Sustainability Chapter Air Quality
Annual Temperature and global warming in Scotland

Data for Scotland was provided by Scottish Executive website and the Met Office.

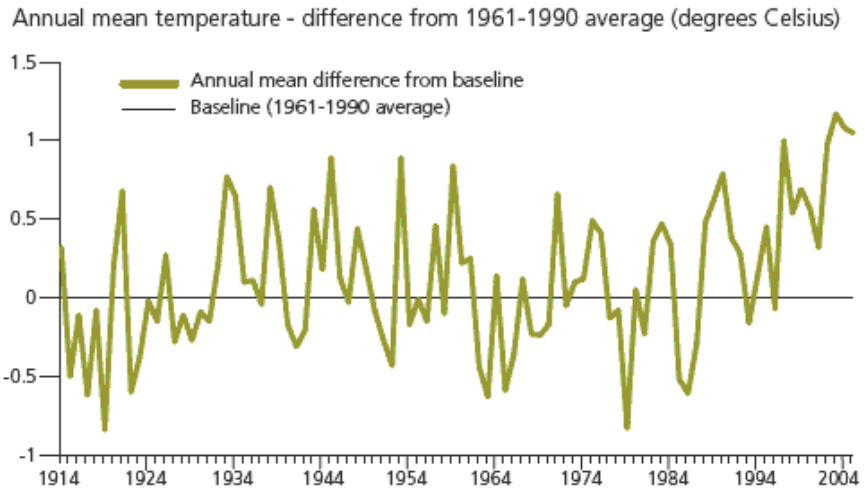
The global average surface temperature has increased over the 20th century by about 0.6°C [1]. The 2003, 2004, 2005 and 2006 temperatures for Scotland are the highest since the record began in 1914. By the end of the century, temperatures in Scotland are predicted to increase by up to 3.5°C during the summer months and around 2.5°C during the winter. Whilst the global impacts of climate change are immense, there are also wide-ranging implications for Scotland. These include increased flood risk, and impacts on water resources, agriculture, transport, tourism and disease; all of great economic, social and environmental importance.

The balance between incoming solar energy and outgoing infrared radiation determines the earth's temperature. Changes in the amount of energy retained within the atmosphere affects global climate, which naturally exhibits long-term fluctuations. Current climate trends are unlikely to be entirely natural in origin however, and there is now evidence that human activities are having a discernible impact on the global climate[i].

Over the period 1901-2000, the change in mean global surface temperature explained by a linear trend is 0.57°C. Similarly, a linear trend through the Scottish temperature series for the period 1914-2005 indicates an average annual increase of 0.006 degrees Celsius, or 0.6 degrees Celcius each 100 years. Annual temperature for each of the last three years is higher than for any other year during this period. By 2100, temperatures in Scotland are predicted to rise by 3.5°C during the summer months and around 2.5°C during the winter months[ii] (Figure).

Figure 1

Annual Variance in Mean Temperature in Scotland : 1914-2005



Source: Met Office

Air Quality and Health

Air quality defined by particulates, ozone, sulphur dioxide and nitrogen dioxide[1].

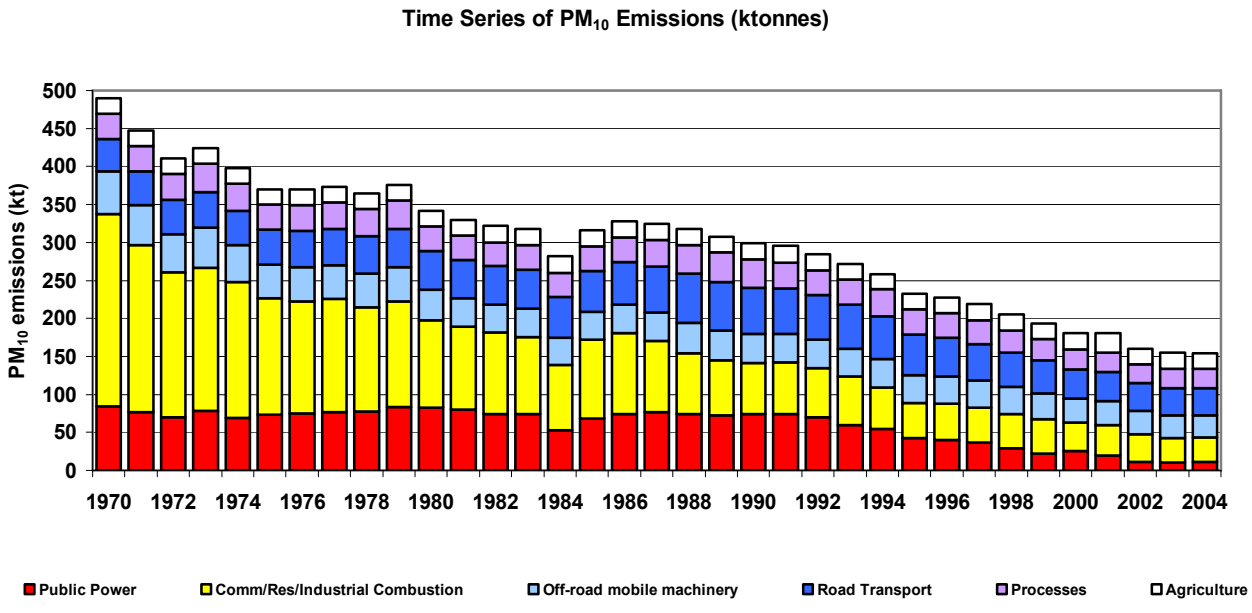
Particulates

Primary particles are emitted directly into the atmosphere by combustion processes, and are generally very small (less than 2.5um diameter and often less than 1um). Secondary particles are those which are formed in the atmosphere from chemical reaction and include sulphates and nitrates formed from the reactions of emissions of SO2 and nitrous oxides (NOx). These secondary particles are generally less than 2.5 um diameter, but the size could vary depending on humidity. The third category is the so-called coarse fraction, which are formed from mostly non-combustion sources (*e.g.* quarrying). Particles can vary widely in size and composition.

PM10 The PM10 (particles measuring 10µm or less) standard was designed to identify those particles likely to be inhaled by humans and to enter deep into alveoli, thereby potentially impacting on health. PM10 has therefore become the generally accepted measure of particulate material in the atmosphere in the UK and in Europe. The main sources of primary PM10 are road transport (all road transport emits PM10, but diesel vehicles emit a greater mass of particulate per vehicle kilometre), stationary combustion (domestic coal combustion has traditionally been the major source of particulate emissions in the UK) and industrial processes (including bulk handling, construction, mining and quarrying). Emissions of PM10 from the UK have declined since 1970. This is due mainly to the reduction in coal use. Domestic and commercial emissions have fallen from 263 kilotonnes (54% of the total emission) in 1970 to 41 kilotonnes (27%) in 2004 (Figure 2).

