

SHEFFIELD CITY REGION TRANSPORT STRATEGY

2011-2026

Evidence Base

DOCUMENT 7: REDUCING EMISSIONS



SHEFFIELD
City Region

southyorkshire
local transport plan

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1. Introduction

The Evidence Base

- 1.1 This document forms part of the series of Evidence Base documents, which are presented here as an annex to our Third Local Transport Plan (LTP3). This series of documents presents a substantial body of evidence we have compiled while developing the Transport Strategy, which is the first of the two parts of the new LTP3.
- 1.2 The evidence we have gathered is used to establish the arguments that inform the list of policies included in the Transport Strategy. The wider context for the Evidence Base is provided in Document 1: Geographic and Demographic Overview.

This Document

- 1.3 This document is the Reducing Emissions part of the Evidence Base and is directly related to one of our Goals. It also directly relates to our concerns about climate change and its impacts. This goal includes the following challenges:
 - Tackling the highest emissions on the road and rail networks.
 - Reducing the distance travelled by vehicles and their emissions without compromising economic growth.
 - Actively encouraging the use of low-carbon vehicles.
 - Encouraging active travel and sustainable transport as an option other than the car.
- 1.4 Chapter 2 outlines the challenge of reducing carbon emissions. Chapter 3 describes the measures that can be used to improve vehicle efficiency. Chapter 4 summarises the evidence relating to active travel and behaviour change. Chapter 5 highlights the emerging research on the use of renewable energy. Chapter 6 examines the issues relating to air quality and noise. Chapter 7 summarises this Evidence Base document.

2. Carbon Emissions

Introduction

- 2.1 This chapter provides an overview of the national and local policy frameworks. This chapter describes the current levels of carbon emissions in SCR. The evidence identifies the contribution of the transport system to carbon emissions and where the most significant effort is needed to reduce them. This chapter also highlights the likely increase in carbon emissions if we take little action over the next 15 years.

National Policy

- 2.2 The Climate Change Act 2008 made the UK the first country in the world to have a legally binding, long-term framework to tackle climate change. This includes a target to reduce emissions by at least 80% below 1990 levels by 2050¹. The 2008 Act also creates a framework for building the UK's ability to adapt to climate change. This framework includes introducing stringent carbon emission standards for cars, investment in electric rail lines and an increased focus on Smarter Choices.
- 2.3 Under the Smarter Choices agenda there is a particular focus on improving the integration of different modes of transport. As part of this process, responsibility is given to local authorities to implement supporting policies and plans.
- 2.4 In 2009 the Minister for Transport, Lord Adonis, placed an emphasis on providing viable options for tackling climate change in his forward to "Low Carbon Transport Strategy: A Greener Future"². It states: "Building a greener future means the low carbon travel must be a genuine, viable and attractive option for businesses and ordinary citizens".
- 2.5 The Low Carbon Transport Strategy states that, "Technology measures are important in reducing transport emissions, but they are not enough on their own. We also need to think about the choices that we, as individuals and businesses, make on a daily basis about when and how to travel and transport goods."
- 2.6 The coalition government, formed in May 2010, acknowledged in their Programme for Government³ that climate change is an important issue and one that requires urgent action. The government's stated commitments include the following actions to cut carbon emissions:
- Influencing the European Union "to demonstrate leadership in tackling international climate change, including by supporting an increase in the EU emission reduction target to 30% by 2020".
 - Considering an increase of the target for energy from renewable sources, subject to the advice of the Climate Change Committee.
 - Mandating a national recharging network for electric and plug-in hybrid vehicles.
- 2.7 Low emission vehicles form a key part of future planning for the delivery of climate change targets and feature in the Low Carbon Transition Plan (LCTP). Following this plan, the Office for Low Emission Vehicles (OLEV) is taking forward an ambitious programme towards creating a fleet of low-carbon vehicles. This programme includes providing the necessary infrastructure to make early adoption of ultra low-carbon

¹ Defra (2010) Air Pollution: Action in a Changing Climate

² Department for Transport (2007) Low Carbon Transport Strategy: A Greener Future

³ HM Government (2010) The Coalition: Our Programme for Government

vehicles practical and feasible. Establishing the potential for mass market growth is essential if the carbon reduction and air quality benefits of these vehicles are to be realised.

- 2.8 In April 2009, the Secretaries of State for Transport and Business jointly announced the UK's strategy for Ultra-Low Carbon Vehicles⁴. This sets out the Government's activity over the next five years including reference to £250m of consumer incentives to stimulate the take up of electric and plug-in hybrid vehicles.
- 2.9 More recently the Government published the White Paper: Creating Growth, Cutting Carbon: Making Sustainable Local Transport Happen. This paper sets out the Government's vision for a sustainable local transport system that supports the economy and reduces carbon emissions. It explains how the Government is placing localism at the heart of the transport agenda, taking measures to empower local authorities when it comes to tackling these issues in their areas. The White Paper also underlines Government's support to local authorities, including through the Local Sustainable Transport Fund.
- 2.10 The Local Sustainable Transport Fund was developed to enable the delivery of sustainable transport solutions that support economic growth while reducing carbon. The Fund was not designed to support major infrastructure or service enhancements in relation to inter-urban journeys. Instead focusing on local solutions, underpinned by the mantra people, place purpose, the funding is to be used to create change at a local level.

Regional and Local Policy

Targets

- 2.11 Table 2.1 identifies targets for reducing carbon emissions in the Region of Yorkshire and the Humber and more locally, in the four South Yorkshire districts. The Yorkshire and Humber Regional Spatial Strategy included in this section is now defunct following announcements by the coalition government; it is, however, important in that it highlights the targets that were previously set. The targets identified by local authorities reflect commitments made in Local Area Agreements.
- 2.12 Table 2.1 show that there is a range of different targets being set by each of the local authorities in South Yorkshire. Meeting the targets will require significant effort and partnership working will be a key part of this. For SCR, there is a need to ensure there is a joined-up approach that still recognises local priorities and targets.

⁴ HM Government (2009) Ultra-low Carbon Vehicles in the UK

Table 2.1 Carbon Emission Reduction Targets

| Document Title | Published | Time Period Covered | Carbon Emission Reduction Targets | Additional Statements |
|--|-----------------------------|-------------------------|--|--|
| Yorkshire and Humber Regional Spatial Strategy | 2008 | 2008-2026 | 20 to 25% | Seeks to meet the targets set out in the Regional Environmental Strategy (compared to 1990 levels) |
| Sheffield Carbon Reduction Framework | 2009 | 10 to 15 year timescale | 2% on 2005 levels by 2009; 5% on 2005 levels by 2010; 10% on 2005 levels by 2011; 30% on 2005 levels by 2020; and 60% on 2005 levels by 2050. | A 10% reduction by 2011 is equivalent to a reduction of 360,000 tonnes of carbon, or the equivalent of 1.4 billion less miles in a standard family car. A 30% reduction by 2020 is equivalent to over 1 million tonnes of carbon dioxide, far greater than the total emissions of places such as Preston, Blackpool and Carlisle. A 60% reduction by 2050 is equivalent to over 2 million tonnes of carbon, or nearly three times the emissions currently created in Sheffield through the use of domestic gas |
| Sheffield Local Area Agreement | 2008 | 2008 – 2011 | 5% by 2009/10 and 10% by 2010/11 | Baseline of 7.7t carbon emissions per head of population (2006/07) |
| Barnsley Sustainable Community Strategy | 2008 | 2008 – 2020 | 12% over three years | The intermediate target is set for 2011 and is based on Barnsley's Local Area Agreement 2008-11 |
| Doncaster Local Area Agreement | 2008 | 2008-2011 | 13% | Based on a per capita reduction from the 2005 baseline |
| Rotherham Local Area Agreement | 2009 (refreshed version) | 2008-2011 | 3.9% | From the 2009 baseline |

SYPTE Environmental Strategy

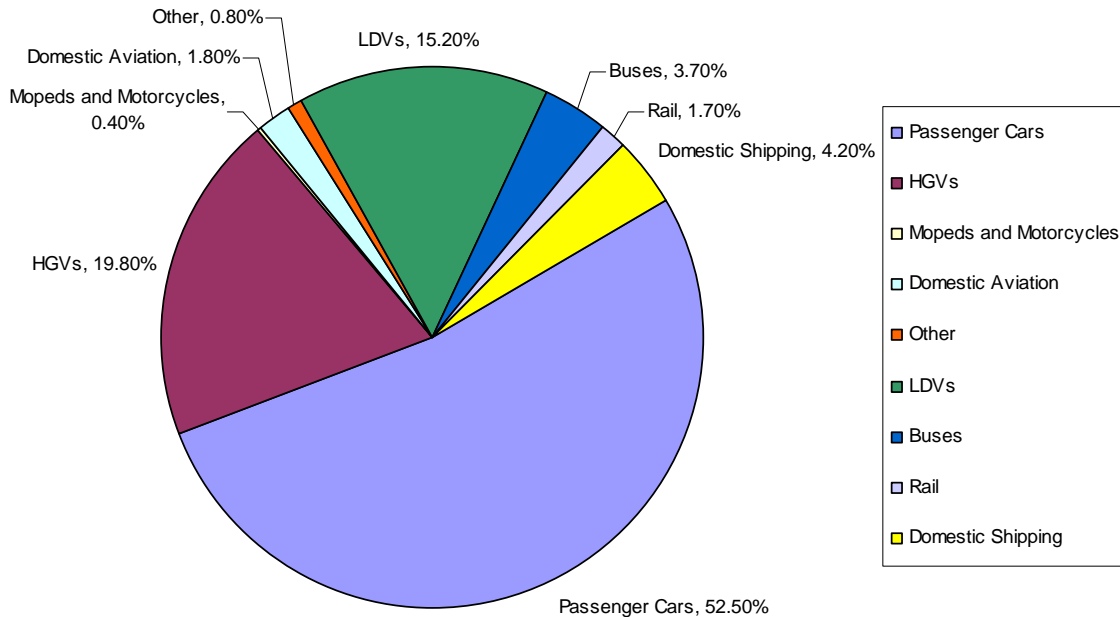
- 2.13 In addition to the local and regional policies, SYPTE have published their Environmental Strategy, focusing on the reduction of emissions from public transport in South Yorkshire. The primary objective of the Environmental Strategy is to adopt a corporate commitment to a low-carbon future. This will be achieved by putting in place a management culture and a complementary programme of communication and training. These measures will allow SYPTE to embed environmental practices into key decision-making processes.
- 2.14 The Environmental Strategy identifies a number of conflicts and challenges that must be overcome to remain successful in reducing emissions, and improving local air quality. The Strategy includes a structured delivery plan with actions centred around the following broad areas:
- Closer working relationships with partners and stakeholders and joint action to build a shared responsibility for of environmental issues
 - Knowledge building and effective monitoring of data
 - Efficient operation of facilities and management systems
 - Embedding the environmental awareness in procurement processes.

Current Carbon Emissions

- 2.15 Transport is responsible for around half of the UK's carbon emissions that are not within an emission trading scheme (or about 40% of carbon emissions)⁵. Figure 2.1 shows that for domestic transport, the majority of these emissions come from road transport.
- 2.16 The Department for Transport have used data from the National Travel Survey to conduct 'Carbon Pathways' Analysis. This analysis is used to improve our understanding of transport emissions by considering how people travel and why they travel, as well as the CO₂ impact of freight movements. Figure 2.2 shows the results of the analysis, indicating that commuting accounts for around a quarter of carbon emissions across Great Britain.

