Air Quality

This topic addresses:

SA Objective: (11) To reduce traffic congestion and associated air pollution by improving travel choice, shortening journeys and reducing the need to travel by car/ lorry

SEA Theme: Air, Climatic Factors

Introduction

Air quality has been improving in Oxford over many years. Most air pollution in Oxford comes from motorised traffic. The introduction of a low emission zone helped reduce emissions further. However, the improvement in air quality was not as dramatic as hoped, and levels of some pollutants are still above 2020 target levels. Further action will be required.

This paper links closely to the background paper on transport

Plans, policies and programmes

EU Ambient Air Quality Directive

The EU Ambient Air Quality Directive sets legally binding limits for ambient concentrations of certain pollutants in the air. For NO_2 (Nitrogen Dioxide) there are two limit values for the protection of human health. These require member states to ensure that annual mean concentration levels of NO_2 do not exceed 40µg/m^3 and hourly mean concentration levels of NO_2 do not exceed 200µg/m^3 more than 18 times a calendar year. Member states were required to meet these limits by 1st January 2010 unless an extension was granted for up to 5 years to 1st January 2015.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Where it appears that air quality objectives will not be met by designated target dates, local authorities must declare an Air Quality Management Area and develop an action plan.

The Air Quality Action Plan (AQAP, 2013-2020) and Air Quality Management Area (AQMA)

The whole of the Oxford City Council area was declared an AQMA in 2010 because assessments of air quality predicted that the annual mean objective for nitrogen dioxide would not be met in a number of areas. The AQAP was developed to seek to address the issue of poor air quality in Oxford.

The Low Emission Strategy (May 2013) Oxford City Council

The Low Emission Strategy (May 2013) provides a framework for integrating all of the Council's activities to reduce carbon and air quality related emissions across the city. It is focussed on measures and policies the City Council can carry out or influence, categorised into action on its own estate, direct influence through regulations, planning policies and procurement practices and wider influence through partnerships and leadership.

Land-Use Planning and Development Control: Planning for Air Quality (The Institute of Air Quality Management, 2015)

This document was published to ensure that air quality is adequately considered in the land-use planning and development control processes. This sets out how land-use planning can play a critical role in improving local air quality. The pattern of land use determines the need for travel, which is a major influence on transport related emissions. At a strategic level, spatial planning can provide for more sustainable transport links between home, work and facilities. Development is not inherently

negative for air quality; policies should promote high quality building standards that reduce energy use and use cleaner technologies.

Air quality has an important influence on health of humans and ecosystems. In the UK it has been estimated that the mortality burden of long term exposure to particulate matter (PM2.5) in 2008 was equivalent to nearly 29,000 premature deaths in those aged 30 or older. In England the fraction of mortality attributable to air pollution is 5.4%. It is estimated that removing exposure to all PM2.5 would have a bigger impact on life expectancy in England and Wales than eliminating passive smoking or road traffic accidents. The economic cost from the impacts of air pollution in the UK is estimated at £9-19 billion every year, comparable to the economic cost of obesity (over £10 billion). Nitrogen Dioxide can also, independently of particulate matter, play and adverse role in exacerbating asthma, bronchial symptoms, lung inflammation and reduced lung function.

Current Situation

Levels of air pollution in Oxford

In Oxford, the air quality objectives are exceeded for annual mean concentrations of nitrogen dioxide close to major roads and at busy junctions across the city. In the city centre, the hourly mean objective was exceeded in streets such as St Aldate's, High Street, George Street, Frideswide Square, Worcester Street and St Clement's.