Figure 2

Time trends for mean levels of PM10 emissions in Scotland, by source and by year, 1970- 2004, provided, with their permission, by the UK NAEI (www.naei.org.uk/pollutantdetail.php).



[1] Data for Scotland was obtained from NAEI and the Air Quality Scotland websites.

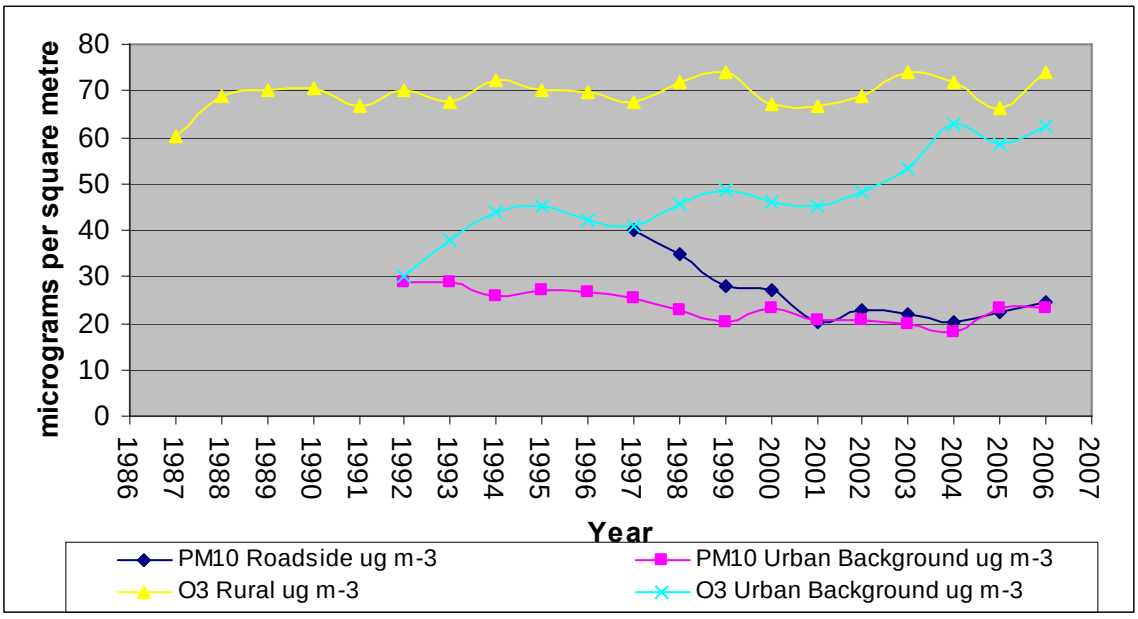
Ozone

Ozone in the stratosphere is essential to human health as it protects us from UV, whereas ozone at ambient levels is a pollutant that is harmful to health. Ozone is a gas which has an irritant effect in high concentration on the surface tissues of the body, such as eyes, nose and lungs and can damage vegetation and materials. Consequently, near the earth's surface ozone and ozone precursors are important pollutants. Ozone emissions are not estimated by the National Atmospheric Emissions Inventory (NAEI) as the direct emissions are not significant compared with photochemical formation of ozone in the air from ozone precursor pollutants (NOx, CO and NMVOC). Estimating ozone concentrations in the troposphere requires modelling, and information on emissions of ozone precursors. Consequently there is a need for emission estimates of ozone precursors.

The provisional trends for PM10 and ozone to 2006 in Scotland are shown in Figure 3. It can be seen that on average the concentrations of ozone in Scottish rural areas appear to be showing a gradually increasing trend, perhaps related to the recent warm summers. This reflects ozone pollution from all of Europe, including the UK, being blown downstream and accumulating in rural environments where there are less nitrogen oxides to bind with it (to form NO2). In urban background areas the increase is much more dramatic as concentrations of total NOx are decreasing as a result of increasing use of catalytic converters on cars and there is now relatively less NOx to bind with. Ozone in these areas is rising and is now much more similar to the rural concentrations which is of great concern for public exposure to this pollutant. PM_{10} particulate concentrations provided by Air Quality Scotland show a decrease up until 2004, but then an apparent slight increase over the most recent years. As for NO_2, these trends should be treated with caution up until 2001 due to the relatively small number of monitoring sites in Scotland.

Figure 3

Scottish time trends for particulates and ozone: 1) All Site Average Gravimetric PM10 Annual Mean for urban background and roadside and 2) Mean Ozone for urban and rural areas, for 1986 to 2006, data provided by Air Quality Scotland www.scottishairquality.co.uk/trends.php.