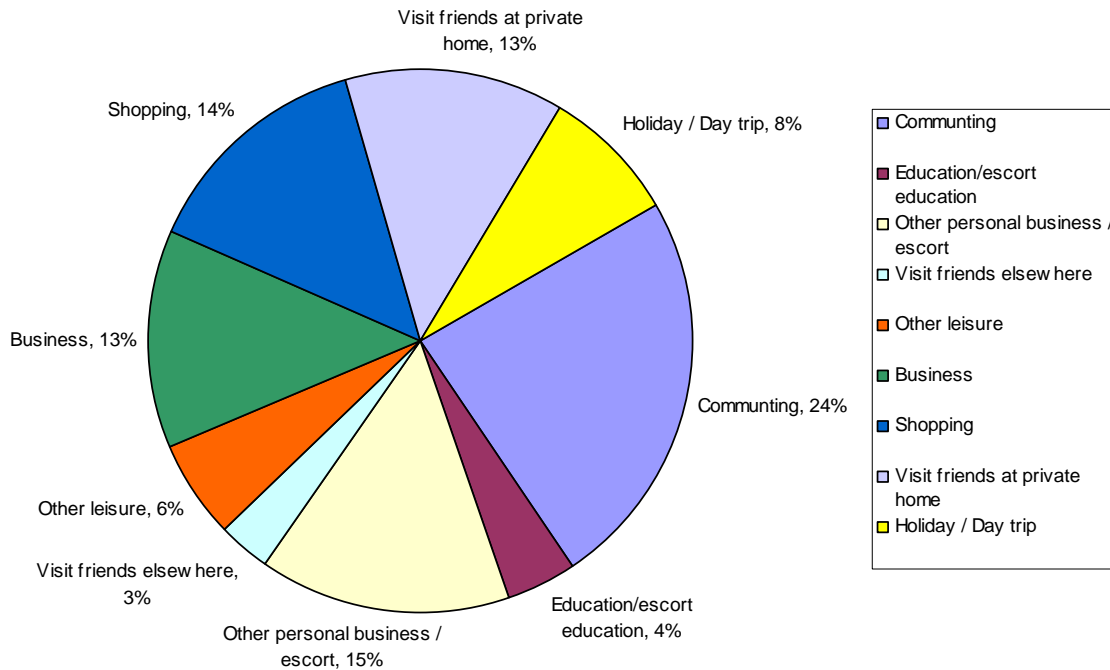
⁵ DfT (2008) Delivering a Sustainable Transport System: Main Report

Figure 2.1 UK Carbon Emissions from Domestic Transport by Source



Source: National Atmospheric Emissions Inventory 2006

Figure 2.2 Estimated Carbon Emissions from all Modes of Passenger Transport by Journey Purpose, Great Britain, 2002/2006 Average



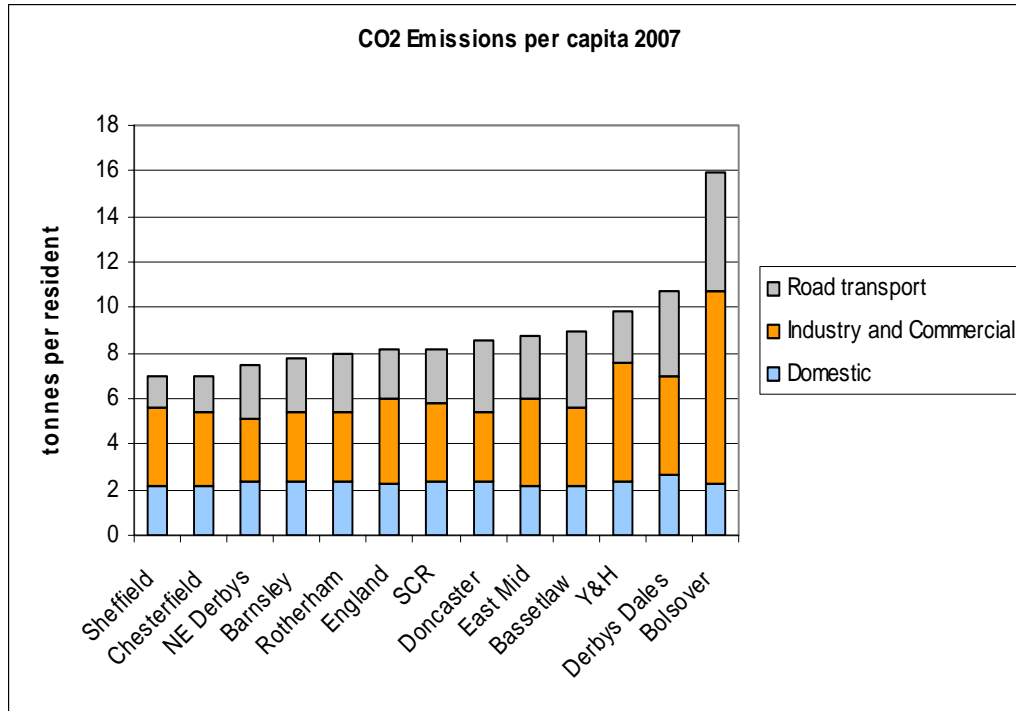
Source: DfT Analysis

Note 1: The 'Other' category includes Liquid Petroleum Gas emissions (all vehicles); other road vehicle engines, and other mobile sources and machinery

Note 2: Emissions from rail given above are from diesel trains only consistent with UNFCCC reporting guidelines.

2.17 In 2006, Sheffield's total carbon emissions were estimated at 3,693,005 tonnes. With a resident population of 528,800, this equates to 7.02 tonnes of carbon per person⁶. In the other districts across SCR, emission figures per capita are higher; Figure 2.3 shows these figures (in tonnes per resident) for 2007. The emissions reported are produced by transport, households and businesses.

Figure 2.3 Carbon Emissions per Capita 2007 (Tonnes per Resident)



Source: Sheffield City Region Strategic Economic Assessment

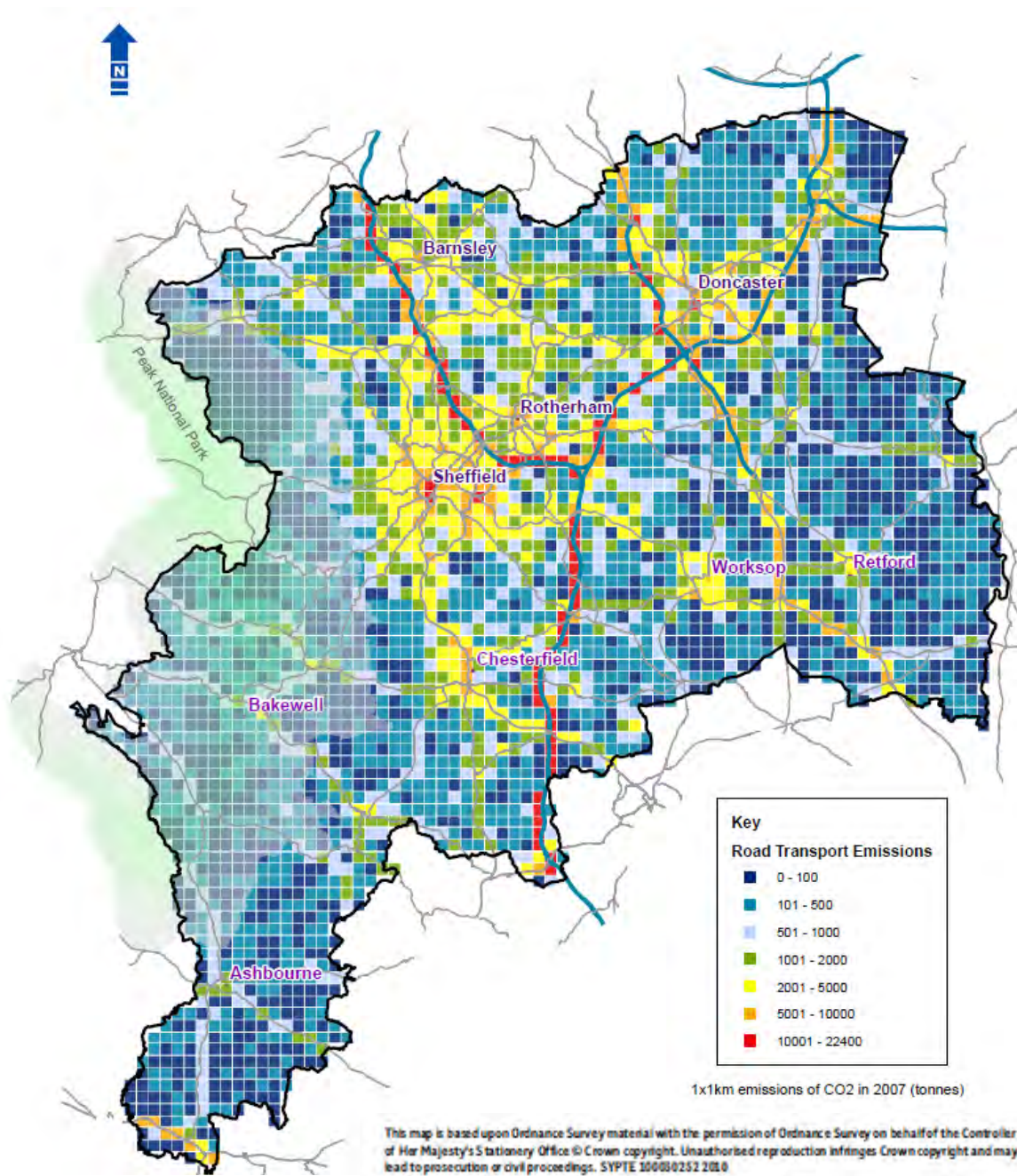
2.18 Of all SCR districts, Bolsover has the highest per capita emissions with 15.9 tonnes; this is followed by the Derbyshire Dales with 10.7 tonnes. Transport emissions per capita in Bolsover are nearly eight times the national average and much higher than those experienced in the rest of SCR. This high level may however be due to long lengths of the M1 passing through the district and Bolsover's low population. Namely, the high levels of transport emissions per capita demonstrate the critical effect of factors outside the control of SCR partners, such as the impact of the national highways network.

2.19 The National Atmospheric Emissions Inventory can determine the zones of highest carbon production. These are illustrated for SCR in Figure 2.4. Transport currently accounts for approximately 20% of all carbon emissions in South Yorkshire⁷.

⁶ Sheffield City Council (2009) Sheffield City Council Carbon Reduction Framework

⁷ LTP mid-term review 2008

Figure 2.4 Carbon Emissions from Road Transport in SCR



Source: National Atmospheric Emissions Inventory http://www.naei.org.uk/data_warehouse.php

2.20 Figure 2.4 shows that carbon emissions in South Yorkshire are concentrated in small parts of the county. The greatest levels of emissions are in the centre of Sheffield and on the motorway network, particularly the M1. These locations serve a strategic function and carry the highest traffic volumes; therefore the concentration of carbon emissions is not unexpected.

- 2.21 Other areas with high levels of emissions are the junction of the A630 and A631 to the south of Rotherham and sections of the M18 and A1 (M). There is also a significant area of high emissions centred on the interchange of the M18 and M180 to the north-east of Doncaster. In addition, high levels of carbon emissions are seen in the centres of Barnsley, Doncaster and Rotherham, with the highest urban emissions found on the road network through Sheffield.
- 2.22 The Sheffield City Region 'DaSTS' Connectivity Study⁸ identifies local corridors where emissions are high. These are summarised in Table 2.2.

Table 2.2 Road Corridors Generating Carbon Emissions

| DaSTS Study Area | Location of high emissions |
|--|---|
| Sheffield Travel to Work | Strategic corridors and the congested urban networks. High proportion of trips are over 10 miles, and these journeys generate the most carbon emissions |
| Doncaster Corridor | Strategic corridors including the M1 and A1 (M). |
| Rotherham - Sheffield Corridor | Key routes within the corridor including the A6109, the A6178 and the A630. |
| External Connectivity and Access to Robin Hood Airport Doncaster Sheffield | Strategic corridors including the M1 and A1 (M). |

Source: Sheffield City Region DaSTS Connectivity Study, Baseline Report, draft, Ove Arup and Partners (2010)

- 2.23 The implication from both the National Atmospheric Emissions Inventory and DaSTS studies is that the areas with the highest levels of carbon emissions are near the motorway and urban road networks. The motorways carry large quantities of traffic that are not necessarily travelling to or from SCR. It therefore highlights the importance of cooperation with other parties, in this case the Highways Agency, in the attempt to mitigate those high emissions.

