DfT Local and Regional Climate Change Research

Final Report

26/05/10

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Executive Summary

Background and study objectives

Following the publication of the Carbon Reduction Strategy (CRS) the Department for Transport (DfT) wants to understand better how local authorities in England are reducing emissions and adapting to a changing climate through the delivery of transport policies.

This research seeks to deliver clear guidance to the DfT on additional action the Department could be taking to support local authorities in delivering low carbon transport policies.

Methodology

The key research elements of the study consisted of a desktop review, in-depth interviews with local authorities and an expert carbon tools workshop, held in April 2010.

Findings

Goals, commitments and targets

Two main types of climate change commitment or targets were identified:

- area wide cross-sector commitments (including LAA targets, Climate Change Action Plan targets, the Nottingham Declaration); and
- transport specific targets.

At the time of the review, most local authorities were undertaking consultation on LTP3, with limited information available in the public domain. More emphasis on carbon and climate change was evident in the available LTP3 objectives compared to LTP2 objectives, reflecting the change of emphasis in the guidance issued by the DfT.

Findings show that target setting for CO_2 emission reduction, especially for transport sector emissions, is often more problematic than for interventions that have traditionally featured in LTPs (such as bus patronage for example) which have more established monitoring and reporting procedures.

Who is in charge of climate change issues?

Responsibility for transport and climate change within local authorities mainly resides in the following areas of expertise:

- sustainability, climate change and carbon emission reduction;
- transportation, with roles including Transport/Transportation Manager, Local Transport Plan Manager, Head of Transport Strategy, Travel Plan Co-ordinator; and
- air quality, including roles such as Air Quality/Environmental Protection Manager.

A significant number of authorities are already working across local authority boundaries as well as at the regional or city regional level.

Reflecting the importance of climate change adaptation and mitigation at the local level, a minority of authorities have set up dedicated governance structures for elected members to discuss climate change policies and decide on priorities for the area.

Alongside local authority actions, community initiatives are being set up by residents, sometimes with the help and support of the local authority but also fully independently in some cases.

Acting on climate change

Actions can be split into two main areas:

- transport specific; and
- cross-sector initiatives (including land-use planning).

Most authorities highlighted improvements to public transport, walking and cycling infrastructure and services through their LTP2 as examples of schemes to reduce CO_2. The development of similar schemes is expected to continue through LTP3. Other key initiatives, identified through the desktop review and the interview process included:

- sustainable travel towns and cycling towns / cities;
- cycling demonstration towns / cities;
- smarter travel and active travel programmes; and
- community car clubs.

Many authorities are aiming to encourage the take up of low carbon vehicles and fuels by providing electric vehicle charging facilities, purchasing or leasing low carbon vehicles for council fleets and encouraging operators to use low carbon buses.

Many of the local authorities considered are seeking to establish links between transport and land use planning frameworks to ensure that the need to travel is minimised where possible.

Local authorities are committed to reducing their own carbon footprint, driven by initiatives such as the Carbon Reduction Commitment and the adoption of NI185. This allows them to set a positive example within the community, but also to reap the financial benefits of more energy efficient practices. Initiatives include 'greening' local authority vehicle fleets, installing energy efficient lighting and signage and implementing sustainable procurement practices.

Some regions (through regional climate change partnerships) and local authorities have undertaken climate change adaptation studies and assessments in their area.

Challenges, drivers and barriers

Key drivers identified during the study included:

- strong political leadership providing high-level support and direction;
- working towards adopted commitments and targets;
- commitment from council officers; and
- community support;

Challenges and barriers which emerged included:

- climate change scepticism amongst councillors and the community;
- competing and conflicting objectives such as cutting carbon in the face of economic growth; and
- resource pressures and reduced budgets;

Review of tools and methodology

There are three broad approaches to estimating greenhouse gas emissions within a particular local authority area:

- relying on statistics published by others (e.g. DECC/AEA/Defra
- monitoring relevant local indicator(s) directly, for example by monitoring person trips, monitoring vehicle kilometres or monitoring fuel sales; and
- predicting future emissions (including assessing the impacts of relevant interventions).