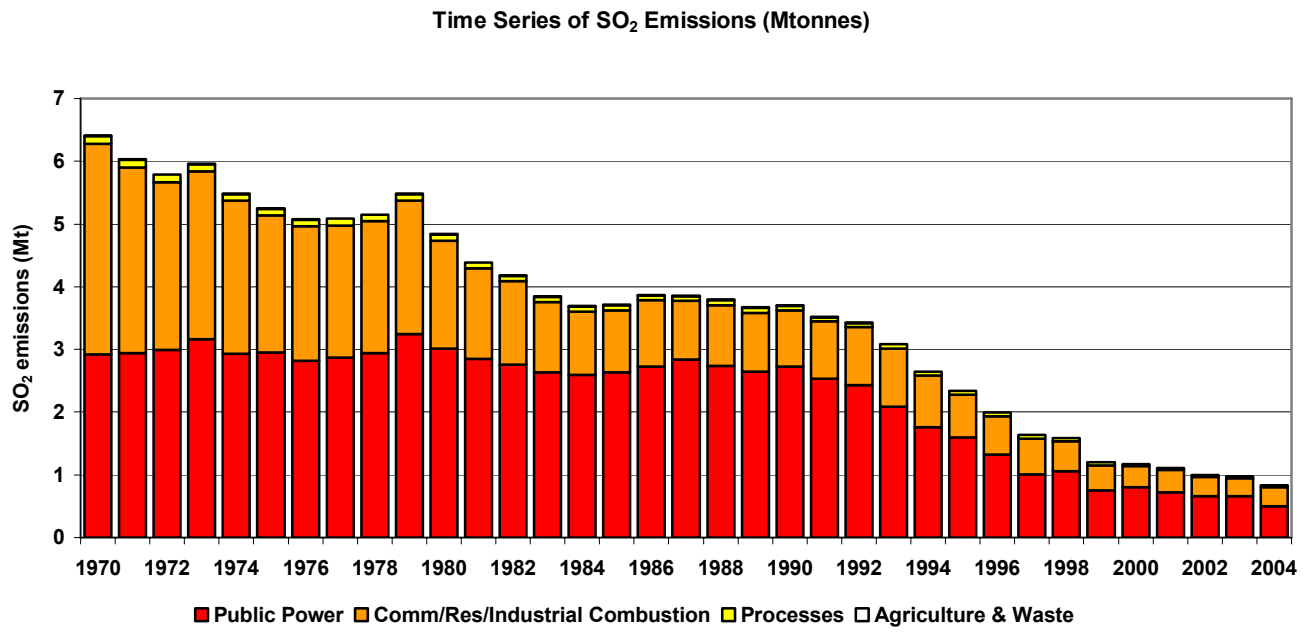
SO2 Sulphur dioxide

Data for Scotland was provided by NAEI

Historically, the introduction of Smoke Control Areas under the Clean Air Act has had a strong influence on the reduction of SO2 in urban areas. Since 1970 there has been a substantial overall reduction of more than 87% in SO2 emissions. The emission profile exhibits a steady decline between 1970 and 2004 with the exception of small peaks in 1973 and 1979 corresponding to the harsh winters in those years and a short period at the end of the 1980s when emissions were relatively constant from year to year. The two main contributors are solid fuel and petroleum products. Emissions from solid fuel use have declined by 84% since 1970 and those from petroleum by 95%. The most important factors in the fall in emissions from petroleum use are the decline in fuel oil use and the reduction in the sulphur content of gas oil and DERV (fuel for diesel engine road vehicles). The reduction in the sulphur content of gas oil is particularly significant in sectors such as domestic heating, commercial heating and off-road sources where gas oil is used extensively.

Figure 4

Time trends for mean levels of SO2 emissions in Scotland, by source and by year, 1970-2004, provided, with their permission, by the UK NAEI (www.naei.org.uk/pollutantdetail.php).



NO2 Nitrogen oxides

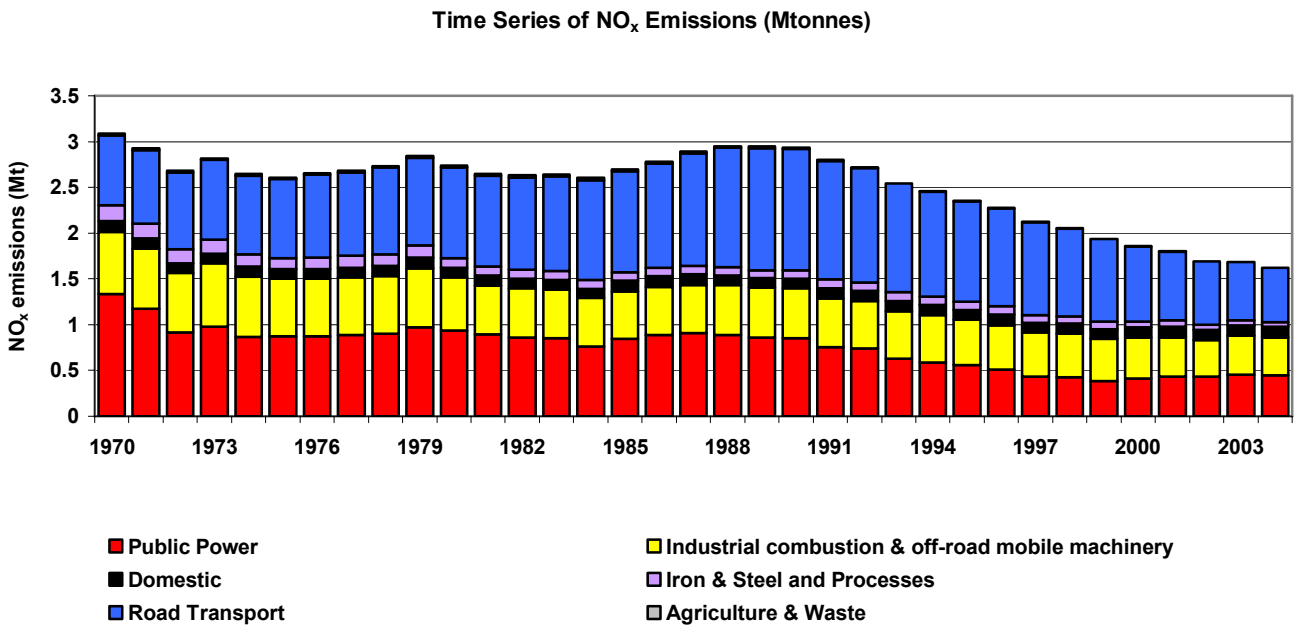
Data for Scotland was provided by NAEI and Air Quality in Scotland

The major source of nitrogen oxides (NOx) emissions in the UK is the road transport sector which overall contributes 37%, on average, to the total emission. In urban areas, this percentage might be much higher approaching 75% in Glasgow. Combustion processes also

provide a significant contribution, although such emissions are complex since the nitrogen can be derived from both the fuel and atmospheric nitrogen. Since 1970, overall NOx emissions have decreased by 47%, although this decrease has not been constant (see plot in Figure 5 below). Up to 1984 the NOx emission profile was relatively flat with small peaks in 1973 and 1979 which were largely due to the cold winters in those years, as for SO2. From 1984, emissions rose markedly as a result of the growth in road traffic, reaching a peak in 1989. Since 1989, total NOx emissions have declined by 45% as a result of a 55% decrease from road transport, due to the introduction of catalytic converters and stricter regulations and a 55% reduction from power stations.

Figure 5

Time trends for mean levels of NO2 emissions in Scotland, by source and by year, 1970-2004, provided, with their permission, by the UK NAEI (www.naei.org.uk/pollutantdetail.php).



Air Quality in Scotland also provides plots for annual mean trends for NO_2 at Roadside+Kerbside and background sites. Figure 6 shows a long-term decline in nitrogen dioxide concentrations in urban areas. Data prior to 1998 should be treated with caution due to the smaller number of monitoring locations.

Roadside and Kerbside NO_2

NO_2 monitoring is performed either at roadside or at kerbside, the precise locations differing[2].

2 Roadside monitors are placed at sites with sample inlets between 1m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5m of the kerbside. Sampling heights are within 2-3m. Kerbside monitors are placed at sites with sample inlets within 1m of the edge of a busy road. Sampling heights are within 2-3m.

In 2006 the calculation was based on 11 monitoring sites in 8 different conurbations. This will continue to increase as additional stations are added to the Scottish Air Quality Database in future years. Although the plot shows a trend downwards in average concentrations, this is mainly due to the fact that prior to 2001 Glasgow Kerbside was the only site available. The indicator only decreases significantly in 2001 and 2002 because of the inclusion of the Dumfries and Inverness sites, which have much lower concentrations than Glasgow kerbside.

