

Air Quality and Car Emissions

Report of the Head of Planning, Transportation and Environment

1. Background/Introduction

At County Council in December 2015 Councillor Hart responded to a question from Councillor Greenslade concerning the impact of car emissions. Place Scrutiny Committee was invited to consider the issue and make any relevant observations, comments or recommendations, as appropriate.

This report provides briefing material to facilitate the Committees consideration of this matter. It outlines high level air quality concerns associated with transport emissions. This is as a result of several recent issues related to the impact on health; types of vehicle emissions from petrol and diesel vehicles; speeds of vehicles and testing of emissions.

1.1 What is air quality?

Air quality is a term used to describe the air that we breathe, and the level of pollutant concentrations that are considered to be reasonably 'safe' from a health perspective¹. The main pollutants of concern in the UK are nitrogen dioxide (NO₂) and fine particulate matter, known as PM₁₀ or PM_{2.5}. The majority of these pollutant emissions are typically associated with combustion emissions, including from vehicles and industry.

Part IV of the Environment Act (1995) and resultant initial Air Quality Strategy, in the late 1990's, introduced the concept of local air quality management in the UK. It was expected at this time that the forthcoming vehicle emissions standards for road vehicles and industrial permitting would deliver, if not all, then the majority of the air quality improvements needed to meet EU legislation.

1.2 EU/UK air quality legislation

The European Union Ambient Air Quality Directive sets out maximum permissible levels for roadside concentrations of pollutants thought to be harmful to human health and the environment. For NO₂ the annual mean is 40µg/m³ and PM₁₀ is also 40µg/m³. The UK government is responsible to the European Commission (EC) for ensuring that it complies with the provisions of the EU Air Quality Directives, which are legally binding. UK and other member states governments are currently in negotiations with the EC over breaching Limit Values for NO₂ and PM₁₀.

On the UK Government's behalf, the Department for Transport (DfT) and Department for Environment Food and Rural Affairs (Defra) have Public Service Agreements relating to EU Air Quality Limit Values and it is their responsibility to ensure the UK meets these.

The responsibilities of local authorities with respect to meeting Air Quality Objectives² are not the same as the responsibilities of the UK Government. District or Unitary Authorities do

¹ It can also relate to impacts on eco-systems, but this is beyond the scope of this memo.

² Whilst the EU Limit Values and UK Air Quality Objectives for NO₂ and PM₁₀ are set at the same concentration in England, they are regulated under separate legislation

have statutory duties for Local Air Quality Management, but are not obliged to ensure Air Quality Objectives are met only worked towards. In the UK the main source of the emissions underpinning the breaches in NO₂ (and a large proportion of PM) comes from road traffic. Both the UK Government and local authorities are expected to have actions relating to the reduction of key emission sources in locations where air quality limit values or objectives are exceeded.

2. Vehicles and emissions

2.1 Technology

Different types of vehicles emit more or less pollution. Technology shifts can be encouraged at both the national and local level, for example Transport for London (TfL) now have a number of hydrogen and electric buses. There are some basic rules that are broadly applicable in terms of technology and emissions:

- A diesel vehicle typically emits more PM and NO_x than a petrol vehicle.
- Newest Euro 6 standard vehicles tends to emit less than an older vehicle, due to better pollution control technology.
- Hybrid vehicles emit typically less No_x and PM emissions than a standard fuelled vehicle.
- Electric or hydrogen vehicles have no PM or No_x tailpipe emissions – though electricity generation emissions will occur at the power station.

Emissions of the air quality pollutant from road vehicles have been reduced by improving fuels and by setting increasingly stringent emission limits for new vehicles. Now that new petrol cars are fitted with catalysts, they produce less nitrogen dioxide and hydrocarbons than diesels, and virtually no particulates. Diesels produce more particulates and nitrogen dioxide but are more efficient and warm up quickly. Improvements in vehicle efficiency have reduced oxides of nitrogen by 20% since 2008, and particulate emissions have also improved, however the reduction in particulate emissions has slowed in the last two years. The Government's aim is for all cars and vans on our roads to be effectively zero emission by 2050.

2.2 Effect of speed on emissions

Future population and car ownership growth generally cause an increase in road traffic. Each road can only take so many vehicles known as its capacity. Therefore, as road traffic increases the capacity of a road is approached, the road becomes congested and the speed of the vehicles reduces. Generally, the higher the speed the lower the emissions per mile travelled (e.g. a diesel car travelling at 20mph is typically more polluting in terms of both NO_x (used to estimate NO₂) and PM emissions than one travelling at 40 mph). However, the relationship between speed and emissions is not always that simple. A car travelling at a constant speed of 20mph on a free-flowing road with no congestion may have lower emissions per mile than the same car travelling at an average speed of 22mph on a higher speed road which is heavily congested, as a result of excessive acceleration and deceleration (i.e. inefficient driving).