The two most-common sources of monitoring data used for estimating transport-related greenhouse gas emissions are the published NAEI/Defra figures (eg as incorporated into NI186) and a variety of local traffic models/databases.

Analysis of local authority approaches found that:

- there was little consistency of approach between the various local authorities considered by the review;
- most local authorities are using measures based on vehicle kilometres, rather than those based on fuel-sales-based information;
- few of the approaches distinguish between resident's trips and through traffic; and
- models generally use national data for speeds, the fleet mix and the current / future fuel mix.

What are local authorities looking for?

Local authorities pointed to the following main areas where they would require additional support from central government:

- advice on monitoring local carbon emissions (including for the transport sector) and target setting - improvements required to NI186 data and the ability to monitor local interventions and appraise their impact on emissions;
- advice on the best way to prioritise interventions and investment for LTP3;
- guidance on the type of interventions to be promoted in emerging sectors such as low carbon vehicles; and
- the ability to demonstrate the value for money of carbon reduction schemes.

Recommendations

Three main recommendations for the DfT to consider have emerged from the study:

1) **Making best use of existing information -** There is a need for local authorities to have full knowledge of the data and guidance that exists, to be able to access it easily, and also to be aware how to use it appropriately.

2) **Improving data sources -** Although many data sources exist, some sources are not currently easily accessible and others might not provide the data local authorities actually require for their monitoring or appraisal activities. There is therefore a need to improve the data made available to local authorities, with standard sets of data provided at the local level for authorities to use.

3) **The creation a DfT carbon tool -** The DfT could consider the development of a basic carbon tool which would provide a consistent means for local authorities to appraise the potential impact of transport interventions on emissions.

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1. Local and Regional Climate Change Research

1.1 Study context

Through the United Nations Framework Convention on Climate Change (UNFCCC), the world aims to reach an agreement on the course of action to reduce the impact of global climate change for all countries, by reducing the level of greenhouse gases emitted each year and by helping those most at risk to adapt. The UNFCCC Conference of Parties (COP) met in Copenhagen in December 2009 (COP15) and negotiations continue towards COP16 which will take place in Mexico at the end of 2010.

In the UK, the Climate Change Act 2008 sets a target of an 80% cut in carbon emissions across all sectors by 2050 (on 1990 levels)[1]. The first three carbon budgets were also adopted for the period up to 2022 to ensure that the UK gets on the path to this challenging 2050 target. This means that UK emissions will need to be cut by at least 34% (on 1990 levels) by 2022. The Government's performance with regard to these targets is monitored by the Committee on Climate Change (CCC) which reports to Parliament on an annual basis[2].

The Government set out a roadmap to achieve these targets in July 2009, publishing the overarching UK Low Carbon Transition Plan alongside sector specific strategies, including the Carbon Reduction Strategy (CRS) for Transport[3] prepared by the Department for Transport (DfT).

The three main objectives of the CRS are to support a shift to new technologies and fuels, promote lower carbon choices and make use of market mechanisms to encourage a shift to lower carbon transport. The policies in the CRS are forecast to reduce transport sector emissions by an additional 17.7 $MtCO_2$ in 2020, on top of savings from existing policies (projected to achieve a 15 $MtCO_2$ reduction in 2020).

Other important processes through which regional and local partners will need to consider climate change and the need to reduce emissions from the transport sector include the emerging Integrated Regional Strategies, the Regional Funding Allocation/Advice process and the preparation of the third round of Local Transport Plans (LTP3)[4].

Following the publication of the CRS the DfT wants to understand better how local authorities in England are reducing emissions from their delivery of transport policies and adapting to a changing climate. One of the key roles of Government is to ensure that local partners have the right tools, information and guidance in order to deliver sustainable transport measures and assess the carbon impacts of different policies.

In addition, the Department of Communities and Local Government (DCLG) recently announced the 'Local Carbon Framework' trials with nine local authorities and partnerships: Bournemouth, Poole and Dorset Multi-Area Agreement (MAA), Bristol, Haringey, Leeds City Region, Manchester, Northumberland, Nottingham, Oxford and Plymouth[5].