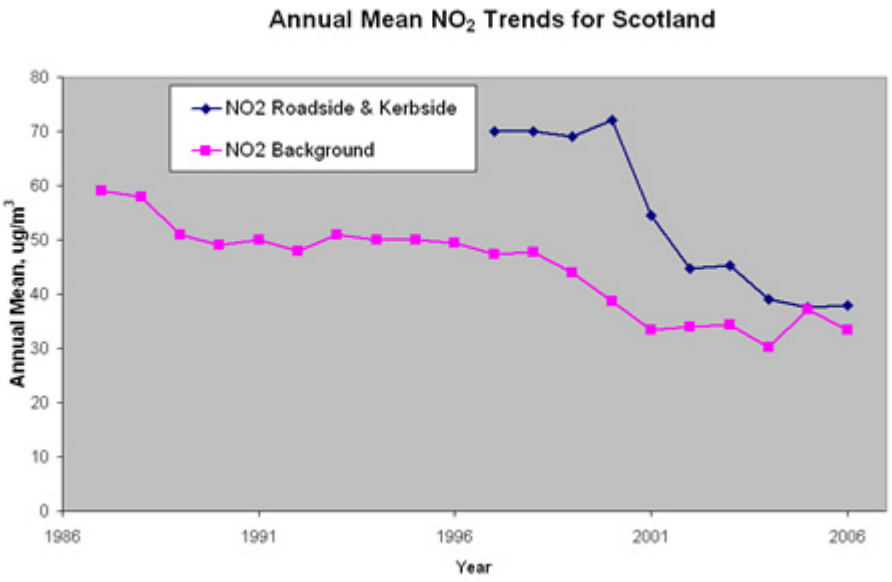
As the number of sites available increases, the indicator will become much less dependent on the inclusion (or exclusion) of any particular site and hence will become more robust.

Urban Background NO_2

Again, although the graph shows a downward trend the number of available monitoring sites for this analysis was very low in the early years (increasing to 9 sites in 2006). The influence of adding sites is demonstrated in 2005 where the apparent increase in average concentrations was primarily due to the inclusion of the Aberdeen Market St and Union Street sites – which have relatively high concentrations.

Figure 6

Annual mean NO2 trends for Scotland, for roadside and kerbside combined, and for background obtained from Air Quality Scotland website www.scottishairquality.co.uk/trends.php.



The evidence on Health effects of air quality

In 2000, the Committee on the Medical Effects of Air Pollution (COMEAP) published advice for the public about the effects on health of air pollution. COMEAP advised that air pollution can worsen the condition of those with heart or lung disease and that air pollution can aggravate, but does not appear to cause, asthma. In the longer term, COMEAP concluded that air pollution probably has additional effects on individuals, including some reduction in average life expectancy, though the extent of this was not fully understood at the time.

Importantly, the advice pointed out that people can improve the air in their homes by not smoking; maintaining heating appliances; and ensuring adequate ventilation. It also advised about the existence of information about levels of air pollution made available on CEEFAX/TELETEXT, the internet and on a freephone helpline, thereby allowing asthmatics who find they are affected to adjust their medication as they would for other triggers; people to minimise their exposure if levels are high by avoiding vigorous exercise or avoiding busy roads; people to use their car less to reduce everyone's exposure; and people to monitor progress of policies to reduce pollution.

COMEAP also advised that people are less likely to get the diseases which would make them more susceptible to air pollution if they don't smoke, eat lots of fresh fruit and vegetables and get plenty of exercise.

Reassuringly, the advice also pointed out that, as a result of international agreements, Government regulations and action by local authorities, the Environment Agencies and industry, air pollution levels in the UK were in general decline, though still a cause for concern at specific times.

The most recent work conducted by COMEAP now reports that there is little doubt that long-term exposure to air pollutants has an effect on mortality and thus decreases life expectancy[3]. It suggests that particulate air pollution, in particular, has a greater effect on mortality in the UK than previously thought, with a 10 µg m-3 increase in fine particles being associated with a 6% increase in risk of death from all-causes. The latest evidence for the effects of long-term exposure to sulphur dioxide, nitrogen dioxide, carbon monoxide and ozone on mortality is also discussed but is felt to be weaker than that regarding particles. Another draft report recently published by COMEAP confirms that the role of chronic exposure to ozone in causing ill health is less clear[4]. Mathematical modelling is underway to predict the potential impact on mortality and life expectancy of specified reductions in concentrations of air pollutants. COMEAP's website states that there is also evidence suggesting effects from air pollution on morbidity and these will be the subject of a future report.

COMEAP also published a report in 2006 on the relationship between air pollution and cardiovascular disease[5]. This concluded that there is a clear causal link between both daily and long-term average concentrations of air pollutants and effects on the cardiovascular system, including risk of sudden death and hospital admission for acute cardiac events. It also concluded that it was impossible to be certain which components of the ambient pollution mixture are responsible for these effects but that it was likely that fine particles play an important part. There are two major hypotheses for how particles might cause acute cardiovascular events and death, neither of which have been conclusively proven. One relates to inflammation deep in the lung that causes a thickening of the blood and the other relates to reflex effects on the autonomic control of the heart. Both are based on the fact that tiny

[3] Long-Term Exposure to Air Pollution: Effect on Mortality. A Report by the Committee on the Medical Effects of Air Pollutants (COMEAP), Draft Report for Comment published on: www.advisorybodies.doh.gov.uk/comeap/statementsreports/longtermeffectsmort2007.htm and accessed 7 August 2007.

[4] The Effects on Health of Long-Term Exposure to Ozone. published on www.advisorybodies.doh.gov.uk/comeap/statementsreports/longtermeffectsmort2007.htm and accessed 7 August 2007, Draft chapter from 'Ozone in the UK: Health Implications' to be published by COMEAP in the coming months.

[5] Cardiovascular Disease and Air Pollution: A Report by the Committee on the Medical Effects of Air Pollution (2006). http://www.advisorybodies.doh.gov.uk/comeap/statementsreports/CardioDisease.pdf

particles are able to penetrate deep into the lung. There are no real hypotheses as to how gaseous pollutants might cause cardiovascular disease.

Air pollution and monitoring in the council areas advised by NHSGG&C

Under the Environment Act 1995 every Local Authority is required to review the quality of air in the Local Authority's area. Since 1997, Scottish Local Authorities have had a duty to monitor for Air Quality in their areas, and since 2003 Scottish councils have been required to produce an annual report for the Scottish Executive.

Glasgow City

As Scotland's largest local authority with a largely urban geography, Glasgow City Council (GCC) faces unique problems and challenges with regards to air quality in the west of Scotland. This is reflected in the quantity and variety of air pollution monitoring undertaken in the City.

Glasgow acts as the local site operators (LSOs) for three stations in the UK-wide Automatic Urban Network (AUN). In addition to this they also operate five real-time monitoring stations of their own, three stand alone TEOM[6] units for PM_{10} and a wide variety of non-automatic monitoring sites. All pollutants recognised in the National Air Quality Strategy are monitored in Glasgow.