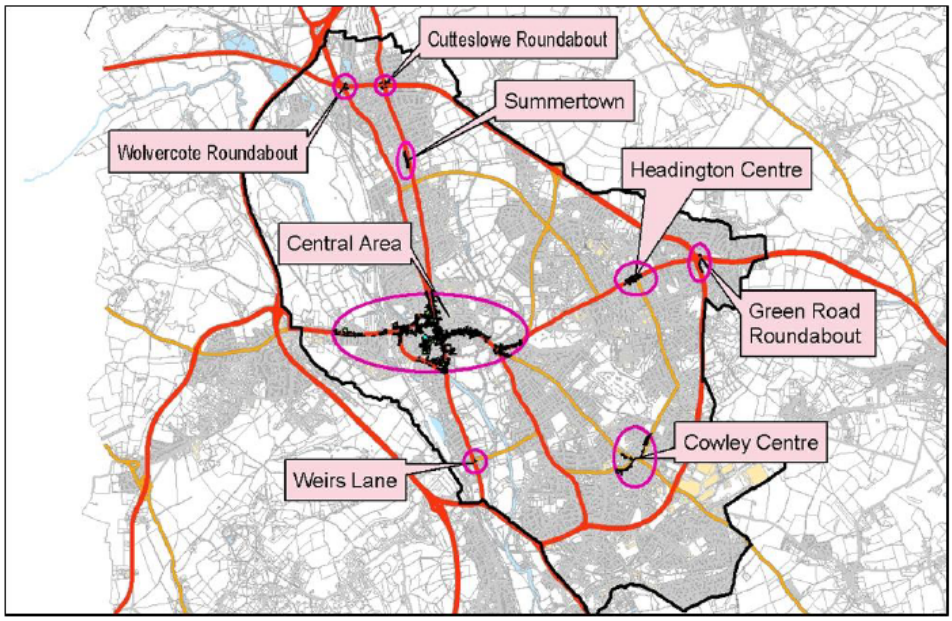
Levels of nitrogen oxide (NO_2) in Oxford are about 52ug/m3 (micrograms per cubic metre of air). This is a reduction from about 65ug/m3 in 1995, but it is still above the national objective of 40ug/m^3, which needs to be met by 2020.

The World Health Organisation has recently released data looking at air pollution world-wide, which looked at those pollutants posing the greatest risk to human health. This found that 10 towns and cities in the UK, including Oxford, breached safe levels of PM10, and another 39 urban areas, including Oxford, breached safe levels of PM2.5.

Air pollution 'hotspots' in Oxford

The following map (Figure 5.5.1), extracted from the AQAP shows the AQMA (black line) and mean air quality hot spots (pink circles) in the city. This shows the many of the main roads in the city centre are air quality hotspots, as well as key junctions on the ring road and many district centres (Summertown, Headington and Cowley).

Figure 5.5.1: map to show air quality hotspots in Oxford



Sources of air pollution in Oxford

The pie charts in Figures 5.5.2 and 5.5.3 below, extracted from the AQAP, show the emissions of NO_x by source in Oxford and an estimate of the NO_x emissions by vehicle type. NO_x is a term for NO and NO_2. They are formed when combustion occurs in the presence of nitrogen so are found in areas of high motor traffic. Transport emissions were identified as the main source of NO_x in Oxford and the vehicle type creating the most NO_x is buses and coaches.

Figure 5.5.2: pie chart to show NO_x emissions by source in Oxford

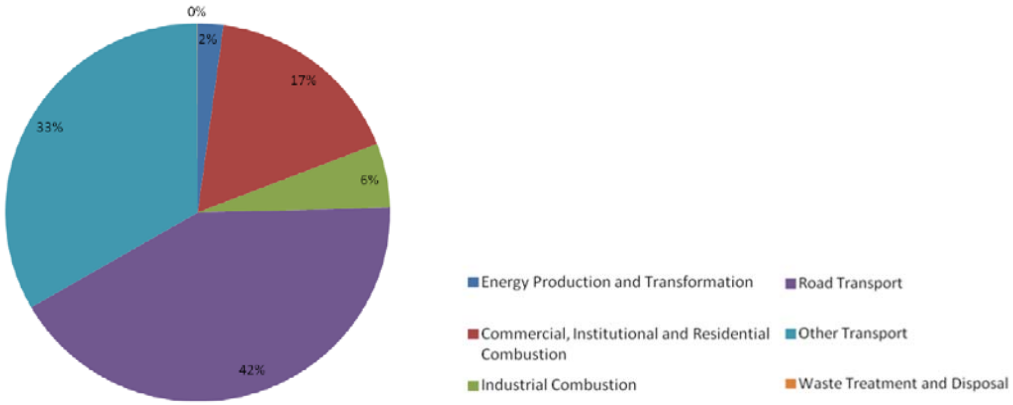
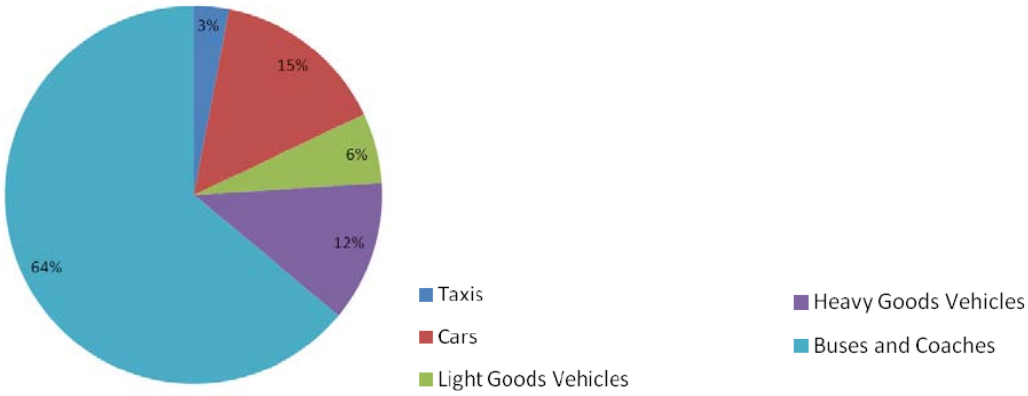