Authorities taking part in the trials will be expected to:

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[1] International aviation and shipping are included in the Act. If these sectors are required to be removed from the Act, an explanation must be put before Parliament before 31st December 2012.
[2] Meeting Carbon Budgets – The Need for a Step Change, First Progress Report to Parliament, CCC, 2009.
[3] Low Carbon Transport: A Greener Future – A Carbon Reduction Strategy for Transport, DfT, 2009.
[4] and Local Implementation Plans in London (LIP2).
[5] John Denham - Local action on climate change will drive down fuel bills and generate new income for councils, DCLG, 28th January 2010.

- set out a clear set of targets for action and a route for progress and milestones;
- develop a clear evidence based strategy for how carbon reductions can be achieved; and
- produce a delivery plan involving all partners, including those outside the formal strategic partnership.

Plans might set out what action is needed on issues spanning recycling, energy efficiency, wind power, transport and other activities. These plans will be set out in a prospectus to be negotiated and agreed with Government, with the councils taking forward their delivery and reporting on their achievements. Local authorities will also be able to use their prospectus to set out an 'ask' of central Government, to secure additional help and support, although councils are expected to maximise the use of their existing freedoms and flexibilities.

1.2 Requirements of the research

Research requirements were informed by the DfT's Technical Specification dated 20th January 2010, and shaped by subsequent meetings with the client.

The research delivers clear guidance to the DfT on additional action the Department take to support local authorities in delivering low carbon transport policies. The research:

- identified existing climate change goals and public commitments which local and regional partners have signed up to, and how they perceived transport as contributing to these goals. This area of work focussed on Local Area Agreements (including National Indicators 185, 186 and 188), LTP2, LTP3s currently in development, Climate Change Strategies, Regional Strategies and other relevant initiatives in which transport has a role;
- identified policies and initiatives which local and regional partners have delivered to reduce carbon emissions and adapt to climate change. This strand of work identified examples of good practice, together with examples of initiatives which have been less effective;
- identified the drivers, challenges and barriers that local authorities are facing in tackling carbon emissions from transport;
- identified the tools, guidance and methodologies currently in use to monitor progress at the local level and assess the carbon impact of transport policies (i.e. who was using what, where and why); and
- provided expert opinion upon the coverage, advantages, disadvantages of monitoring and evaluation methodologies identified. There is a particular emphasis upon practical issues and differing requirements for the project, programme and strategic levels and for different geographical coverage.

At the inception meeting, the DfT emphasised that the study should principally focus on reviewing the policies and interventions that are being implemented to reduce transport related carbon emissions at the local level, but the extent to which local authorities are being influenced and driven by actions at the regional and sub-regional levels[6] was also of interest.

The DfT was also particularly interested in what local authorities are planning to do regarding carbon reduction in their developing LTP3 strategies, the guidance for which places a greater emphasis on reducing emissions and adapting to climate change when compared to LTP2 guidance.

Specifically the research aimed to identify innovative approaches to influencing transport emissions, which the DfT could feed into its wider thinking for the ongoing policy development of the area.

[6] Although the study does not include an in-depth analysis of actions undertaken at the regional or sub-regional level.