An important method for local authorities to evaluate air quality and predict future levels and trends involves computer modelling programs. Crucial components of the information which must be input to these models includes weather, traffic and other emissions data. To achieve the most locally accurate data possible GCC operates its own weather station, located in the Dalmarnock area.

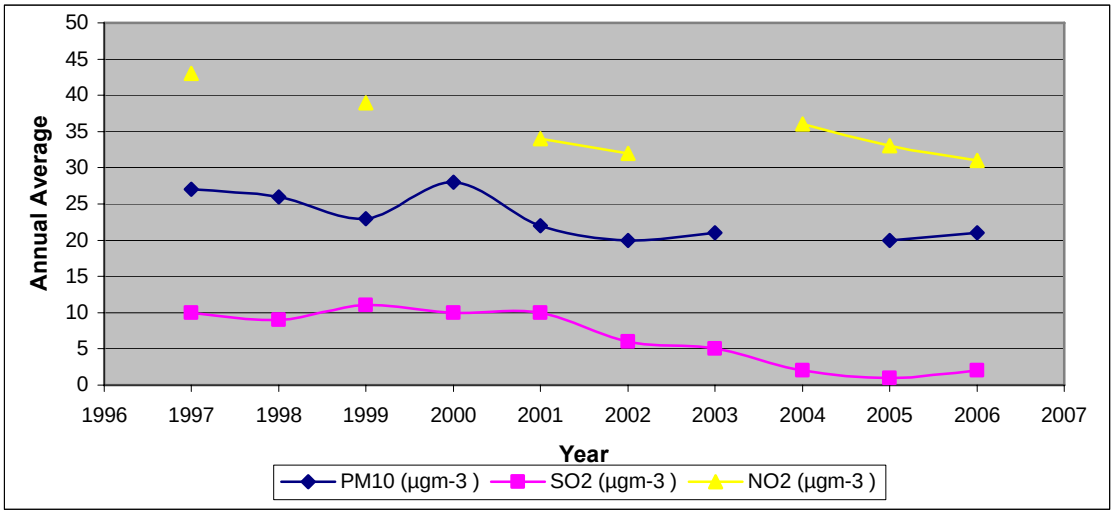
Where modelling or monitoring has indicated that exceedences of the Air Quality Objectives are likely, it is a statutory requirement for the authority to declare Air Quality Management Areas (AQMAs). Glasgow had previously declared the entire City centre as one such area for exceedences of the standard for NO_2. However, this has recently been extended to include PM_{10} and the GCC has also declared two smaller AQMAs outside of the City centre for exceedences of the standards for NO_2. Much of this pollution arises from road transport.

Trends for PM10, SO2 and NO2 obtained from a city centre monitor (St Enoch) are depicted in Figure 7 and demonstrate the steady reduction in SO2 to very low levels in 2005, the tendency for NO2 to decline by about 33% over the past 10 years and the stabilising of PM10 at around 20 microgram per cubic metre.

[6] Tapered Element Oscillating Microbalance. A technology designed to measure particulates.

Figure 7

Secular trends of mean levels of PM10, SO2 and NO2 obtained from St Enoch monitoring site in the centre of Glasgow city, from 1997 to 2006, provided by Environmental Protective Services, Glasgow City Council.



One important development which GCC has undertaken in an attempt to address air quality is the introduction of dedicated staff to undertake vehicle emissions testing. With the assistance of the police, drivers can be stopped and their vehicles tested to ensure that they are not exceeding prescribed exhaust emissions limits. This approach is intended to reduce the number of polluting vehicles on the road and to raise public awareness of the importance of vehicle maintenance in reducing emissions levels. GCC also introduced measures to tackle emissions from stationary idling vehicles, by requiring drivers to switch off their engines while parked. These vehicles are producing unnecessary pollution and contribute to raised pollution levels. An intensive advertising campaign was launched to highlight the damage these activities can cause and to educate motorists that they can reduce their impact on local air quality through simple methods.

Work to improve air quality in Glasgow is ongoing and action plans will be produced for the new AQMAs to reduce levels of pollution. The Action Plan also includes the role of the completion of the M74 extension, Quality Bus Corridors, priority signalling for buses, extensions to Park and Ride schemes and other intitiatives.

East Dunbartonshire

Historically in East Dunbartonshire, poor air quality was caused by smoke and SO2 predominately as a result of industrial, commercial and domestic coal burning activities. The graph (Figure 8) below illustrates how levels of SO2 fell dramatically up until 1990 as a result of changing industrial processes; the introduction of new heating systems such as domestic central heating, and significant reductions in the burning of fossil fuels with the introduction of Smoke Control Areas in terms of the Clean Air Acts.

The pollutants of concern today are nitrogen dioxide and PM10s. Sources of these pollutants are predominately traffic and industrial processes, however within East Dunbartonshire the 'hot spots' of NO2 and PM10 are caused by road traffic emissions and are concentrated in certain busy roads and junctions.

An AQMA was declared in Bishopbriggs in 2006 as a result of exceedances in national air quality objectives for NO2 and PM10. An Action Plan is currently being developed to consider options for the local authority to improve air quality within the AQMA. Such options include the implementation of a bus corridor to elevate traffic, and completion of the Bishopbriggs Relief Road.

East Dunbartonshire Environmental Partnership, which includes EDC Environmental Health and various Community Planning Partners, are carrying out stakeholder consultation and a citizen panel questionnaire on air quality and the local transport strategy amongst other local environmental issues. Air quality awareness is being improved by the provision of live local air quality information available via the Council website. High profile initiatives such as 'Vehicle Emission Testing' and 'Vehicle Idling' are ongoing, utilising new national enforcement powers available to deal with offenders, and raising awareness of the effects of traffic emissions on air quality (Figures 9 and 10).

Today, local air quality considerations are increasingly being included in all proposed new developments, and in strategies and plans being implemented within East Dunbartonshire. This is helping to raise awareness of the importance of reducing air quality impacts across Council Departments; with Community Planning Partners and other agencies; the private sector; and the public.

Figure 8

Mean annual SO2 levels in East Dunbartonshire from 1976 to 2004 by monitoring site.