Future Carbon Emissions

- 2.24 Forecasts of future carbon emission from transport have been developed as part of our work with SCR Urban Dynamic Model (UDM). The UDM has been used to assess the effectiveness of transport policy measures and to identify their environmental and other impacts over time. Further information on the UDM work is provided in Document 3: Forecasting.
- 2.25 Among the UDM outputs are estimates of the environmental impacts of pre-specified scenarios, based on a known relationship between vehicle kilometres and carbon emissions. Table 2.3 shows the change in carbon emissions, as per the UDM outputs, between 2007 and 2027. The results focus solely on journeys to work by car and do not include journeys made for other purposes. The presented forecast relates to the do-minimum scenario with two different sets of assumptions about the growth of population and employment in SCR. The do-minimum scenario represents what would happen if no new interventions, except those already committed, are completed within the timeframe.

⁸ Ove Arup and Partners (2010) Sheffield City Region Connectivity Study (part of the Delivering a Sustainable Transport System programme, 'DaSTS'), Baseline Report, draft,

Table 2.3 Journeys to Work by Car, Change in Carbon Emissions per Annum in 2027 (Baseline Do-minimum Option)

| District | Carbon Emissions | | | | | | |
|------------------------|------------------|----------------|---------------|-----------|----------------|---------------|------------|
| | Base | Low Growth | | | High Growth | | |
| | 2007 | 2027 | Change | % Change | 2027 | Change | % Change |
| Barnsley | 42,661 | 44,696 | 2,034 | 5% | 45,892 | 3,230 | 8% |
| Doncaster | 80,863 | 75,559 | -5,304 | -7% | 81,708 | 845 | 1% |
| Rotherham | 56,159 | 60,918 | 4,758 | 8% | 62,986 | 6,827 | 12% |
| Sheffield | 91,490 | 102,524 | 11,034 | 12% | 113,810 | 22,320 | 24% |
| South Yorkshire | 271,173 | 283,696 | 12,523 | 5% | 304,396 | 33,223 | 12% |
| Bassetlaw | 54,356 | 66,745 | 12,389 | 23% | 71,116 | 16,759 | 31% |
| Bolsover | 27,766 | 29,933 | 2,166 | 8% | 28,268 | 502 | 2% |
| Chesterfield | 49,488 | 49,664 | 176 | 0% | 52,337 | 2,849 | 6% |
| Derbyshire Dales | 60,036 | 66,669 | 6,632 | 11% | 67,607 | 7,571 | 13% |
| North East Derbyshire | 22,348 | 22,151 | -197 | -1% | 22,820 | 472 | 2% |
| SCR | 485,168 | 518,857 | 33,689 | 7% | 546,544 | 61,375 | 13% |

Source: UDM, Steer Davies Gleave

- 2.26 For the entire SCR area, the forecast is for an extra 61,375 tonnes of carbon emissions per annum by 2027 in the do-minimum, high growth option. This is an increase of 13% which is contrary to the direction of national and local policy discussed earlier.
- 2.27 The detailed analysis presented in Document 3: Forecasting, explores the impact of different types of intervention and how different combinations of interventions can result in different outcomes. Comparisons between different intervention scenarios are made with the 2007 baseline and a 2027 do-minimum option. Some of the key results identified in the forecasting document are summarised here:
- Under the 'low' growth scenario, some of the intervention scenarios show a reduction of CO₂ emissions across SCR by up to 20 Kilo tonnes per annum
 - Under the 'low' growth, more of the intervention scenarios reduce CO₂ emissions for South Yorkshire only
 - Under 'high' growth, none of the intervention scenarios reduce CO₂ for Sheffield City Region, but some of the scenarios increase it by less than 20 Kilo tonnes per annum (i.e. less than 4%)
 - Under 'high' growth, some of the intervention scenarios reduce CO₂ in South Yorkshire compared to 2007, albeit slightly, while others hold emissions more or less steady.
- 2.28 This suggests that some of the potential interventions are more likely to reduce carbon emissions than others. This modelling work gives us evidence to determine which combinations are more likely to achieve our goal of reducing carbon emissions.
- 2.29 More generally, it is clear from the modelling work that if we do little to change the current trends then carbon emissions will increase significantly. This clarifies that we need to put in place clear policies to reduce carbon emissions and tackle climate change.

3. Vehicle Efficiency

Introduction

- 3.1 This chapter identifies a number of measures that can be considered to tackle climate change. The chapter highlights measures to improve vehicle efficiency and the wider use of low-emission vehicles that can help to reduce carbon emissions.

Increasing Efficiency and Using Greener Fuels

- 3.2 Sheffield City Council (SCC) has made significant steps towards improving the carbon efficiency of vehicles within SCR. Along with trials of various low carbon vehicles (LCV) SCC has introduced 10 Compressed Natural Gas (CNG) vehicles into their fleet along with temporary refuelling stations. The fuel used to power these vehicles is bio methane which is extracted from a landfill site. LCVs' can offer significant benefits compared to the conventional vehicle including; 80% less carbon emissions, 97% less NOX emissions and 100% particulate emission reduction.
- 3.3 The project is funded by the City Council with further monies from the Government's Alternative Fuel Infrastructure Grant, Defra Air Quality Grant and support from Volkswagen and Mercedes-Benz. To allow longer term commitment to gas vehicles, the possibility of further grant funding together with the necessary match-funding for a permanent gas refuelling facility is currently under investigation.

Plugged in Yorkshire

- 3.4 Sheffield City Council also submitted a funding application to the Government's Plugged in Places funding programme (circa £30m over 3 years) on behalf of SCR and South Yorkshire Partnership. The intention was the fund would be used across SCR to install electric vehicle charging infrastructure. Whilst this was unsuccessful, elements of the bid are being taken forward by Sheffield City Council to achieve the following:
- To provide a strategic electric transport hub, facilitating travel by electric vehicle between the North East, the North West, the Midlands and the South of England. This will be achieved by establishing Sheffield as a key hub in the new national infrastructure and becoming a 'leading light' in 21st century low-carbon transport options.
 - To place electric and bio methane vehicles, alongside other conventional choices, as viable travel options where appropriate. This will include the creation of refuelling and recharging infrastructure across SCR, to ensure that vehicles can be used where and when it is sensible to do so.
 - To commit to developing a collaborative approach with the Leeds City Region.
 - To encourage a wider uptake of electric charging infrastructure across all local authority areas, through the development of policies and a procurement commitment in fleet management.
 - To actively increase the awareness of low-carbon transport options across SCR, so that people begin to change their approach to travel.
 - To procure a strategic partner who will maintain, co-fund and expand the recharging network across SCR.

Carbon Reduction Policy

- 3.5 Already in chapter 2 the targets for carbon reduction have been identified. The Carbon Reduction Policy in Sheffield also sets a number of targets to increase the efficiency of vehicles and of the highways network, as well as using greener fuels. The policy states that Sheffield will:
- Set parking charges in their car parks to benefit people who choose low carbon vehicles
 - Work with utilities companies to reduce the impact of road works and use intelligent urban traffic control to smooth traffic flows
 - Tackle illegal parking, particularly in bus lanes and urban clearways
 - Make sure that bidders for new highways contracts set out how they will reduce carbon emissions over the lifetime of the contract.
- 3.6 While the first of the policies relates directly to evidence in this document, the following three are more closely linked to benefits of reduced congestion and improved traffic management. The topics of congestion and traffic management are covered in more detail in Document 2: Networks and Document 5: Supporting Economic Growth.

European Strategy for Clean and Energy Efficient Vehicles

- 3.7 A strategy has been developed by the European commission in order to address the issue of growth in an unsustainable global car fleet. It is predicted that the global car fleet will grow from 800 million to 1.6 billion by 2030⁹.
- 3.8 The Strategy will provide a framework for and promotion of clean and energy efficient vehicles. The outcome of these actions will be:
- Addressing climate change and fossil fuel dependency
 - Improved air quality especially in the cities
 - Faster development of clean automotive technologies without compromise on safety requirements
 - Mass market uptake of these technologies and therefore greater choice for the consumer
 - More competitive automotive industry and associated sectors.

⁹ European Commission (2010) European Strategy on Clean and Energy Efficient Vehicles

4. Sustainable Travel

Introduction

- 4.1 This section gives an overview of how active travel and the use of smarter choices to influence behavioural change towards travel can benefit SCR and contribute towards reducing carbon emissions.

Active Travel

Overview

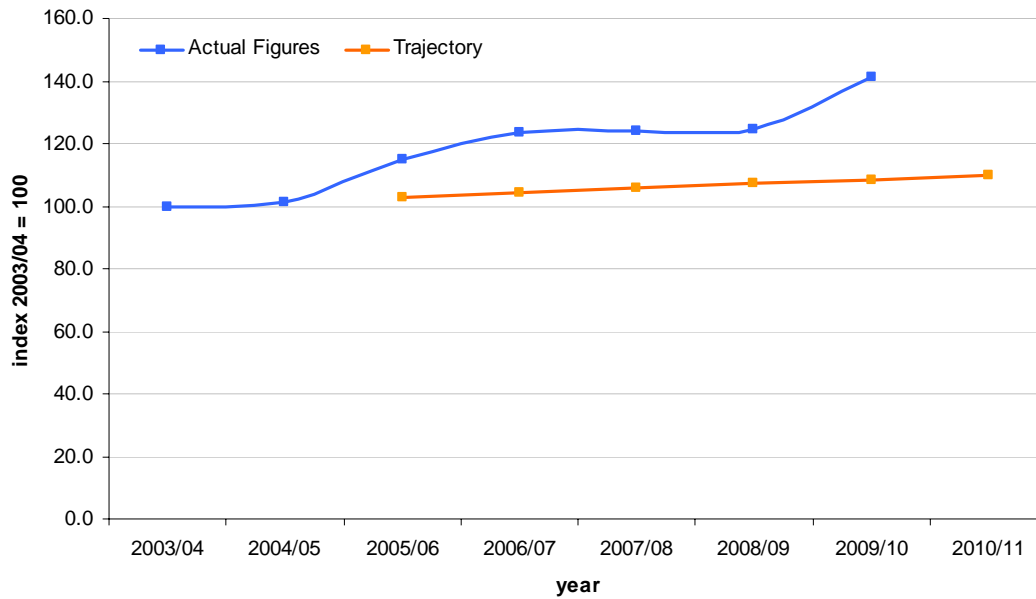
- 4.2 In order to reverse the trends of higher levels of obesity and shorter life expectancy there is a need to develop targeted interventions. These interventions will need to ensure residents are able to lead active, healthy lifestyles by providing easy access to walking and cycling activities. The importance of walking and cycling is supported by government, with walking and cycling been placed at the heart of central government transport and health strategies.
- 4.3 The British Medical Association (BMA), in its 2009 Annual Representative meeting, put forward a number of recommendations to encourage the take up of walking and cycling. These recommendations were:
- Highway authorities create safe and comprehensive cycle networks suitable for all cycling abilities
 - Facilities for cyclists to use train travel should be increased, so as to provide practical alternative to the private car for many journeys
 - Cycling should be included in NHS exercise promotion programmes.
- 4.4 Encouraging physically active travel helps to meet a wide range of local and national objectives, including:
- Improving public health
 - Reducing carbon emissions
 - Improving air quality and the local environment
 - Improving accessibility and reducing congestion
 - Improving quality of life and better neighbourhoods.
- 4.5 The publication by National Institute for Health and Clinical Excellence (NICE)¹⁰ identifies that whilst individual interventions to promote physical activity may be important, they are not the only solution. Other issues, including environmental factors, need to be tackled. NICE quotes research by Schmid et al (1995) they say 'It is unreasonable to expect people to change their behaviours when the environment discourages such changes' NICE defines the environment as; 'Any aspect of the physical or the urban or constructed environment that subconsciously or consciously relates to an individual and their physical activity behaviour'.