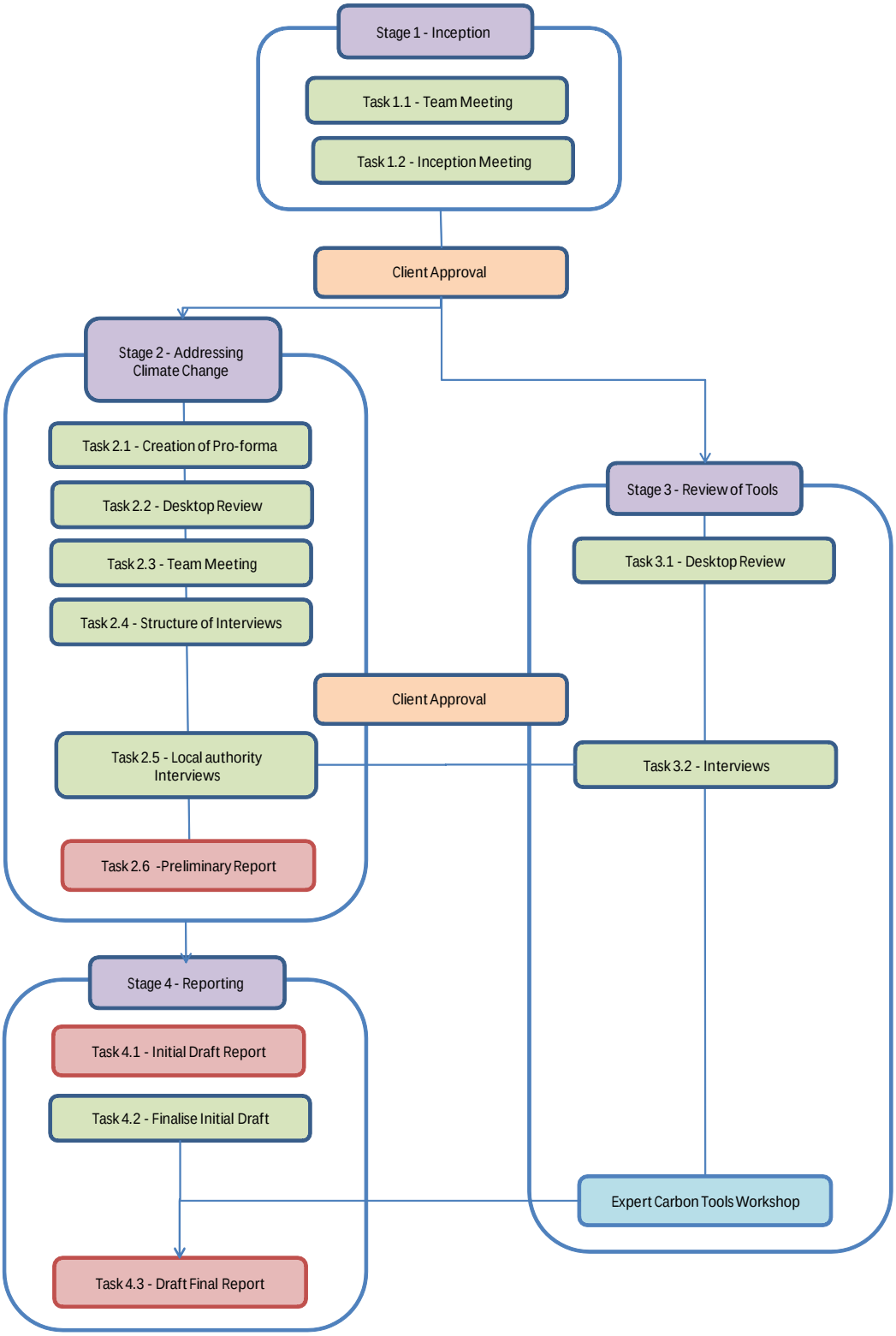
1.3 Study team

Atkins along with AEA, TRL, MVA Consultancy and ITS Leeds was appointed to undertake the study in March 2010.

1.4 Methodology

The overall study methodology is shown in Figure 1.1.

Figure 1.1 - Overall study methodology



1.5 Summary

The key research elements of the study consisted of a desktop review, in-depth interviews with local authorities, and an expert carbon tools workshop, held in April 2010.

Desktop review

The aim of the desktop review was to produce a broad evidence base of climate change activity, commitments and monitoring for the sample of 20 local authorities. The team reviewed LTP2 documents, Local (or Multi) Area Agreements (LAA, MAA), available LTP3 information, Climate Change Strategies (CCS), Adaptation Plans and other documents uncovered during the study.

It was decided that activities within metropolitan areas would be considered as a whole by selecting one area and reviewing relevant documentation available from the constituent Metropolitan Districts as well as the Integrated Transport Authority (ITA) and Passenger Transport Executive (PTE) as a common LTP3 would be prepared for each metropolitan area.