Figure 5.5.3: pie chart to show NOx emissions by vehicle type in Oxford



Mortality attributable to air pollution

The World Health Organisation (WHO) says that ambient air pollution, made of high concentrations of small and fine particulate matter, is the greatest environmental risk to health, causing more than 3 million premature deaths worldwide every year. The WHO estimates that there are 40,000 early deaths a year in the UK from air pollution.

In Oxford, 5.6% of all mortality is attributable to long-term exposure to fine particulate matter (PM2.5). The table in Figure 5.5.4 below shows that this is higher than the average for England and the South East. Road traffic can make substantial contributions to PM2.5 concentrations at the kerbside (within 1m of the kerb), but a few metres from the kerb the contributions are relatively limited.

Figure 5.5.4: Table to show mortality attributable to particulate air pollution, comparing Oxford to England and Oxford to the South East

Indicator	Period	Oxford		Region	England	England		
		Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
3.01 - Fraction of mortality attributable to particulate air pollution	2013	-	5.6%	5.2%	5.3%	3.3%		7.9%

Indicator	Period	Oxford		Region	England	South East region		
		Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
3.01 - Fraction of mortality attributable to particulate air pollution	2013	-	5.6%	5.2%	5.3%	4.4%		6.4%

Likely trends without a new Local Plan

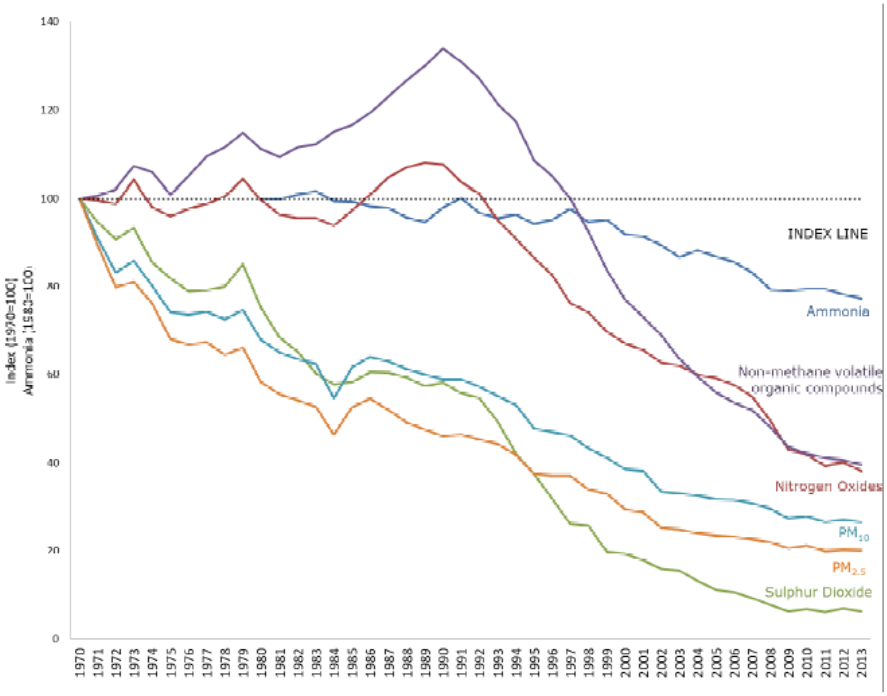
Population and job growth in Oxfordshire and expected effects on air quality

Growth in population and jobs is expected to happen within Oxford and across Oxfordshire. Congestion is likely to become increasingly severe without a strategy to reduce or prevent the increase in traffic in Oxford and on its approaches. This is likely to lead to worsening air quality within the city and on trunk roads nearby, such as the A34. The County Council has produced a Local Transport Plan. However, without implementation of a transport strategy aimed at reducing car use, greater congestion in and around Oxford will be expected.