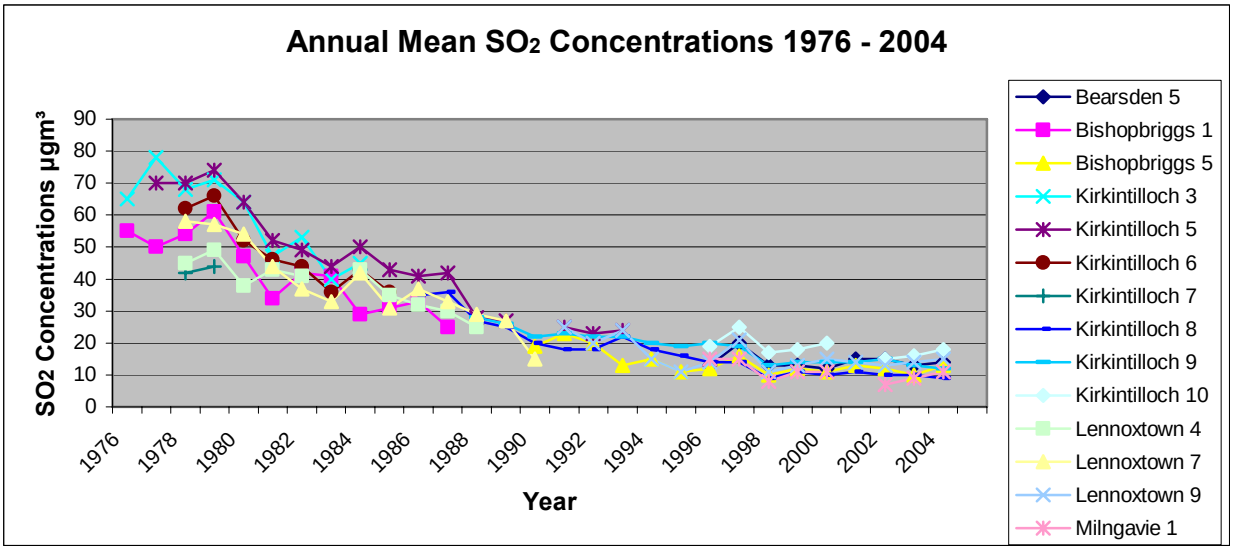
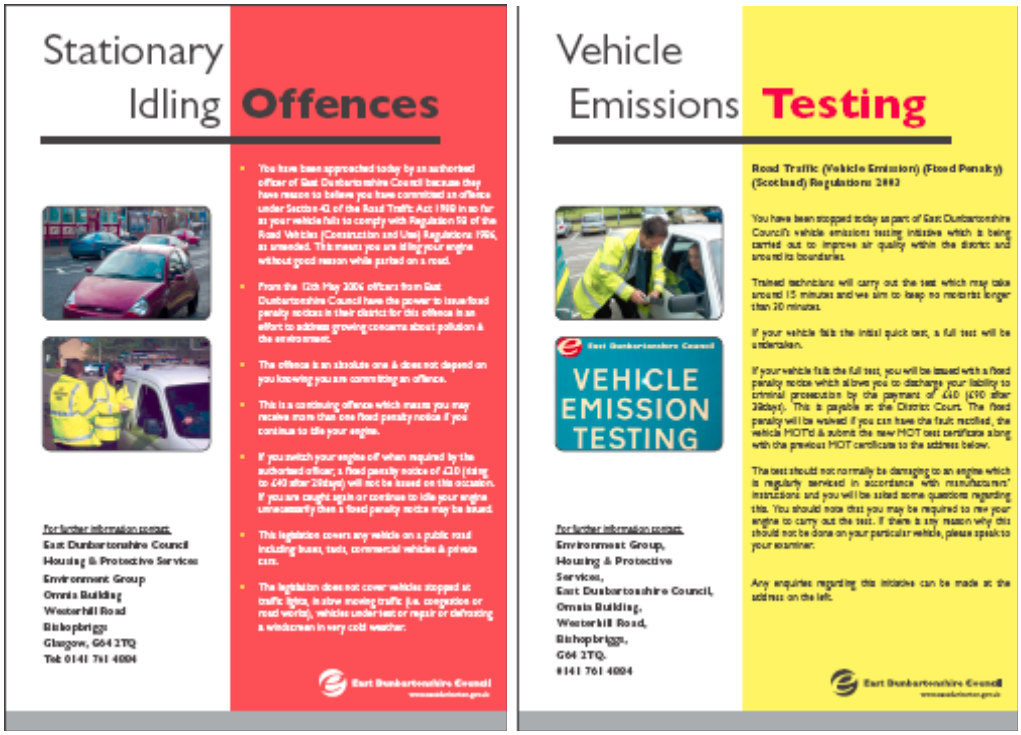


Figure 9

East Dunbartonshire Council 'Vehicle Emissions Testing' & 'Stationary Idling Offences' Information Leaflet



Stationary Idling **Offences**

- You have been approached today by an authorised officer of East Dunbartonshire Council because they have reason to believe you have committed an offence under Section 42 of the Road Traffic Act 1988 in so far as your vehicle fails to comply with Regulation 98 of the Road Vehicles (Construction and Use) Regulations 1986, as amended. This means you are idling your engine without good reason while parked on a road.
- From the 12th May 2006 officers from East Dunbartonshire Council have the power to issue fixed penalty notices in their district for this offence in an effort to address growing concerns about pollution & the environment.
- The offence is an absolute one & does not depend on you knowing you are committing an offence.
- This is a continuing offence which means you may receive more than one fixed penalty notice if you continue to idle your engine.
- If you switch your engine off when required by the authorised officer, a fixed penalty notice of £20 (rising to £40 after 28days) will not be issued on this occasion. If you are caught again or continue to idle your engine unnecessarily then a fixed penalty notice may be issued.
- This legislation covers any vehicle on a public road including buses, taxis, commercial vehicles & private cars.
- The legislation does not cover vehicles stopped at traffic lights, in slow moving traffic (i.e. congestion or road works), vehicles under test or repair or defrosting a windscreen in very cold weather.

For further information contact:
East Dunbartonshire Council
Housing & Protective Services
Environment Group
Omnia Building
Westerhill Road
Bishopbriggs
Glasgow, G64 2TQ
Tel: 0141 761 4884

East Dunbartonshire Council

Vehicle Emissions **Testing**

Road Traffic (Vehicle Emission) (Fixed Penalty) (Scotland) Regulations 2003

You have been stopped today as part of East Dunbartonshire Council's vehicle emissions testing initiative which is being carried out to improve air quality within the district and around its boundaries.

Trained technicians will carry out the test which may take around 15 minutes and we aim to keep no motorist longer than 30 minutes.

If your vehicle fails the initial quick test, a full test will be undertaken.

If your vehicle fails the full test, you will be issued with a fixed penalty notice which allows you to discharge your liability to criminal prosecution by the payment of £40 (£90 after 28days). This is payable at the District Court. The fixed penalty will be waived if you can have the fault rectified, the vehicle MOT'd & submit the new MOT test certificate along with the previous MOT certificate to the address below.

The test should not normally be damaging to an engine which is regularly serviced in accordance with manufacturers' instructions and you will be asked some questions regarding this. You should note that you may be required to rev your engine to carry out the test. If there is any reason why this should not be done on your particular vehicle, please speak to your examiner.

Any enquiries regarding this initiative can be made at the address on the left.