It was also agreed that London authorities would be excluded from the scope of this study, on the basis that they face different challenges and operate in a different legislative environment from the majority of local authorities across England.

Local authority interviews

The next stage of the study involved interviewing eleven selected unitary and shire authorities to explore in more detail the themes and issues which emerged from the desktop review. In most cases interviews were conducted with several people within the authority, with interviewees typically drawn from transport planning, strategy and sustainability teams.

Expert carbon tools workshop

The expert carbon tools workshop was held on 15th April 2010 in DfT's offices at Great Marsham Road, London. The emphasis of the workshop was on the practical application of carbon tools, and the existing barriers that are faced by local authorities in their development and use. Attendees were drawn from a range of local and regional authorities, transport consultancies and the DfT.

A more detailed discussion of the methodology is included within Appendix A of this report.

Table 1.1 shows the local authorities contacted at each stage of the study.

Table 1.1 - Local authority engagement

Number	Local authority	Type	Desktop review	Interviews	Carbon tools workshop[7]
1	Bristol	Unitary Authority	*	*	
2	Cambridgeshire	Shire County	*		*
3	Darlington	Unitary Authority	*		
4	Derby	Unitary Authority			*
5	Hampshire	Shire County	*		
6	Herefordshire	Unitary Authority	*		
7	Hertfordshire	Shire County	*		
8	Kent	Shire County	*	*	
9	Kingston upon Hull	Unitary Authority	*		
10	Lancashire	Shire County	*	*	
11	Leicester	Unitary Authority	*		*
12	Leeds	Metropolitan			*
13	Norfolk	Shire County	*	*	*
14	Northumberland	Unitary Authority	*	*	
15	Nottingham	Unitary Authority	*		*
16	Oldham	Metropolitan			*
17	Oxfordshire	Shire County	*		
18	Plymouth	Unitary Authority	*	*	
19	Poole	Unitary Authority	*	*	
20	Shropshire	Unitary Authority	*	*	
21	Staffordshire	Shire County		*	
22	Warrington	Unitary Authority	*		
23	Worcestershire	Shire County	*	*	
24	York	Unitary Authority	*	*	

[7] Representatives from national and regional organizations, as well as consultants attended the workshop in addition to local authority attendees.

1.6 Structure of study findings

The following five sections summarise the findings from the desktop review and interviews conducted with selected authorities.

Section 2 - Goals, commitments and targets as adopted by authorities

This section discusses the drivers behind the goals and commitments adopted by local authorities, and the process and reasoning behind targets that have been set. Area-wide cross-sector commitments are presented alongside transport specific targets.

Section 3 – Who is in charge of climate change issues?

Discusses the different roles and responsibilities within authorities, and the wider partnership arrangements that exist across authority areas. Also included is a summary of roles across wider regions and city regions.

Section 4 - Acting on climate change

Presents current examples of best practice in the fields of transport climate change mitigation and adaptation. Examples range from strategy development, coordination and partnership working through to specific interventions which are delivering quantifiable cuts in emissions.

Section 5 – Challenges, drivers and barriers

Builds on discussions with local authorities during the interview stage of the study. Local authorities were asked to identify challenges and opportunities they are facing in relation to climate change mitigation and adaptation.

Section 6 – Review of tools and methodology

Discusses the approaches which are currently being employed by authorities to report against the targets and indicators they have adopted. The tools which are being used to evaluate the impact of policies and interventions are included within this section, along with the issues and limitations associated with different approaches.

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2. Goals, commitments and targets

All the authorities surveyed have some form of goals, commitments or targets relating to climate change mitigation or adaptation. These commitments are usually being driven by elected members and officers (including management teams) within the authorities as well as initiatives led by local communities or local authority partners.

The role of tools and models is not discussed within this section. However, the importance of such approaches (particularly in establishing a baseline, forecasting and appraising) to the setting of targets is acknowledged. Carbon tools and methodologies are discussed in detail in Section 6.