UK air quality trends

The UK trend in sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, Ammonia and particulate matter (PM10, PM2.5) emissions is that of a steady decrease, especially from 1990. However, the graph in Figure 5.5.5 suggests the rate of reduction is slowing.

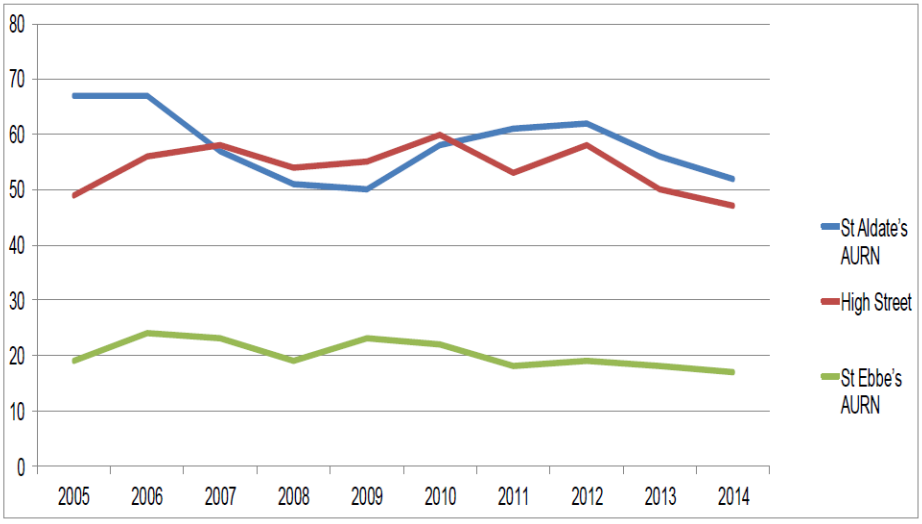
Figure 5.5.5: Trends in UK sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and particulate matter (PM10, PM2.5) emissions 1970-2013



Oxford air quality trends

Air quality in Oxford is improving. Ten year trends from the City Council's data collection and analysis show that nitrogen dioxide (NO2) levels have dropped by typically 35% at roadsides in the city centre, when looking at all monitoring sites, including non-automatic monitoring sites. The graph in Figure 5.5.6 below shows a smaller reduction at the three automatic monitoring sites in the city centre. The annual mean objective is 40µg/m^3, which is being exceeded in St Aldate's and High Street.

Figure 5.5.6: Annual mean levels of nitrogen dioxide in central Oxford, 2005-2014



Low emission zone and low emission vehicles

A low emission zone was introduced for the city centre in 2014. This requires all bus services to operate low emission vehicles. It is possible that a zero emission or ultra-low emission zone could be introduced if it seems to become necessary in order to reach air quality targets. This would happen in a process separate to the Local Plan.

It is expected that electric, hybrid and lower emission vehicles will become more widely used during the Local Plan period, with or without the Plan or an ultra-low emission zone. These can bring air quality and carbon reduction (climate change) benefits. Work to identify suitable public charging points in on-going.

Climate change and carbon emissions

The UK Climate Impacts Programme predicts that Oxfordshire's temperature increase by 2050 is unlikely to be less than one to two degrees. This will have impacts that will have to be adapted for, but it is equally important that action to limit climate change. Major actions to reduce emissions will need to be taken at the national and international level, but a contribution through local actions is important also. Transport in Oxfordshire contribute to carbon emissions. To reduce carbon emissions from transport requires a reduction in trips or for trips to be made in a way that uses less carbon. Electric vehicles and more fuel efficient vehicles reduce carbon emissions as well as brining local air quality benefits. Transport planning to reduce car use would also result in reduced carbon emissions for vehicular traffic.

Sustainability/Plan Issues

- Tackling congestion, for example by reducing journeys to and within Oxford by motorised traffic would help improve air quality.
- Encouraging uptake of low and zero emission vehicles, in particular buses and taxis which will continue to need to access the city centre.