¹⁰ Promoting and Creating Built or Natural Environments that Encourage and Support Physical Activity (2008) NICE

Cycling

4.6 Since the 2003/04 baseline year the number of cycling trips has increased by almost 25%. Figure 4.1 shows the growth in cycling trips in South Yorkshire.

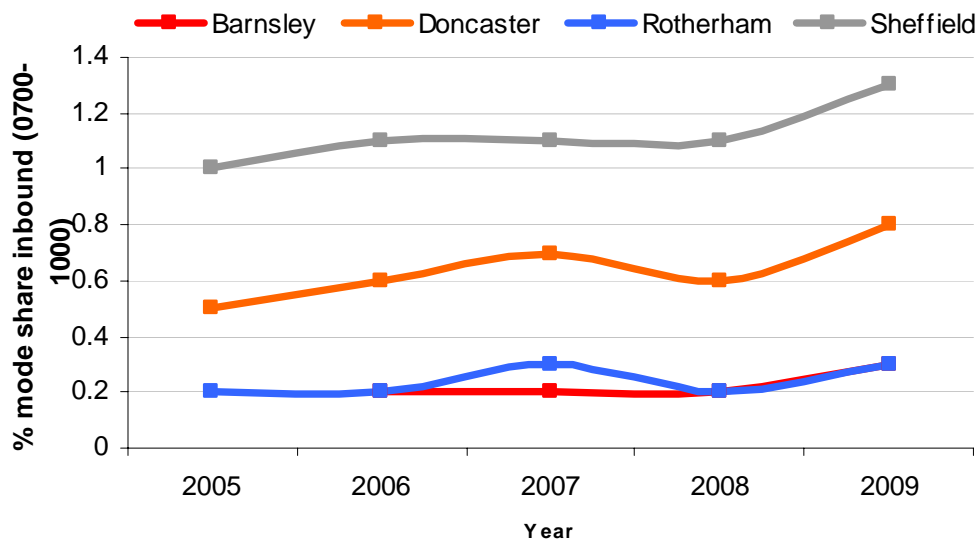
Figure 4.1 Cycle Trips Entering or Leaving Centres of Barnsley, Doncaster, Rotherham and Sheffield (Annualised Index)



Source: LTP Monitoring

4.7 However, the recorded growth is from a low base and cycling still only represents a small proportion of commuting trips. Cordon Count data for each of the districts is presented in Figure 4.2.

Figure 4.2 Cycle Mode Share Percentage



Source:

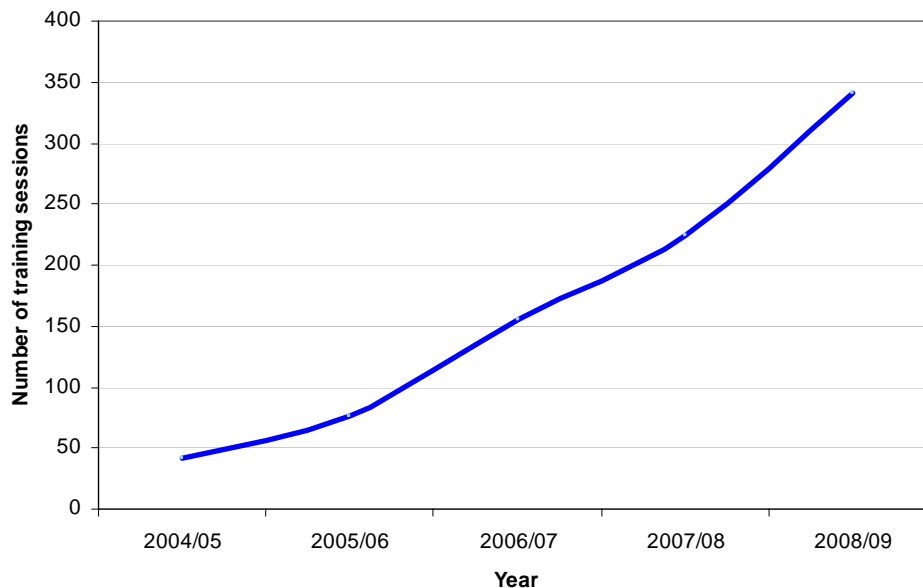
SYLTE Cordon Count data

- 4.8 Figure 4.2 shows that cycle trips make up just over 1% of all journeys into Sheffield. The figures for Barnsley and Doncaster are much lower than this, with cycle trips representing only 0.2% and 0.3% of journeys into the respective centres. Despite these low proportions, growth has been seen across all four districts between 2005 and 2009. Sheffield and Doncaster have seen the greatest increases in the number of cycle trips measured. Rotherham and Barnsley have seen the least growth.
- 4.9 There are a number of cycling routes across South Yorkshire, however overall provision is limited. Some 14 miles of National Cycle Network have been introduced in the Rotherham Area. There is also an additional 28 miles of Trans-Pennine Trail available. The route along the towpath of the South Yorkshire Navigation Canal provides a further 8 mile traffic free route between Rotherham and Sheffield.
- 4.10 The Doncaster Cycling Action Plan (DCAP) details the core objectives to promote cycling in the borough. DCAP aims to provide a high quality cycle route for commuter and leisure use along with cycle parking in town centres, transport interchanges and local facilities together with road safety education training and publicity. All the proposed routes within the DCAP are identified on the Unitary Development Plan (UDP) proposals map to ensure that alignments are protected from future development.
- 4.11 Funding has been awarded by the Department for Transport to develop a cycle hub at Sheffield railway station; this hub will offer repairs, bike hire and secure supervised parking. Across South Yorkshire investment has and is being made at local railway stations.

The Performance of Cycling Initiatives

- 4.12 Sheffield has set up a series of one-to-one training schemes through their accredited company Pedal Ready. These courses provide:
- A free 2 hour one-to-one cycle coaching session for any resident living in Sheffield
 - Help with basic cycling skills
 - Help choosing and using your route (e.g. to work/leisure)
 - Male/female instructors
 - Slots that are run at convenient times.
- 4.13 Uptake of the one to one training is shown in Figure 4.3. Over the past 5 years the number signing up for these courses has increased from 42 in 2004/05 to 341 in 2008/09.

Figure 4.3 Pedal Ready '121' Cycle Training Sessions Undertaken



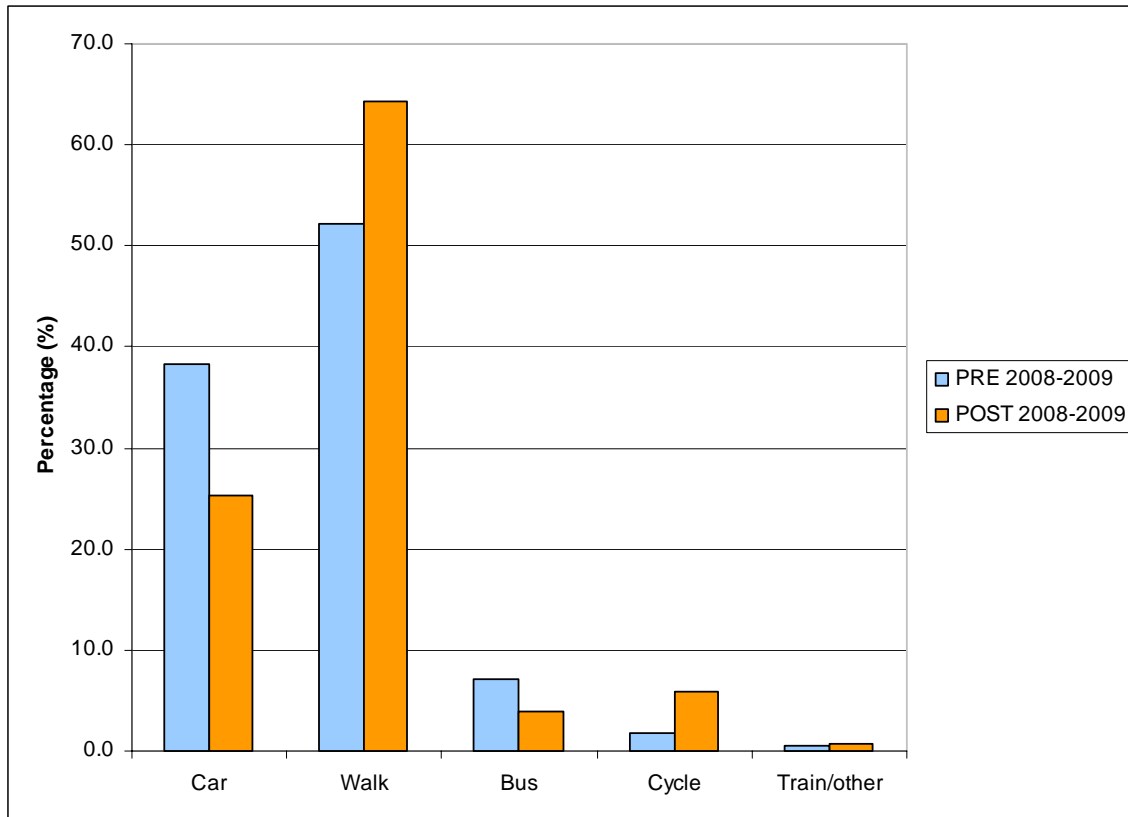
Source: Sheffield City Council

- 4.14 Feedback from the courses indicated that 85% of respondents would 'definitely' or 'possibly' cycle more as a result of the course. However, a number of people enrolled on these courses are already regular commuters. Taking this into account results in 92% of trainees who responded say they will either be cycling more or are already regular cyclists. The main areas of progress have been in personalised advice and training for current and would-be cyclists.
- 4.15 Sheffield City Council also provides cycle training for children. Between 2004 and 2008 there were between 200 and 400 children trained each financial year to Bikeability Level 2, which incorporates Level 1. By 2008/9, Sheffield City Council had delivered cycle training to 1,517 children (target 1,500). The target for 2009/10 was for 2,000 children to have been trained.
- 4.16 This has been supported by the Bike It project. Bike It is a scheme that is all about helping children get fit and healthy by teaching them the skills they need to cycle safely and responsibly. Bike It officers work with schools throughout England and Wales, talking and listening to parents, teachers and children and then running a year long programme of school projects, training and fun events to get the whole school community cycling together. In South Yorkshire, both Doncaster and Sheffield councils have been involved in the scheme.
- 4.17 In Sheffield a Bike It officer works intensively with up to 18 schools in a given year to break down the barriers that prevent children cycling to school¹¹. Only twelve months into the Bike It project, car use on the days of the surveys was down from roughly 38% to 25% of school trips, cycling increased from below 2% to around 6%. Perhaps most surprising is that walking increased its mode share from 52% to 64%. The outcomes are less congestion and pollution around schools and more active children and parents.
- 4.18 Doncaster has been involved in the Bike It scheme since 2005. Starting off with 2 schools taking part, Bike It has grown into 12 schools per year being involved. Working

¹¹ In a recent hands-up survey the preferred mode of travel for 43% of Sheffield schoolchildren was by bike

in partnership with Bike It officers, schools have been targeted through School Travel Plans. Work includes attending school assemblies, 'Dr Bike' sessions, Bike Breakfasts and guided rides. Figure 4.4 shows the results from before and after surveys in Doncaster and the growth in cycling post Bike It.