2.1 Area wide cross sector commitments

2.1.1 Climate change mitigation

The desktop review and interviews show a range of cross-sector commitments related to climate change for the local authority areas considered. These include:

- LAA targets (mainly NI186);
- Climate Change Action Plans;
- The Nottingham Declaration;
- The Covenant of Mayors; and
- emerging Local Carbon Framework pilots.

LAA Targets

Of the 20 local authorities studied, four authorities adopted NI185 and 16 selected NI186. NI185 relates to CO_2 reduction from local authority operations. NI186 relates to per capita reduction in CO_2 emissions in the local authority area, including emissions from the industrial, commercial, domestic and transport sectors within each authority area.

Table 2.1 below shows the climate change mitigation LAA targets selected by the local authorities studied during the desktop review.

Table 2.1 - 2011 LAA mitigation targets

Local Authority (LA)	NI185 - CO_2 emission from LA operations	NI186 – Per capita reduction in CO_2 emissions (Base 2005)
Bristol	-	1%
Cambridgeshire	2% reduction by 2011 from 2008 baseline	11%
Darlington	-	11.6%
Hampshire	-	10%
Herefordshire	-	13.1%
Hertfordshire	-	9.1%
Kent	-	11.2%
Kingston upon Hull	60% reduction by 2050 (baseline not yet set)	-
Lancashire	-	12.5%
Leicester	-	-
Norfolk	-	11%
Northumberland	-	-
Nottingham	-	12.6%
Oxfordshire	Not yet set	-
Plymouth	-	13.8%
Poole	10% reduction by 2010/11 from 2009 baseline	12%
Shropshire	35% reduction by 2014 from 2009 baseline	-
Warrington	-	10.4%
Worcestershire	-	9%
York	-	12%

Table 2.1 shows that most of the local authorities surveyed have set ambitious targets for NI186, aiming for a 9%-13.8% reduction in per capita CO_2 emissions by 2011. However, most authorities had not set disaggregated targets at a sector level within NI186 so therefore do not set out how much of those reductions will be achieved from reductions in emissions from transport policies.

Some authorities have disaggregated their NI186 target to differentiate the share of cuts in emissions to be achieved through local action from savings as opposed to those to be achieved through national measures. Herefordshire targeted a 13.1% per capita reduction in NI186 by 2010. Of this 13.1%, 8.2% relates to national measures and 4.9% to 'national measures with local authority influence'. Such measures include speed limit enforcement and speed limit change.

Moving forward, Shropshire County Council is keen that the wider community help set the reduction target for NI186. This target setting is likely to go through a consultation process to obtain consensus.

Climate Change Strategies and Action Plans

Seventeen of the 20 local authorities studied during the desktop review had a Climate Change Strategy (CCS) in place. Of the remaining three, Poole is known to be developing a CCS at the Multi-Area Agreement (MAA) level and whilst Kent does not have a CCS, it does have a dedicated Climate Change Programme Team.

CCSs were typically developed by the Local Strategic Partnerships (LSPs) within the LAA framework, and aim to[8]:

- provide a clear statement of the area's climate change and environmental objectives;
- set out how authorities will meet environmental sustainability and climate change aspects of their corporate priorities;
- provide a framework for an ongoing programme of action by the authorities on environment and climate change issues;
- guide the authorities in working with partner organizations and other stakeholders on environmental issues locally, regionally and nationally; and
- raise awareness of the key environmental issues affecting each authority.

CCSs present high level ambitions in terms of carbon reduction, and the types of interventions that will be implemented. For example, the Nottingham CCS target is to reduce carbon dioxide emissions from Nottingham by 60% (from 1990 levels) by 2050 with the eventual aim of being carbon neutral by 2100.

CCSs address carbon emissions across all sectors, of which transport is highlighted as a component. Case Study 1 on the following page highlights the types of transport initiatives which are cited in Bristol's CCS, and comprise a mixture of behavioural, land-use, technological and fiscal measures.

Transport actions and interventions cited in the CCSs tended to be similar to those outlined in LTP2 strategies. Where stated, monitoring of the delivery of CCSs was usually through NI186.