East Dunbartonshire Council

VEHICLE EMISSION TESTING

For further information contact:
Environment Group,
Housing & Protective Services,
East Dunbartonshire Council,
Omnia Building,
Westerhill Road,
Bishopbriggs,
G64 2TQ.
0141 761 4884

East Dunbartonshire Council

Figure 10

'Stationary Idling Offences' rear bus advertising campaign – used on buses passing through East Dunbartonshire from March 2007

West Dunbartonshire

Air quality within the West Dunbartonshire Council area remains generally good.

West Dunbartonshire Council currently monitors Nitrogen Dioxide (NO2) and PM10. There are currently 16 NO_2 diffusion tubes located throughout its area. Additionally the Council has two automatic NO_2 monitoring stations which provide real time data. These two units are rotated annually between four monitoring sites within the West Dunbartonshire Council area. One of the NO_2 units is co-located with a PM_{10} monitor – A TEOM (Tapered Element Oscillating Microbalance) – which provides real-time PM_{10} data.

Our latest Progress Report to Scottish Government indicated that projected figures for 2010 remain consistent with achieving the NO_2 National Air Quality objectives at all locations. Projections were undertaken by use of the Year Adjustment Factors Calculator Tool accessed under Local Air Quality Management on the Air Quality Web Site.

However results from 2006 for the diffusion tube designated Dumbarton 1 (sited on the A814) indicate that the objective of 40µg/m^3 is currently being breached. Given the unpredictable nature of NO_2 tube results a real time NOx analyser has been located at the site and results from this will be included in the 2008 Progress Report. Additionally new traffic management proposals for the road are currently being considered.

West Dunbartonshire Council recently launched an air quality initiative "Idling Gets You Nowhere" urging local motorists to do their bit to improve air quality, curb pollution and save lives. Part of the initiative invites local primary schools to get involved in spreading the message by taking part in the "Idling Gets You Nowhere" promotion competition. The idling campaign is part of West Dunbartonshire Councils "If You Breathe You're Involved" air quality campaign which was launched in 2006 (Figure 11).

Figure 11

The cover used for West Dunbartonshire's air quality campaign launched in 2006.

East Renfrewshire

The principal pollutant of concern in East Renfrewshire is PM_{10} at the Sheddens Roundabout, Clarkston and the surrounding areas. An automatic monitor at this area has indicated a potential exceedance of PM_{10} against the proposed 2010 levels. A Detailed Assessment was also undertaken by independent consultants which reached a similar conclusion. As the projected failure is marginal it has been decided that further monitoring will be carried out using upgraded monitoring equipment before the Council decides about declaring an Air Quality Management Area for PM_{10} at locations around Sheddens Roundabout.

ERC also monitors at 21 sites located across the district using diffusion tubes. These are changed monthly with results to date indicating that the annual mean objective for NO_2 ($40ugm^{-3}$) is being met at all locations. A NO_X monitor is located at the former Carlibar Primary School, Main Street, Barrhead.

ERC received a grant allocation to carry out vehicle emissions testing in 2007/8. It is intended that this will be carried out using officers and equipment from Glasgow City Council with East Renfrewshire staff in attendance.

Inverclyde

Inverclyde Council has been monitoring for NO2 since 1993, when it introduced 4 monitoring sites. Since then Inverclyde has increased the number of sites to 16. Benzene is also monitored at 4 of these sites. In 1996, in partnership with North Ayrshire Council, Inverclyde purchased an automatic, mobile air quality monitoring unit. Each authority has use of this equipment for one year at a time. The unit is capable of monitoring NO2, CO and PM10s. In addition, Inverclyde Council recently purchased an automatic mobile particulate monitor, which can easily be moved from to different sites to measure the air quality in particular 'hot spots' around the district. Recent monitoring within Inverclyde has shown that it has no pollutants which are above National Objective Levels and monitoring will continue to ensure that this remains the case into the future.

North Lanarkshire

North Lanarkshire Council (NLC) has been monitoring air quality in the area for a number of years now, in order to check that it is complying with Government objectives. One of the main pollutants NLC monitors is known as particulate pollution, which arises frequently through high levels of road traffic emissions. There are three areas within North Lanarkshire where the levels of particulate pollution is higher than the Government objective and, as a result of failing the Government's objective, the council has declared these three areas as AQMAs. The areas are – Motherwell Town Centre, Whifflet Coatbridge and Chapelhall. NLC is now working towards preparing an Action Plan which sets out possible solutions they are considering in order to improve air quality. As part of this exercise the council has done additional work in trying to find out the exact source of this particulate pollution and has found that a significant amount of particulate pollution in North Lanarkshire arrives from outwith the Council boundary. As well as working on the 3 AQMAs, the council continues to monitor air quality at other areas throughout the Council area, in order to make sure it is complying with the Government targets, paying particular attention to areas with bad traffic congestion.

South Lanarkshire

The first round of screening and assessment highlighted that the pollutants which are likely to cause problems within the South Lanarkshire Council (SLC) area are NO2 and PM10. Indeed, SLC's latest report indicates that these pollutants are getting close to the 2010 objectives and therefore SLC are currently in the process of carrying out a Detailed Assessment on each of these pollutants. Where the objectives are likely to be exceeded they will declare AQMAs and implement action plans to improve air quality in the vicinity of the monitoring sites.

SLC is currently developing its Sustainable Development strategy and regards air quality as an important element within the strategy. The draft strategy states that the Council will declare an AQMA at the Whirlies Roundabout, East Kilbride and develop plans to improve air quality there. It also commits to increasing the number of air quality monitoring stations at main town locations in South Lanarkshire and provide real time air quality information within public facing Council buildings.

Carrying out these actions will allow SLC to improve our local air quality in South Lanarkshire, to be aware of local conditions and to raise the profile of air quality as a public concern. This will undoubtedly reduce instances of ill-health related to poor air quality and increase the sense of well-being of local communities.

Renfrewshire

Renfrewshire Council has been monitoring Air Quality since 1993 and we have various means by which we measure the pollutants specified by the National Air Quality Strategy. Nitrogen dioxide (NO2) is measured at 44 sites across the district by means of diffusion tubes. These allow us to indentify areas where levels are high and additional monitoring may be required.
We also have three monitoring stations positioned at Central Road, Paisley, Gordon Street, Paisley and Glasgow Airport. At the airport we monitor NO2 levels to ensure that the NAQS are not exceeded by the air traffic and vehicular traffic around the vicinity.

At the Gordon Street site we measure PM10 and NO2. PM10 is measured by FDMS to ensure greater accuracy. This monitoring equipment was introduced following our 2006 Updating and Screening Assessment and which indicated the requirement to carry out a Detailed Assessment in this area for both NO2 and PM10. The 2006 USA also concluded that we should carry out detailed assessments for NO2 at Love Street, Paisley and the Paisley Ring Road (one way system).