Figure 4.4 Question: How Children get to School Before and After the Bike it Project



Source: Sheffield City Council

- 4.19 There have also been two workplace initiatives that have improved take-up and safety of cycling to work. Firstly, Pedal Ready work with Sheffield City Council to help Sheffield businesses reward and encourage their cycling employees. For example, between September 2008 and December 2009 1,216 bikes were checked at 'Dr Bike' sessions. Partnership organisations included both Universities and two hospitals. In addition workplace roadshows focus on helping cyclists and potential cyclists overcome barriers.
- 4.20 The second is Bike Boost, where the City Council is working with Get Cycling, a York-based cycling company, with the aim of recruiting 800 non-cycling commuters to 'give it a go'. This includes free loan of new bike and equipment, training, peer support, web-based support and FAQs as well as social events. Evidence from Get Cycling's workplace challenges indicates a 75% stay-on rate. Over two years it is expected that 600 new regular cycle commuters will be generated (cycling at least 50% of the time).
- 4.21 Doncaster Council has established a Bike to Work scheme that has seen over 250 employees taking up the initiative since its inception. Interest in this scheme continues to grow and the scheme was re-launched in May 2010 where Doncaster expect to have a high level of interest again.

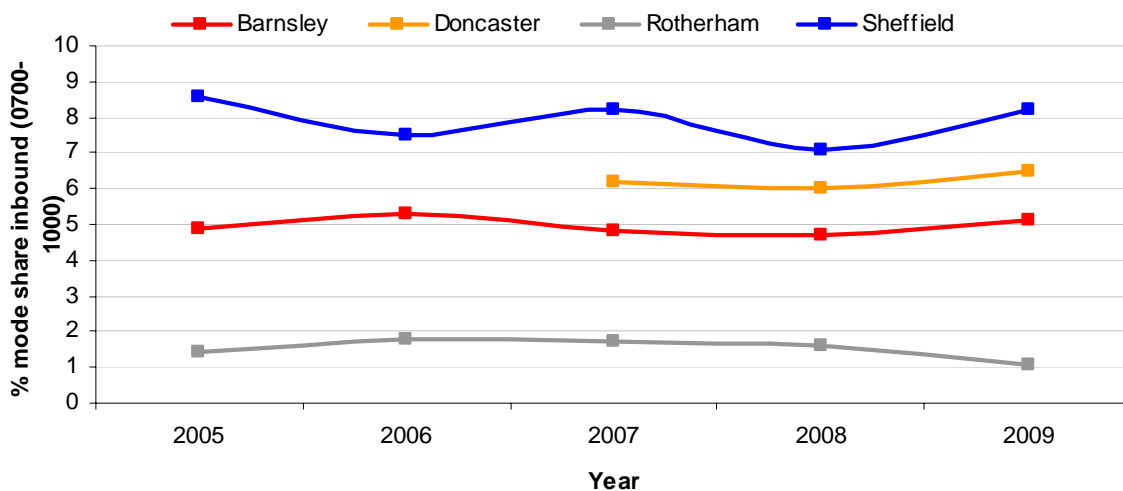
4.22 Barnsley Bikeability is a partnership that has been formed to deliver national cycle training across the borough. The scheme started in 2007/08. To date well over 1,000 year 6 pupils have been trained to Bikeability standard level 2. In 2009 the Barnsley Bikeability scheme won the care4air award for excellence.

Walking

4.23 There are many benefits to walking including improving physical and mental health, contributing to a more sustainable transport system and being an affordable means of transport that is available to almost everybody. Better conditions and facilities for pedestrians can improve people's quality of life, reduce congestion, and make SCR a more attractive location for employers, employees, residents and visitors, which results in economic benefits.

4.24 Cordon count data obtained by the four South Yorkshire district authorities shows higher levels of walking than cycling across all of the districts. However, as Figure 4.5 shows, the numbers have remained static throughout the past five years.

Figure 4.5 Cordon Count Data Detailing Walking Trips across South Yorkshire



Source: SYPTE Cordon Count data

4.25 During the development of their draft Pedestrian Strategy Sheffield City Council carried out a series of consultation events. Key issues identified during these events included:

- The quality of highway surfaces and street lighting
- Barriers such as the ring road, subways and footbridges
- Obstructions such as cars parked on pavements, excessive road signs and vegetation
- The need to feel safe
- The needs of disabled people to be addressed more fully
- Conflicts with cyclists on the footway
- The need for integration with other modes
- Making combined journeys, such as dropping children at school then travelling to work

- Poor information.
- 4.26 Sheffield's overall aim is to be a walking friendly city. Nine key priorities have been set out to realise the City Councils vision of making jobs, services and amenities, accessible by foot with pedestrian routes being pleasant, people focused and safe. These priorities are:
- Design and Facilities
 - Safety and Security
 - Accessibility and Mobility
 - Integration with Other Modes of Transport
 - Planning for New Development and Regeneration
 - Promoting the Benefits of Walking
 - Route Maintenance
 - Consultation and Partnership Working
 - Resources and Delivery.
- 4.27 Barnsley Metropolitan Borough Council set up the Barnsley Reward Scheme in September 2007. This scheme is a walking initiative to encourage walking to school and reduce car journeys. The Barnsley Reward Scheme aims to encourage full time primary school children (aged 4-11 years) to walk to and from school by offering rewards. It is hoped that by doing this, car journeys to schools will be reduced and the environment around the school gate improved. The scheme works in a similar way to many high street 'loyalty' cards; each day that a child walks to or from school they are issued with a sticker. Once a specified number of stickers are collected, the card is validated and can be used to gain free entry to many local attractions.

Using Streetscape to Encourage Active Travel

- 4.28 In order to enable active travel there is a need to ensure that streets are well designed, so that they function as both places and movement routes. Where streets balance these roles effectively, they can enhance the quality, and improve the viability, of a place. Good quality design can help reduce accidents, create areas for people to socialise and encourage walking, cycling and use of public transport. It is also important that the design includes the needs and preferences of the different users. In addition, good streetscape can also encourage visitors to an area.
- 4.29 The DfT's Manual for Streets primarily covers new residential streets but can also apply to existing residential streets. The key recommendation is that increased consideration should be given to the 'place' function of streets. This function is essentially what distinguishes a street from a road, where the main purpose of a road is to facilitate movement.
- 4.30 Within the major centres the links between the quality of the public realm and accessibility for walking and cycling were not considered to the same extent in the past as now. There are numerous examples in SCR where accessibility is constrained by roads. For example in Doncaster the Minster Church of St. George¹² dominates the Doncaster skyline and is one of the town's most architecturally important buildings. However, the Minster has poor accessibility from the town centre because of severance caused by the ring road (Church Way).

¹² Described by the former poet Laureate, Sir John Betjeman as "Victorian Gothic at its very best"

- 4.31 In order to increase the take up of Active Travel modes such as walking and cycling the environment needs to be conducive. The Public Attitudes to transport survey identified from DfT's On-line Citizens' Panel identified three key themes for improving peoples' health and life expectancy through healthier forms of travel such as walking and cycling (ordered by frequency of mention):
- Improve provision for cyclists/safe lanes/facilities
 - Improve safety/lighting/reduce street crime
 - Educate and promote walking and cycling
- 4.32 Within Doncaster large areas of the town centre have been pedestrianised, and in 1999 Doncaster won the British Council of Shopping Centres Design Award for Phase IV of its Quality Streets initiative.
- 4.33 Other schemes include the Civic and Cultural Quarter development which will see Waterdale Road becoming pedestrian friendly like other quality streets in Doncaster with only public transport and service vehicles allowed access into the area.
- 4.34 In 2009 Rotherham Council obtained a Beacon status for their 'Streetpride' initiative in the town, one of only five authorities in the country to receive this award. In determining the award feedback from the Inspectors stated that "Rotherham understands the links between public realm and events".
- 4.35 'Streetpride' has already achieved impressive results both in service delivery and response times, having achieved a 97% success rate in meeting targets against a list of 30 target response times for clearing drug litter, dealing with a dangerous highway defects, spillages, dog waste, fly tipping, abandoned cars, offensive graffiti and dog fouling.
- 4.36 In Sheffield the Gold Route has been developed. This multi-award winning route provides a clear pedestrian route through the city linking the station, retail areas, business quarter and two university campuses. Sections of new pedestrianised space have been developed this includes Howard Street and Sheaf Square where planting, surface finishes and lighting guide people towards the city centre. The use of surface finishes such as stone setts has led to reduced traffic speeds in areas where pedestrians and traffic mingle around the Winter Gardens and Town Hall.
- 4.37 The redesign of many areas of the city has seen the removal of many sections of the Inner Ring road, this 1960s dual carriageway and associated subways was built when planning for roads was prioritised. Much of the inner ring road has been replaced with a much more pedestrian friendly environment. Pavements have been built out to provide wider footways and roads have been reduced from dual carriageway to single carriageway, subways have been removed with crossing points placed above ground. The remodelling of Eyre Street in Sheffield saw a seven fold increase in the number of cyclists crossing between the City Centre and the Cultural Industries Quarter with an increase from 20 to 137, highlighting the impact that streetscape has on cycle use .
- 4.38 Pedestrian crossing movements between the City Centre and the Cultural Industries Quarter also increased by 40% from 3168 movements per day to 5525 movements a day. The number of infirm, elderly and encumbered pedestrians crossing Eyre Street was even more impressive increasing by 175% from 72 per day to 198 per day . These figures show the impact of the scheme in terms of improving access for some of the least mobile pedestrians and highlight the severance affect of the previous road layout.
- 4.39 Whilst these are positive examples of what can be done much work, further progress will be required over the lifetime of the strategy, such as:

- Making walking safer by providing attractive, pedestrian friendly streets giving greater opportunity to walk and reducing pedestrian casualties.
- Improving mobility, giving priority to the needs of pedestrians in the design of transport infrastructure by creating standards for design, safety and quality.
- Improving maintenance and remove obstructions to the footway.
- Linking the public realm to improvements in transport.

Benefits of Active Travel

Economic Benefits

- 4.40 Congestion, physical inactivity, CO2 emissions, pollution and accidents are amongst the wider impacts of our transport system which is predominantly car orientated. The cumulative economic impact of these effects is up to £56 billion for the UK alone. This is more than the UK's income from vehicle excise duty and revenue from fuel sales, which only raised £37.1 billion in 2007/08¹³. With investment in walking, cycling and public transport, governments could immediately start reducing these costs to our wider economy.
- 4.41 In 2009 the National Cycle Network carried over 407 million journeys. These cycle and walking journeys had a combined health benefit of £384 million. These values far exceed the cost of developing walking and cycling paths.
- 4.42 At a benefit to cost ratio of nearly 8:1, 40,000 households received local walking, cycling and public transport information from Sustrans. This resulted in travel behavior change and a reduction in car use of between 460 and 875 miles per household per year¹⁴.
- 4.43 If the cycling infrastructure and facilities can be improved and are supported by lower speed limits and car free zones, large urban areas can achieve a 15% modal share for cycling by 2022¹⁵.

Carbon Reduction

- 4.44 Of the UK's total transport emissions, 55% come from personal car use with more than half of all car journeys being less than five miles. Only 2% of journeys less than five miles are currently cycled¹⁶. Evidence suggests that with the right investment in urban areas, 9 out of 10 journeys could be made on foot, bike and public transport¹⁷.
- 4.45 In Britain, on average, each person travels about 1,300 miles a year on journeys of less than five miles¹⁸. If we could increase the percentage these of cycle trips from 2% to 20% and these walking trips from 34% to 40%, there is the potential to reduce CO2 emissions by 3.9 million tones per year with a value of £236 million.
- 4.46 Sustrans began work on new walking and cycling networks in 30 communities, overcoming barriers including roads, rivers and railways to give people easier access to schools, work and green spaces. In the next two years, a further 49 communities will benefit from similar schemes and in total up to six million people UK-wide will be able to

¹³ Sustrans (2010) Moving Forward Monitoring Report

¹⁴ Sustrans (2008) Travelsmart information sheet FF36

¹⁵ PTEG (2009) Carbon Pathways for Transport in the City Regions

¹⁶ Department for Transport (2009) National Travel Survey 2008

¹⁷ Sustrans (2010) Moving Forward Monitoring Report

¹⁸ Department for Transport (2010) travel survey 2009

choose to walk and cycle their everyday journeys, potentially saving 80,000 tonnes of carbon dioxide annually at a value of over £4 million¹⁹.

