient air quality criteria stipulated in the standards. Forty-two such airsheds have been created around New Zealand. Along with Gisborne, the Taranaki region is one of only two in New Zealand that have not had to gazette an airshed. The region is in this position because of its high air quality.

Nationally, about 53% of New Zealanders live in areas that from time to time do not meet ambient air quality standards, primarily because of emissions from vehicles and from coal and wood used for home heating[13]. Main centres such as Auckland, Hamilton, Christchurch and Dunedin all have poor air quality. The main pollutant of concern is inhalable particulate materials. As noted above, in Taranaki the main source of such particles is sea spray, and Taranaki's air is rated good to excellent with respect to this pollutant.

Nationwide, 44% of homes burn solid fuels (wood and coal) for home heating. This is the same level as in Taranaki.

6.2 GREENHOUSE GASES AND CLIMATE CHANGE

6.2.1 WHAT IS THE STATE OF GREENHOUSE GASES IN TARANAKI?

Greenhouse gases include carbon dioxide, methane and nitrous oxide, which have the ability to trap infra-red energy that would otherwise be radiated off the Earth's surface into the atmosphere. These gases originate from industry, wastes, farming and fuel.

(A) CHANGES IN EMISSIONS

Industry

The level of emissions from industry varies year by year, especially in the energy sector in those years when gas-fired power stations are used to make up the shortfall in generation from other generators, such as hydropower stations.

The New Plymouth power station was a 600 MW capacity station operating on gas. When operating at a capacity of 75-80%, the station would have emitted 2.4 million tonnes of carbon dioxide annually. In 2007, Contact Energy announced the permanent closure of the station, although in 2008 parts of the station were temporarily used for emergency electricity generation.

A 200 MW gas turbine station at Stratford was closed in August 2001 and subsequently dismantled. In 2007 Contact Energy announced that it would build a new high efficiency open cycle gas turbine peaking station of 200 MW generation capacity on the site. Peaking stations are not generally intended for continuous operation but rather only for short-duration operation to satisfy demand at peak periods or to provide cover for the country's hydropower stations during periods of low hydro storage. Assuming a 40% load factor for the 200 MW power stations (i.e. recognising that they were/are not baseload stations), the old power station would have emitted 560,000 tonnes of carbon dioxide per year, and for the same load factor, the new station will emit 350,000 tonnes per year, a reduction of 210,000 tonnes per year (38%).

Methanex owns two methanol plants in Taranaki, located in the Waitara Valley and at Motunui. The two sites would have emitted 0.5 and 1.6 million tonnes of carbon dioxide per year, respectively. The Motunui site was closed in 2004, with limited production continuing at Waitara Valley. In 2007 Methanex announced its intention to refurbish and re-open half the capacity of the Motunui site during 2008. The intention is that the Waitara Valley site will be closed. The net change in combined maximum annual emissions will be a reduction from 2.1 million tonnes to 0.64 million tonnes.

Hydrocarbon production stations use natural gas as a fuel for on-site energy requirements, and as a purge gas burnt from flares as a plant safety procedure. Gas may also be discharged during plant trip-outs or if unsaleable (e.g. LPG from time to time). Over the past 15 years, the hydrocarbon production and treatment plants in Taranaki have reduced carbon dioxide emissions by reducing everyday flaring, recovering more hydrocarbon fractions as sales stock, and improving plant stability. For example, at one production station annual CO_2 emissions have been reduced 85% since 1996, and at another, 55% since 2001.

Methanex methanol plant and the Pohokura production station in foreground, Motunui.

13 Ministry for the Environment, 2007. *Environment 2007.*