Staffordshire's Climate Change Strategy, which will form a key chapter of the LTP3, is currently being written. It will include key facts, a vision for Staffordshire, the challenges, and an overview of the national and local policy context. The council are currently undertaking an options appraisal (using a matrix approach) to highlight which options are likely to be effective and deliverable.

Staffordshire Council have included reference to air quality in line with guidance from Defra on linking air quality and emissions data to ensure value for money. The draft will be circulated to environmental colleagues for comment and will be completed by September in line with the LTP3 deadline. The council's Climate Change Action Plan, 'A Hard Rain' (September 2009) – sets the target of an 80% reduction in carbon dioxide emissions from the County Council's buildings, vehicles and street lighting by 2050. A specific target for transport CO_2 reduction is not given within this document.

[8] The examples listed have been extracted from Cambridgeshire's County Council's CCS, "Tackling Climate Change in Cambridgeshire" (2005), but similar aims exist in the other CCSs which have been reviewed.

Case Study 1: Bristol's Climate Change Strategy

In terms of transport initiatives, Bristol's CCS aims to:

- develop city centre carbon emissions reduction initiative (e.g. EU Concerto bid);
- promote sustainable modes of business travel through the Employee Travel Policy;
- promote, monitor and increase the use of cleaner fuelled vehicles (e.g. LPG, electric & bio-fuel) in the council fleet including pool cars;
- introduce fleet fuel monitoring and efficient driving awareness programme;
- ensure that new development where appropriate contributes to walking, cycling and public transport initiatives;
- encourage mixed-use and compact development in accessible locations which reduce the need to travel;
- discourage excessive car parking and encourage shared and collective car use;
- support information and awareness raising initiatives in the Air Quality Action Plan and make links with climate protection;
- accelerate the adoption of travel plans;
- support the promotion of clean and efficient vehicles;
- raise awareness of climate protection initiatives at local transport groups and events;
- provide support to the VOSCUR Transport Network and raise awareness of local community transport projects;
- rollout of clean vehicles in the council fleet, efficient driving advice, fuel monitoring, and staff travel plans;
- encourage energy efficiency in new developments, local development of renewable energy, recycling and sustainable transport through planning and building control; and
- encourage low emissions vehicles, promoting walking, cycling, public transport, park and ride, travel plans and sustainable freight initiatives through the Air Quality Action Plan.

Case Study 2: Lancashire's Climate Change Strategy

Lancashire's CCS explicitly presents the expected contribution of transport measures towards overall carbon reductions. As outlined in the strategy, most of the potential savings of 431 $KtCO_2$ per year will be delivered by national measures but local activity will support these. The 'Supporting Actions' document presents these measures, along with quantified CO2 reduction estimates for some interventions:

- Low Carbon Vehicle (LCV) fleet;
- increasing use of sustainable biofuel e.g. through Lancashire County Council's participation in EU BIONIC project;
- Air Quality Action Plans;
- eco-driving (potential 100 $KtCO_2$/year);
- reducing the need to travel (potential 44.3 $KtCO_2$/year) – promotion of teleworking, tele-conferencing and home shopping. Flexible working schemes (including home working) at major local employers;
- travel planning (potential 32.5 $KtCO_2$/year) – Personalised Travel Planning (PTP) schemes in Preston, South Ribble and Lancaster. All schools to have travel plans by 2010 Burnley Borough Council and Preston City Council implementing staff travel plans;
- low carbon bus fleets (potential 24 $KtCO_2$/year) – investment from bus operators is triggered by Quality Bus Partnerships;
- car sharing schemes (potential 19.4 $KtCO_2$/year) – www.sharedwheels.co.uk includes Lancashire County Council, Blackburn with Darwen Council, Blackpool Council and Preston City Council;
- communications (potential 11.9 $KtCO_2$/year) – 'Travelwise' schemes promoting awareness of alternatives. New bus information strategy developed in 2008 by Lancashire County Council, Blackburn with Darwen Council and Blackpool Council;
- demand responsive public transport – action plan under development in West Lancashire; and
- Urban Traffic Management and Control (UTMC) – developing plans to improve management of transport network in Preston and Lancaster city centres, including transport information for all travellers;

Lancashire stated that additional activity on this theme is likely to focus around soft measures for reducing emissions from transport such as travel planning provision and extending the publicity and coverage of car-sharing schemes.