Our Central Road area in Paisley was declared as an Air Quality Management Area for NO2 and Officers are producing the Action Plan for this area at the moment. This is a highly congested, partially enclosed street (see picture below) and the main bus terminus for Paisley town centre. Due to the complexities of our AQMA we are working on various options including a Low Emission Zone, Quality Bus Partnerships and exposure reduction strategies. In addition the effects any potential scheme will have on surrounding AQ in the town centre must also be considered. Our existing AQMA combined with the DAs ensures that challenging times are ahead to meet the 2010 air quality objectives, protect Public Health and raise the profile of Air Quality in our area.

Figure 12

A excerpt from Renfrewshire Council's website describing a key air quality management area in Paisley.

Comparative study of NO2 for all councils in the West of Scotland

Selected pollution data is provided to Health Protection Scotland by all West of Scotland council areas on an on-going basis. The seasonal effect of temperature on NO2 levels in 2003 for the 8 councils advised by NHSGG&C is depicted in Figure 13. This demonstrates the higher mean level of NO2 throughout the year in Glasgow City as well as the peak in the winter and the trough in the summer.

Mean annual levels of NO2 by council are shown in Figure 14, clearly marking out Glasgow City's higher level of pollution in keeping with its large and dense population and greater number of cars, the modern source of combustion-engine pollution, including NO2.

Figure 13

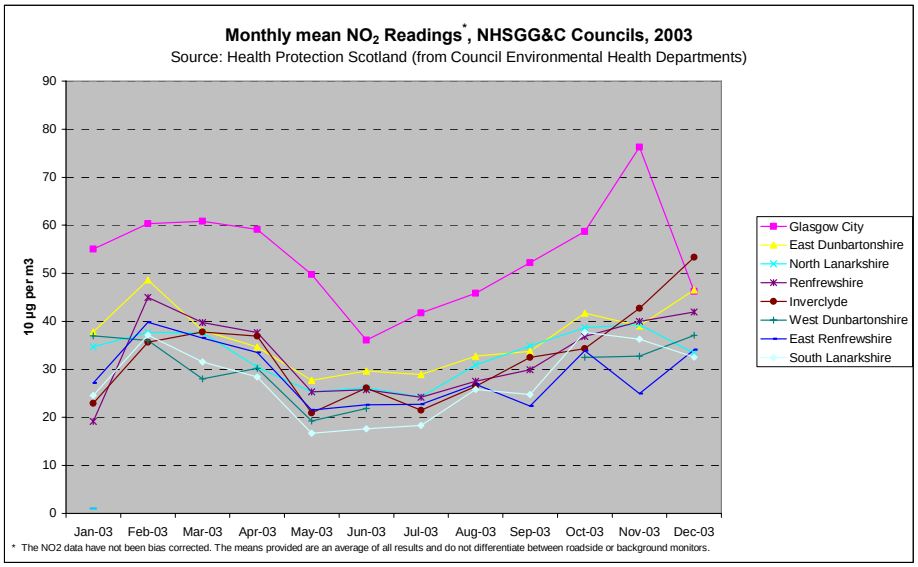
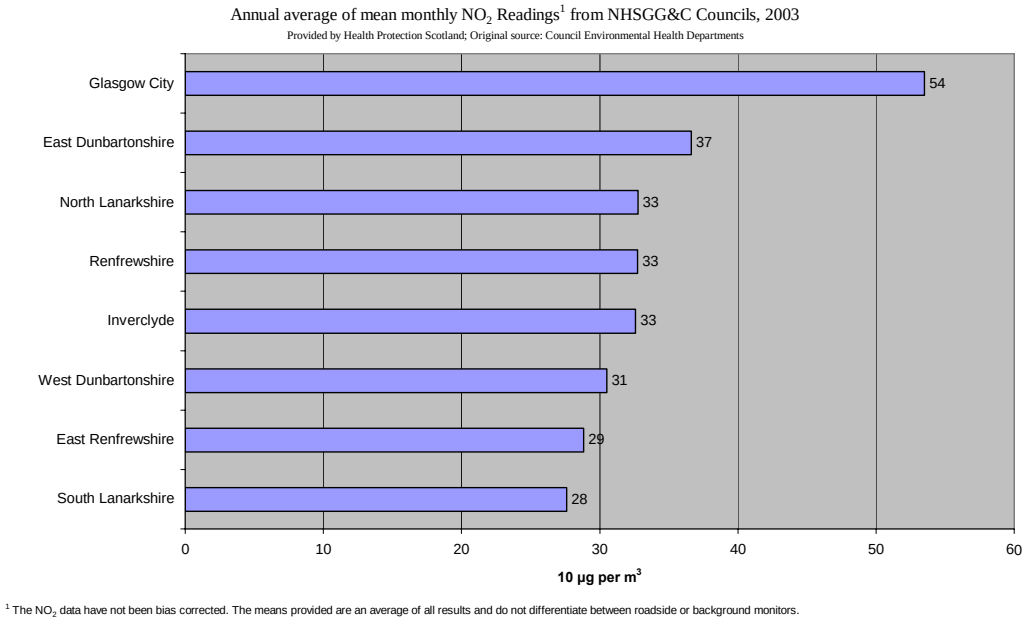


Figure 14



Recommendations:

1) Air pollution continues to pose a threat to human health in parts of NHS Greater Glasgow and Clyde because of local exceedances of health-based air quality standards. It is crucial the NHSGG&C works closely with the 8 local authorities it advises, who have responsibility for monitoring and controlling air quality in their local areas in keeping with national legislation. It is advocated that closer working relationships are developed between NHSGG&C public health staff and the various Council Environmental Protection staff.

2) However, concern has been expressed that a proactive and coherent multidisciplinary approach to tackling problems of air quality that involve all relevant stakeholders does not exist. It is therefore also advocated that a multiagency system be created to address air quality that involves Health Protection Scotland and NHS Boards in addition to the official agencies listed below. Such a system would address the need to maintain air quality profile, raise awareness, exchange ideas and information, and lead to cross-coundary working throughout West of Scotland on, e.g. regional modelling, publicity, funding, enforcement, *etc.* At the moment different parts of the West of Scotland are dealt with individually by local authorities essentially working on their own.

3) The production and control of air pollution is everyone's responsibility. Ensuring that pollution levels meet air quality standards is a multi-agency responsibility. It is critical that all statutory, private and voluntary organisations and initiatives including the Scottish Executive, the NAEI, Air Quality in Scotland and the councils share responsibility for keeping air pollution under control, as no one agency can solve this on-going problem unilaterally.

---

[i] IPCC Third Assessment: Climate Change 2001. A Report of the Intergovernmental Panel on Climate Change.
[ii] UK Climate Impacts Programme (2002). Climate Change Scenarios for the United Kingdom (UKCIP02).