- 4.47 Sustrans' National Cycle Network carried over one million zero-carbon journeys every day. If each of these journeys replaced a car trip, this is a potential carbon dioxide saving of 625,000 tonnes a year, the equivalent annual emissions of more than 227,000 car trips²⁰.

Health Benefits

- 4.48 Studies have shown that moderate physical activity, including walking and cycling, can reduce the risk of obesity, diabetes, hypertension, coronary heart disease, stroke and mental illness. Lower risk of colon, breast and lung cancer has also been linked to physical activity. Based on this benefit to health, adults are recommended to undertake a minimum of 30 minutes, of at least moderate intensity activity, on most days of the week.
- 4.49 Short periods of moderate activity throughout the day are as beneficial to health as a sustained session of activity. In this context, shifting transport modes towards active travel can be an important contribution to an individuals overall activity level.
- 4.50 In 2010, the National Institute for Health and Clinical Excellence issued guidance on preventing cardiovascular disease, calling on governments to invest in active travel. Obesity and related chronic conditions are predicted to cost the UK nearly £50 billion a year by 2050²¹.
- 4.51 Enabling people to walk and cycle more for everyday journeys is one of the easiest ways of introducing physical activity into our daily lives. If everyone could choose to walk or cycle for more journeys, the nation's health would improve, with considerable savings to the NHS and wider economy.
- 4.52 Of adult users of the National Cycle Network, 42% got at least 30 minutes of physical activity on at least five days a week, the recommended levels suggested by health experts²². On average only 34% of adults in England are achieving these recommended levels of activity²³.
- 4.53 The percentage of children who never cycle to school dropped by 17% in schools where Sustrans worked. Sustrans worked with 130,000 children who had a positive experience of cycling, and 94% of head teachers said that this had helped pupils become more physically active²⁴.
- 4.54 The total health benefit to cyclists using the National Cycle Network during 2009 was worth £288 million when valued using the World Health Organisation's Health Economic Assessment Tool. The target for the London 2012 Olympic Games legacy is to help at least two million people to be more active. Over two million people were more physically active in 2009 alone thanks to the National Cycle Network. Of these, over half were previously not active enough to benefit their health.

¹⁹ Department of Energy and Climate Change (2009) Carbon Valuation in UK Policy Appraisal: A Revised Approach

²⁰ Sustrans (2010) Moving Forward Monitoring Report

²¹ Government Office for Science (2007) Foresight Tackling Obesity: Future Choices – Project Report

²² Department for Health (2004) At least five a week: Evidence on the impact of physical activity and its relationship to health. A report from the Chief Medical Officer

²³ Sustrans (2010) Moving Forward Monitoring Report

²⁴ Sustrans (2010) Moving Forward Monitoring Report

Additional Smarter Choices

- 4.55 Smarter Travel Choices is a broad title referring to a range of activities undertaken to inform travellers of the benefits of using public transport, walking and cycling, through targeted travel plans at businesses and key organisations, and through personalised travel planning.
- 4.56 The DfT have published an evaluation of the Sustainable Travel Towns projects²⁵. The 5 year project aimed to demonstrate the effect a sustained package of 'Smarter Travel Choice' measures can have when coupled with infrastructure improvements. Darlington, Peterborough and Worcester were selected to become 'showcase' demonstration towns. The 3 towns shared £10m of revenue funding during the project with building and improvement works funded by LTP capital funding. The interventions used in the Sustainable Travel Town projects include:
- Workplace travel planning
 - School travel planning
 - Personal travel planning
 - Public transport information and marketing
 - Cycling and walking information, marketing, training and events
 - Travel awareness
 - Car clubs.
- 4.57 Within the DfT report a number of conclusions have been made that support the use of Smarter Choices for reducing Carbon Emissions. The report concludes that the interventions in the Sustainable Travel Towns were successful in reducing carbon emissions, and that large-scale Smarter Choice programmes therefore represent a viable tool for reducing carbon.
- 4.58 Estimations made in the report suggest that the Sustainable Travel Town programme resulted in annual per capita carbon savings across the three towns. This saving was a result of reductions in car driver journeys of less than 50km in 2008, compared to 2004.
- 4.59 In South Yorkshire, the South Yorkshire Sustainable Travel Working Group (SWTG) provides a strategic focus and delivery programme for Smarter Choices initiatives. The group is made up of representatives from the four Local Authorities, South Yorkshire Passenger Transport Executive (SYPTe), Highways Agency (HA) and the South Yorkshire Local Transport Plan Partnership (SYLTP).
- 4.60 The main objective of the STWG is to reduce single occupancy car use, encourage more people to travel by sustainable modes and reduce the need for people to travel. The work of the group is promoted through a series of initiatives including travel planning, car sharing schemes, travel awareness campaigns, public transport information, incentives, marketing and other complimentary sustainable travel initiatives.
- 4.61 In addition to the work of the STWG, SYPTe's Business and Community team work with over 500 businesses to encourage modal shift. They help businesses, employers and many other groups and organisations find the most efficient and sustainable ways of travelling. This is done through introducing them to the various ticketing schemes and easy access information systems.

²⁵The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Full Report

- 4.62 Smarter Choices is also used to encourage car sharing, for example using the Car Share South Yorkshire (CSSY) website. This website was launched in March 2007 as a jointly-funded initiative between the four local districts in South Yorkshire. This online matching tool allows people in the county to find others to share a car journey with, both giving and taking lifts. In the first two years of its operation 1500 members signed up to the site, surpassing the two year target of 1000. As of July 2010, there are 1689 members with 29% making contact to car share.
- 4.63 In addition, a scheme called BikeBoost has successfully engages adults in behaviour change by integrating a workplace travel planning approach with the promotion and convenient access to bicycles. Between March and June 2010 BikeBoost has engaged with 6 workplaces in Sheffield and recruited 138 participants onto the scheme. This reflects approximately 2.5% of the potential workforce engaging with the scheme in the first 3 months of the pilot project.
- 4.64 Calculations made to assess the value for money of Smarter Choices interventions²⁶ suggest each £1 spent on soft measures could produce benefits of about £10 on average, and considerably more in congested conditions. The report also suggests that inclusion of values for potentially positive effects on safety, health or the environment would further increase the value for money.

²⁶ Cairns S et al (2004) 'Smarter Choices – Changing the Way We Travel'

5. Renewable Energy

Introduction

- 5.1 This section describes the role of alternative fuel sources in securing the long-term supply of energy. The section covers the potential impact of peak oil, schemes to encourage the generation of energy and fuel produce from natural waste.

Energy Supply

- 5.2 Alongside the need to adapt to environmental changes, is the need to adapt to the likelihood of possible constraints on the supply of energy. The term 'Peak Oil' is used to describe the point in time when worldwide production of conventional crude oil peaks in volume. This is expected, by some, to result in a dramatic increase in oil prices as a result of the decline in the availability of accessible oil sources. Although the Earth's finite oil supply means that 'Peak Oil' is inevitable, technological innovations in finding and drilling for oil have changed the understanding of the total oil supply on Earth.
- 5.3 It could be argued, that Peak Oil is the point at which the alternatives to fossil fuels become more competitive, rather than a failure of supply. Therefore, future energy security clearly depends on the provision and use of renewable energy.
- 5.4 In order to overcome the reliance on fossil fuels and reduce emissions, there is a need to reduce the amount of energy required and change to more sustainable energy sources. Technology for electric and alternative fuel vehicles is increasingly becoming a commercial reality; however, the necessary charging and refuelling infrastructure needs to be provided.
- 5.5 By investing in gas and hydrogen technologies, it will also be possible to reduce carbon emissions, improve air quality and generate new revenue streams. An emerging market in the Sheffield City Region for reduced emission transport demands the availability of renewable energy sources and will need security of supply and the refuelling stations to support the shift from diesel/petrol to cleaner and quieter engines.

Feed-in-Tariffs

- 5.6 Currently only 2% of UK energy (and under 5% of UK electricity) comes from such sources²⁷. The Government must deliver a huge increase in UK renewable energy if it is to meet its share of the target of 20% of EU energy to come from renewable sources by 2020 (energy includes electricity, transport fuels and heat)²⁸.
- 5.7 The 15% target which the EU has allocated to the UK would, if adopted, require the UK to generate about 40% of its electricity from renewable sources – an eight fold increase from current levels. Reforms to the Renewable Obligation (RO) contained in the Energy Bill will only see the UK reach 15% renewable electricity by 2015²⁹. Feed-in-Tariffs will play a large part in ensuring this 40% renewable energy generation target is achieved.
- 5.8 The feed-in tariff works by guaranteeing long-term premium payment electricity generated from renewable sources and fed into the grid. The Government would fix the level of the tariff to be paid for each renewable technology and set the length of contract.

²⁷ www.berr.gov.uk/energy/statistics/index.html.

²⁸ Friends of the Earth (2008) What is a Feed-in-Tariff and why does the UK need one to support renewable energy?

²⁹ Government Response, BERR (2008) Renewables Obligation Consultation

- 5.9 Government have set the tariff to achieve an effective rate of return between 6 – 8%, however different tariffs are used for different energy generation technologies. The tariff is based on the overall amount of energy generated and is paid regardless of whether this is used on site or exported to the national grid.

Bio Fuel

- 5.10 The process of Anaerobic Digestion can play a role in supporting the provision of sustainable fuel sources for SCR vehicle fleet. An increase in the use of sustainable fuels will lead to a decrease in the burning of fossil fuels and consequently a reduction in the amount of greenhouse gas emitted.
- 5.11 Biogas is produced through anaerobic digestion when a naturally occurring process breaks down plant and animal waste to produce methane. This can then be used as a clean sustainable fuel source, especially for larger vehicles such as buses and HGVs.

6. Air Quality

Introduction

- 6.1 This section covers the relationship between air quality and transport. This describes the negative impacts of air pollution on health, air quality objectives and the actions that have been put in place to reduce poor air quality.

Air Quality and Health

- 6.2 There has been considerable research to quantify the effect of air pollution on mortality. The Air Quality Strategy for the UK (2007) estimates that as a result of air pollution caused by man-made particulates life expectancy is reduced by around seven to eight months, averaged over the whole population of the UK³⁰.
- 6.3 In 1998, the Committee on the Medical Effects of Air Pollutants (COMEAP)⁴, estimated that up to 24,000 UK residents may be dying prematurely every year as a result of short term exposure to air pollution, and thousands more are hospitalised³¹.
- 6.4 More recent research, published by the European Commission in 2009 suggests this figure is too low, as it does not include the effects of long-term exposure. COMEAP is currently working to reassess the quantification of the number of UK residents that die prematurely every year as a result of short term exposure air pollution.
- 6.5 Poor air quality contributes to the development of several respiratory illnesses in the UK as well as being a large contributor to morbidity and mortality. A House of Commons report has placed a value of up to £20 billion on the cost which poor air quality affects the health of the UK population³².
- 6.6 The most up-to-date evidence suggests that in Sheffield there are around 500 premature deaths per year, due to poor air quality. A recent City Council cabinet paper estimated the cost to the NHS in Sheffield of poor air quality to be £95 million per year³³.
- 6.7 Evidence presented in the Air Quality Strategy for the UK³⁴ identifies that exposure to air pollution can have a long-term effect on health. Poor air quality is associated in particular with premature mortality due to cardiopulmonary (heart and lung) effects.
- 6.8 In the short-term, high pollution episodes can trigger increased admissions to hospital and contribute to the premature death of those people that are more vulnerable to daily changes in levels of air pollutants. Air pollution also has negative impacts on our environment, both in terms of direct effects of pollutants on vegetation, and indirectly through effects on the acid and nutrient status of soils and waters.
- 6.9 The conclusions of the Air Quality Environmental Audit Committee³⁵ were that:
- Poor air quality probably causes more mortality and morbidity than passive smoking, road traffic accidents or obesity. Yet it receives little or no attention in the media and scant attention in Parliament and within Government.