2.3 Government interventions

Most people acknowledge that the growth in car ownership and use as seen in recent decades is unsustainable and it is impossible to build our way out of congestion and air quality problem areas.

Over large areas of the network across Devon, very little growth in traffic has been experienced in recent years. This is due to variables such as fuel price increases, congestion and changing attitudes. It is however acknowledged that many drivers are resistant to alternatives modes of travel, or have no other choice. Therefore the challenge that is faced is:

1. To make vehicles cleaner.
2. To impose car tax related to vehicle emissions to encourage use of cleaner vehicles
3. To build environments that makes it easier to walk or cycle.
4. To encourage behavioural change by developing attractive and affordable options.

The key actions being undertaken at international, national and local level are summarised in the table below.

Action	Detail	Level
Tighter standards	Reduction of road vehicle emissions through progressively tighter standards (known as Euro Standards), plus stricter testing regimes.	International and National
Technology	Clean vehicle technology through the Office for Low Emission Vehicles (OLEV). Use of lower emission Public Service Vehicles	International, National and Local
Policy	Setting of the National Planning Policy Framework (NPPF) to consider 'cumulative impacts on air quality'. Defra Local Authority Guidance including mandatory Clean Air Zones in a number of cities. Local Supplementary Planning Guidance	International, National and Local
Permitting	Environment Agency permitting of large industrial sources. Small industrial process permitting.	International, National and Local
Grants/Funding	Grants or funding allocations (such as the Local Sustainable Transport Fund or through the Growth Fund) to encourage use of smarter travel and to invest in schemes such as new rail stations, Real Time Information or cycle/pedestrian schemes.	National
Behaviour change	Influencing the use of alternative, less polluting means of travel, allowing more efficient use of the existing road space.	National and Local
Infrastructure upgrades	In exceptional cases, it may be possible to undertake road improvements subject to planning, environmental considerations and cost constraints. These will be aimed at relieving an air quality problem area (but may not reduce overall emissions).	International, National and Local

3. Local air quality

3.1 Local air quality data

The District Councils across Devon are responsible for collecting air quality data. Available NO₂ emissions data has been reviewed for 2014 (or the most recent year) and compared to previous years to ascertain a trend in emissions.

A summary of the information is as follows:

- South Hams had five sites exceeding the EU Limit Value (23% of all sites). Thirteen sites have seen a decrease in NO₂ emissions from 2010 levels.
- Mid Devon has only one site exceeding the EU Limit Value (5% of all sites). All but one site has seen a decrease from 2010.
- Exeter has thirteen sites exceeding the EU Limit Value (33% of all sites). 56 sites have seen a decrease from 2010 levels.
- North Devon has only one site exceeding the EU Limit Value (6% of all sites). Thirteen sites have seen a decrease from 2010 levels.
- Torridge has no sites exceeding the EU Limit Value. Seven sites have seen a decrease since 2010.
- Teignbridge had thirteen sites exceeding the EU Limit Value in 2012 (17% of all sites). 57 sites have seen a decrease from 2009 levels.
- Twenty of the sites exceeding the threshold are measuring an annual mean below 45 µg/m³. Eight sites exceed 50 µg/m³.
- Overall, NO₂ levels have been on the decline across Devon.

3.2 Effect of the road network on emissions

A key issue is the geography and topography of the road network. Within Devon, the majority of locations which exceed limit values occur in streets where there is a canyon effect. These generally include narrow streets bordered by tall buildings, and are predominately located on key radial routes where there is a lack of suitable alternative. In addition, low speeds of traffic occur along these corridors as traffic travels to and from town centres and are subjected to continued acceleration and deceleration.

4. Conclusion

Air pollution can have negative impacts on human health and the environment. Pollutant emissions are regulated by the Euro emissions standards.

Modern cars, if kept in good condition, produce only quite small quantities of the air quality pollutants, but the emissions from large numbers of cars add to an air quality problem. The Government is committed to meeting air quality standards in as short a time as possible. Emissions have been reduced by improving the quality of fuels and by setting increasingly stringent emission limits for new vehicles.

There are a number of actions and strategies in place to reduce atmospheric pollution by vehicles, focused primarily on technology, standards, permitting and behaviour change. Improvements in vehicle efficiency have reduced oxides of Nitrogen by 20% since 2008.

Districts within Devon collect and monitor emissions data. Across the County, levels of NO₂ exceed the EU threshold in some locations, predominately where street canyons exist. Across all sites there appears to be a general trend of NO₂ levels reducing.

Rather than see vehicle emissions as a growing health risk, we should recognise this as a significant health issue which has been successfully reduced in recent years, but where there is still potential to improve.

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Local Government Act 1972: List of Background Papers

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Background Paper	Date	File Reference
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Nil

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