³⁰ House of Commons (2010) Air Quality Strategy

³¹ NAO (2010) Air Quality

³² House of Commons Environmental Audit Committee (2010) Air Quality

³³ Sheffield City Council 13/1/2010 cabinet report <http://www.sheffield.gov.uk/your-city-council/council-meetings/cabinet/agendas-2010/agenda-13th-january-2010>

³⁴ House of Commons (2010) Air Quality Strategy

³⁵ World Health Organisation (2005), Particulate Matter Air Pollution

- The cost to the country of air pollution is significant. More comprehensive cost benefit analysis should drive both changes in policy and better implementation of existing policy. It could also find the most cost effective way of complying with the existing legal limits.
- Change requires more investment, better co-ordination of policy, increased public awareness and better research to shape policy. The Government needs to achieve these aims quickly.
- Local authorities have a key role in delivering improved air quality. They need better support from across central government to achieve this.

Objectives

- 6.10 The air quality objectives applicable to Local Air Quality Management in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 6.1.
- 6.11 Table 6.1 shows the objectives in units of micrograms per cubic metre $\mu\text{g}/\text{m}^3$ with the number of exceedences in each year that are permitted (where applicable) for the pollutants of concern in South Yorkshire. The objectives of concern in South Yorkshire are the annual mean and hourly average nitrogen dioxide objectives and the 24-hour PM10 objective.

Table 6.1 Air Quality Objectives

| Pollutant | Air Quality Objective | |
|---|--|--------------|
| | Concentration | Measured as |
| Nitrogen dioxide | 200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean |
| Particles (PM ₁₀) (gravimetric) | 50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean |

- 6.12 Where any air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action, along with others, to work towards meeting the National Air Quality Objectives.

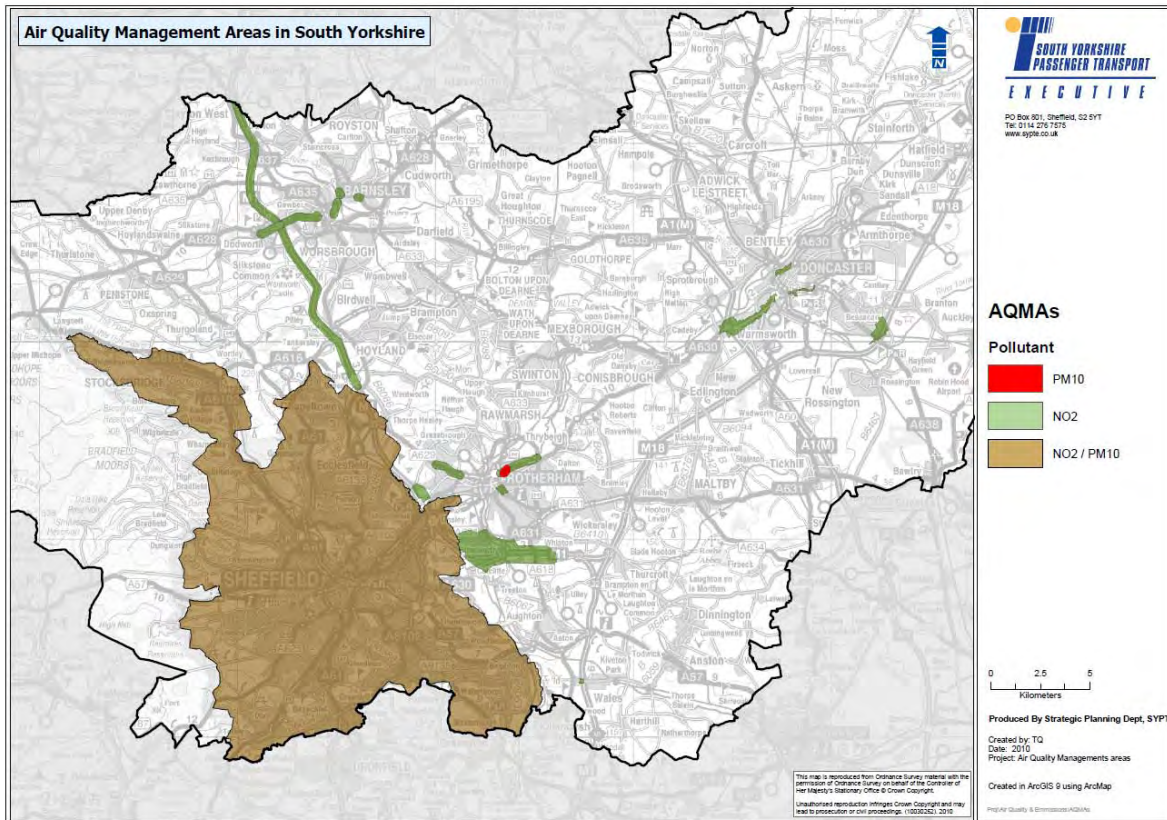
Air Quality Management Areas

- 6.13 The Environment Act 1995 introduced the requirement for each local authority to carry out regular reviews and assessments of air quality within their areas. This involves

measuring air quality against national objectives and predicting change over the coming years³⁶.

- 6.14 If there is an area where national air quality objectives are not met, the local authority must declare this an AQMA and agree an action plan which will aim to improve the air quality.
- 6.15 Currently, some parts of SCR are not meeting these objectives, with particularly high levels of PM10 which exceed the 50mg national limit, leading to several parts of SCR have been declared AQMA³⁷. Their primary designation seems to be in relation to nitrogen dioxide from vehicle emissions. In 2009, road transport was the largest source of Nitrogen oxide emissions, accounting for 32% of the total. Figure 6.1 and Table 6.2 show the Air Quality Management Areas in South Yorkshire.

Figure 6.1 South Yorkshire AQMA's



³⁶ <http://aqma.defra.gov.uk/objectives.php>, last accessed 16/02/11

³⁷ PCT Board (Oct 2010) Air Quality Paper

Table 6.2 AQMAs

| District | AQMA | Declared |
|-----------|--|---------------|
| Barnsley | M1 Motorway 100m either side of the central reservation within the Barnsley Borough | 2001 |
| | A628 Dodworth Road | 2005 |
| | Junction of A61 Wakefield Road and Burton Road | 2005 |
| | A61 Harborough Hill Road | 2008 |
| | Junction of A633 Rotherham Road and Burton Road | 2008 |
| Bolsover | The AQMA encompasses twelve properties and their gardens, 1-23 (odd) Carter Lane East, South Normanton on the east side of the M1 Motorway. The area extends 100m east of the main carriageway (not the sliproad). | Not known |
| | Single Property adjacent to the A619/A616 roundabout in Barlborough | Not known |
| | An area encompassing 5 residential dwellings on Orchard Close, Barlborough where the western property boundaries border the M1. | Not Known |
| Doncaster | A630 Church way for annual average Nitrogen Dioxide | August 2001 |
| | A1/A630 for annual average Nitrogen Dioxide | August 2001 |
| | A18 for annual average Nitrogen Dioxide | August 2001 |
| | A638 for annual average Nitrogen Dioxide | June 2003 |
| Rotherham | M1 for annual average Nitrogen Dioxide | July 2001 |
| | M1 Wales for annual average Nitrogen Dioxide | July 2003 |
| | St Ann's for 24hour PM10 | November 2004 |
| | A630 for annual average Nitrogen Dioxide | November 2004 |
| | A6021 Wellgate for annual average Nitrogen Dioxide | November 2004 |
| | A629 Bradgate for annual average Nitrogen Dioxide | November 2004 |
| Sheffield | Sheffield Urban Area (excluding the Peak Park) for annual average Nitrogen Dioxide | 2006 |
| | Sheffield Urban Area (excluding the Peak Park) for hourly Nitrogen Dioxide and PM ₁₀ 24 hour objectives | 10 March 2010 |

Source: South Yorkshire LTP Partnership/ UK Air Quality Archive

6.16 As Table 6.2 shows there are currently no transport related AQMAs in North East Derbyshire, Derbyshire Dales, Chesterfield or Bassetlaw, Figure 6.2 shows the position of those within South Yorkshire.

Air Quality Action Plans

- 6.17 All four South Yorkshire authorities have published Air Quality Action Plans for the areas covered by the AQMAs. Sheffield's Air Quality Action Plan was first published in 2003 and at the time of writing was ready for update. Since being published very little has been achieved in actual air quality improvements. With the designation of new AQMAs a new Air Quality Action Plan is being produced. To lead this process a Steering Group of senior managers has been set up.
- 6.18 Radical and ambitious measures will be needed to achieve any improvements in air quality. It has previously been reported to DEFRA that as traffic is the major air quality problem in Sheffield to achieve nitrogen dioxide objectives traffic levels, would need to be reduced to 1991 levels (approx 25% traffic reduction).
- 6.19 Similarly Barnsley MBC has recently completed a revision of its Air Quality Action Plan. A further assessment, complimentary to the revised AQAP is currently being prepared. The further assessment will ascertain whether the proposed measures in the plan are sufficient to meet the air quality objectives or additional measures are required.
- 6.20 It is acknowledged that local measures have only had limited success to date in improving air quality in South Yorkshire, this is in keeping with the national picture.

Benefits of Air Quality Management

- 6.21 The Defra Air Quality Strategy (2007) has reported that since 1997 when the first air quality strategy was introduced, there has been a marked improvement on air quality in the UK, with a decline in concentrations of air pollutants.
- 6.22 It is estimated that as a result of these air quality improvements, several benefits have been gained. These include:
- A reduction of 4200 premature deaths and 3500 hospital admissions each year
 - A reduction in the loss of life years by between 39,000 and 117,000 in 2001
 - £68 billion worth of benefits generated at a cost of only £6 billion³⁸.
- 6.23 It is clear that in order to extend these benefits, further work needs to continue on improving air quality in the UK.

Reducing NO_x

- 6.24 A number of initiatives have been put in place to help bring about this reduction in NO_x concentrations, these initiatives include:
- Enhanced Quality Bus Corridors (QBCs) and voluntary partnerships which have helped to stimulate investment in new buses with cleaner Euro III engines
 - Traffic reduction and management
 - Land use planning and development control policies which take account of air quality issues more fully
 - Air quality awareness campaigns to encourage motorists to either reduce overall travel patterns, switch to more sustainable means and partnership working.

³⁸ Defra (2007) The Air Quality Strategy for England, Wales and Northern Ireland, Volume 1

- 6.25 The move towards newer more environmentally friendly buses has led to more than 50% of the fleet operating services in South Yorkshire having engines which meet the requirements of Euro III or above. Table 6.3 shows the breakdown of the fleet and the appropriate Euro rating.

Table 6.3 Proportion of Fleet with Euro Engines

| Euro Rating | Number of buses | Percentage of Fleet |
|-------------|-----------------|---------------------|
| Pre Euro | 16 | 1.6% |
| Euro I | 137 | 13.4% |
| Euro II | 357 | 35% |
| Euro III | 327 | 32.1% |
| Euro IV | 154 | 15.1% |
| Euro V | 28 | 2.8% |

Source: SYPTE

- 6.26 Further development of Quality Partnerships and stipulation on the vehicle type to be used will help to further increase the number of buses with Euro engines.

Care4Air

- 6.27 Care4Air is a partnership between the four South Yorkshire local authorities. It aims to raise awareness of air quality issues and highlight what is happening in the county to improve the quality of our air. In particular it aims to provide individuals, organisations, schools and businesses with information that will enable them to do their bit and improve air quality. One scheme set up by the Car4Air consortium is ECO Stars.
- 6.28 ECO Stars (Efficient and Cleaner Operations) Fleet Recognition Scheme was set up by Care4Air, the consortium of the South Yorkshire Local Transport Plan Partnership with support from Travel South Yorkshire and NHS Barnsley. The scheme was launched in January 2009 as part of the drive to improve air quality across the district.
- 6.29 Since its formal launch ECO Stars has grown to cover 19 members who between them operate approximately 4,600 vehicles in, or serving South Yorkshire. As of the 31st March 2010 the list of ECO Stars members showed a mix of different transport operators.
- 6.30 The scheme, which is the first of its kind in the UK and possibly Europe, recognises the day to day work of vehicle fleet operators who use modern, low polluting and low carbon emitting vehicles, and who exhibit effective fuel and driver management practices. ECO Stars aims to help South Yorkshire's goods vehicle, bus and coach operators gain recognition for their commitment to reducing fuel consumption, pollution and carbon emissions and improving operational efficiency.
- 6.31 The success of the scheme was recognised by the receipt of a 'gold' Green Apple Award for Local Authority Environmental Best Practice. This is the top award for Metropolitan Borough Councils across the UK given by The Green Organisation. The awards were supported by by the Environment Agency, The Chartered Institute of Waste Management, The Chartered Institute of Environmental Health, The Ecology Building Society, Go4Green, The MJ (Municipal Journal) and several other environmental bodies.

- 6.32 Research has been carried out by TTR to examine the trajectory of environmental progress made through participation in the scheme. The case study looked at Clipper Logistics (5 Star rating) and Doncaster Metropolitan Borough Councils (3 Star Rating) fleets. The 'Case Study' looked at emissions of NOx and PM10, and the Greenhouse Gas CO2.
- 6.33 Both fleets showed a significant reduction in the percentage of toxic emissions, with reductions of up to 75% for PM10 and 50% for NOx. This shows that proactive fleet renewal can have a significant impact on reducing levels of toxic emissions within a relatively short timescale.
- 6.34 For toxic emissions the percentage reductions were more significant for the Clipper logistics fleet, demonstrating that the most heavily polluting vehicles (HGVs) can yield high levels of emissions benefit.
- 6.35 Fleet renewal did not show the same benefits for the reduction of CO2 emissions with only a small (3-5%) reduction in emissions seen over the four years. This is because progressive reduction in CO2 emissions was not incorporated into the Euro emissions standards in the same way as for toxic pollutant emissions. It should be noted, however, that the ECO Stars scheme also includes other measures to improve environmental performance by reducing fuel consumption and by extension, CO2.

Linking Climate and Air Quality Policies

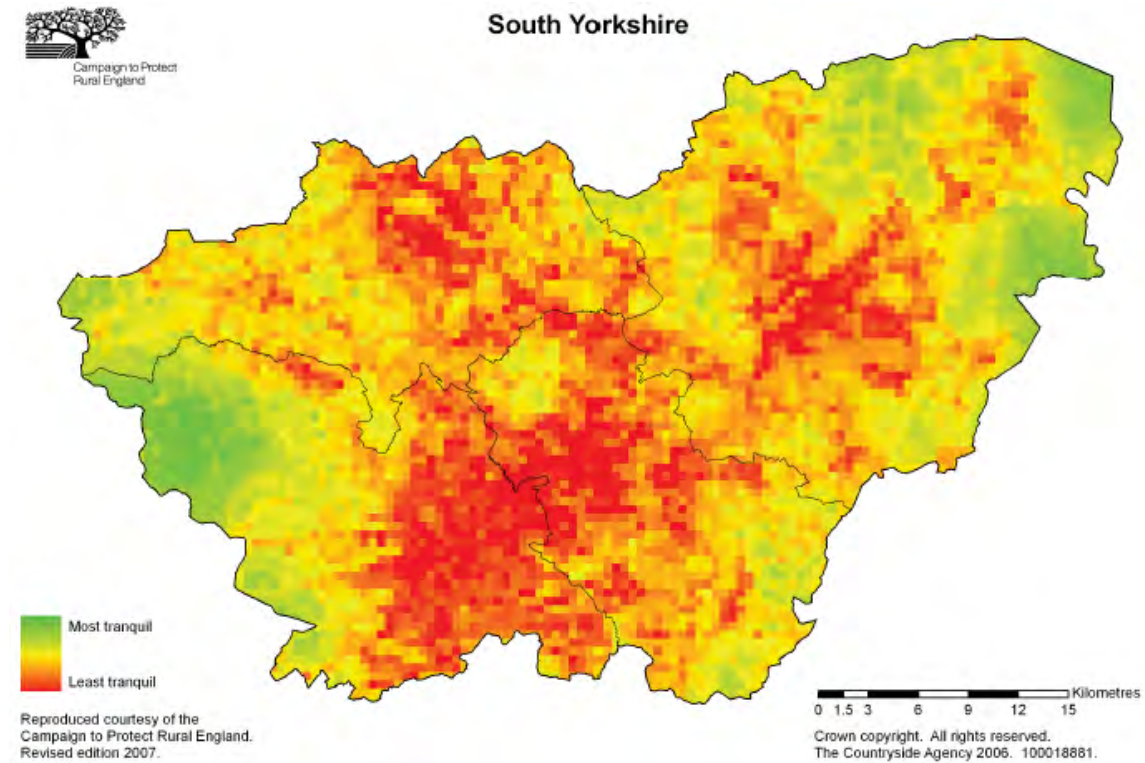
- 6.36 Air pollution causes annual health costs of roughly £15 billion to UK citizens. This is comparable to the growing annual health costs of obesity, estimated at £10 billion (although the basis of the cost calculation differs). Many of our activities, especially transport and energy generation, contribute to both local air pollution and global climate change, so it makes sense to consider how the linkages between these policy areas can be managed to best effect.
- 6.37 On 3 March 2010, Defra published a document³⁹ which highlights the additional health benefits that can be achieved through closer integration of air quality and climate change policies in the future. This 'forward looking' document includes the following key messages:
- Air pollution often originates from the same activities that contribute to climate change (notably transport and electricity generation) so it makes sense to consider how the linkages between air quality and climate change policy areas can be managed to best effect.
 - The UK's commitment to build a Low Carbon Economy by 2050 will reduce air pollution, but the choices made to get there will affect the extent of air quality improvements. Optimizing climate policy decisions to account for air pollution could yield additional benefits of approximately £24 billion by 2050.
 - Air quality and climate change co-benefits can be realised through actions such as promoting low-carbon vehicles and renewable sources of energy that do not involve combustion. At the same time, actions that tackle climate change but damage air quality must be avoided.
 - Action will be needed at international, EU, national and local levels. This will help to ensure that air quality and climate change policies are integrated. This will, in turn, maximise the co-benefits of tackling both air pollution and climate change together and ensure ambitious but realistic air quality targets are set for the future.

³⁹ Air Pollution: Action in a Changing Climate (2010) Defra

Noise Pollution

- 6.38 Motorised transport creates noise and whilst the levels of environmental sound do not reach the intensity needed to damage hearing, it is an issue for other reasons. There is increasing evidence that environmental noise, from both aircraft and road traffic, is associated with annoyance, sleep disturbance, raised blood pressure and with a small risk of coronary heart disease. Noise impacts associated with busy highways can affect local communities and residential areas. Transport noise affected 21% of those questioned in a national survey.
- 6.39 The Environmental Noise Directive requires European Union member states to develop and adopt action plans designed to manage noise issues and effects, relating to noise from road, rail and air traffic and from industry. Initial mapping for first round agglomerations with a population of more than 250,000 and a certain population density includes:
- Major roads with more than six million vehicle movements;
 - Major railways with more than 60,000 train movements a year;
 - Major airports with more than 50,000 movements and transport sources; and
 - Major industrial sites.
- 6.40 Analysis of this mapping work shows that the M1, M18 and A1 (M) all have noise levels in excess of 75dB. Major roads into Sheffield, Rotherham and Doncaster also show areas where the noise level exceeds 75dB. For comparison purposes 70dB is the noise made by a passenger car (60 km/h at 7m distance) and 81dB is the noise experienced from a modern twin engine jet (at take-off at 152m distance).
- 6.41 Noise can have an affect on the value of green spaces. Research carried out by Defra has found that 'tranquillity' was rated as the most important feature of the countryside that 'makes it a place where you want to spend time' (58% of responses). Noise also came up in answers to a question about features that prevent the countryside being a place where you want to spend time.
- 6.42 The Campaign to Protect Rural England's (CPRE) 'tranquility maps' have raised awareness that only a comparatively small and decreasing proportion of England's countryside can now be regarded as 'tranquil'. These maps show that roads are one of the major causes of loss of tranquillity. For 2007 to 2008, traffic increased on rural minor roads, rural A-roads and motorways whilst it has decreased in urban areas. The tranquillity map for South Yorkshire is shown in Figure 6.2.

Figure 6.2 Tranquillity Map



Source: CPRE

- 6.43 The Environmental Noise (England) Regulations 2006 as amended, Regulation 13 (1) and Regulation 15 (1) (C) require that Action Plans for Agglomerations include provisions that aim to protect any formally identified Quiet Areas in the agglomeration from an increase in noise. The Environmental Noise Regulations 2006 requires that noise from major road, railways, airports and large urban areas be mapped.

7. Summary

- 7.1 This Evidence Base document relates specifically to our goal of Reducing Emissions. There are many topics where overlaps exist between this document and others in the series. Specifically, further information is provided in the following documents:
- Document 1: Geographic and Demographic Overview
 - Document 5: Supporting Economic Growth
 - Document 6: Enhancing Social Inclusion and Health
- 7.2 The key messages from this Evidence Base document are summarised below:
- Under the Climate Change Act 2008, the previous Government's ambition was to provide measures which will reduce emissions by at least 80% below 1990 levels by 2050. The general aspiration is also supported by the current government.
 - As part of the current Government's commitment to climate change, they have identified that they will seek to increase the target for energy from renewable sources, subject to the advice of the Climate Change Committee. They also state a commitment to mandate a national recharging network for electric and plug-in hybrid vehicles.
 - The greatest amount of carbon emissions in SCR is created around the centre of Sheffield and around the national and strategic road networks.
 - There are areas in SCR where the carbon emissions from transport are related to infrastructure we do not control. Partnership working with organisations, such as the Highways Agency, will be important for reducing carbon emissions.
 - It will become more important for policies and plans to recognise, mitigate and adapt to climate change. Increasingly issues relating to climate change will be factored into all decision making.
 - Where possible, mitigation measures are important to reduce the impact of carbon emissions. This includes encouraging people to use more sustainable means of transport. Smarter Travel Choices measures have been identified as a successful mechanism for achieving modal shift.
 - Health, and in particular obesity, is a significant issue in SCR. As a result, there is an urgent need to increase the activity levels of people living in the area. The evidence suggests that walking and cycling offer excellent opportunities to encourage more active lifestyles as part of everyday routines.
 - There is a need for infrastructure that facilitates the use of low-carbon vehicles, such as recharging points. Sheffield City Council bid for funding as part of the 'Plugged on Places'. The bid was unsuccessful, but given the momentum gained SCC is investigating how to take the work forward.
 - It is inevitable that 'Peak Oil' will be reached at some point in the future. Therefore, future energy security will rely on the availability of alternatives to oil-based fuel sources.
 - The adaptation to climate change is likely to result in more strain on maintenance resources. Adaptation will require extensive risk assessments and efforts to improve the flexibility of the networks.
 - A reduction in carbon emissions will not be achieved overnight. A successful reduction in emissions will require a wide range of steps to be taken by people and

businesses. Individually, each of these steps will not make a significant difference, but added together and over time, the overall impact can be significant. This applies both at a national level and at the SCR level.

- Improving air quality can drastically improve the nation's health and provide an estimated £20 billion worth of health benefits and a total of £68 billion benefits overall from a small investment.
- Noise pollution is an issue for some areas of the SCR. The effort that is made to reduce air pollutions is likely to reduce noise pollution. This includes encouraging people to travel by non-car modes.