Lancashire County Council's methodology for CO_2 estimation is included within Section 6 of this report.

Other key examples of high-level, area wide commitments include the Nottingham Declaration and the Covenant of Mayors. All of the authorities studied as part of the desktop review had signed up to the Nottingham Declaration. Local authorities which have signed up to the Covenant of Mayors include Bristol, Darlington, Hartlepool, Lancashire, Manchester, Northumberland, Nottingham and York.

Darlington and Northumberland produced draft SEAPs in February 2010 with the intention of full submission for the September 2010 deadline.

Local Carbon Framework (LCF) pilot areas

Several of the authorities interviewed (Bristol, Plymouth, Northumberland and Poole) have been nominated as pilot areas for the above initiative. The LCF was not prominent within the interviews, possibly because little work has been undertaken at present (the pilot areas were announced in January 2010). Northumberland stated that work through this initiative is still to be confirmed and agreed with Department for Communities and Local Government (DCLG), and would be further defined in April 2010 through a two-day residential session within the DfT where selected pilot areas will present their proposals.

The interviewees from Poole felt that transport would be unlikely to play a major role in the framework as the continuous nature of the Bournemouth/Poole conurbation would make monitoring CO_2 emissions from transport for Poole in isolation very difficult.

2.1.2 Climate change and local authority operations

Several authorities have made commitments to reduce CO_2 emissions from their own operations. This is either through the adoption of NI185 in the LAA, mandatory schemes such as the Carbon Reduction Commitment (CRC) or by signing up to voluntary pledges such as the 10:10 Campaign.

NI185

NI185 relates to CO_2 emissions from local authority operations. Of the 20 authorities studied, only four had formally adopted NI185, as shown below;

- Cambridge, with a target of 2% reduction in emissions by 2011 (2008/9 baseline);
- Poole, aiming to achieve a 10% reduction target by 2010/11 (2009 baseline);
- Kingston-upon-Hull, with a 60% reduction target by 2050 (baseline not yet set); and
- Oxfordshire, with an 18% reduction target by 2011/12 (2009 baseline).

Shropshire highlighted that addressing emissions from council operations was perceived as a way for the local authorities to lead by example and address the need to achieve CO_2 reductions in their local area in a more credible manner. The council had done this through the Local Authority Carbon Management Programme (LACM) (see Case Study 4).

Similar to Shropshire, Staffordshire established a carbon baseline as a result of participation in the LACMP. The authority has established baseline data for the financial year 2005-06 using the Carbon Trust's standardised methodology.

This baseline includes a breakdown of the emissions from transport into the following categories: business mileage; fleet vehicles; Staffordshire Highways contracted vehicles; and staff commute. The council have used tools provided by the Carbon Trust to project what the authority's future emissions would be based on two scenarios: the Business As Usual (BAU) where no carbon management plan is implemented and current energy use trends continue; and a Reduced Emissions Scenario (RES), where a carbon management strategy is implemented, using a 2% year on year reduction.

The 10:10 Campaign

The 10:10 Campaign[9] is a national initiative inviting individuals and organizations to pledge a voluntary 10% cut in their carbon emissions to be achieved in 2010. This involves baselining 2009 emissions (as per NI185 above), and monitoring over the 2010 period.

The campaign recognises that organizations that have already made significant cuts in CO_2 may find it difficult to achieve a 10% cut in 2010. In such cases organizations are asked to make a commitment to reduce emissions by at least 3%. There are no league tables or independent

[9] See www.1010uk.org.

auditing of figures. Organizations that produce evidence showing they have reduced emissions by 3% or more in 2010 will be recognised by the campaign. Local authorities are asked to use NI185 figures for reporting to the campaign.

Several local authorities have signed up to the campaign, including Darlington, Nottingham, Warrington, Worcestershire and York.

Case Study 3: Establishing a baseline – Shropshire County Council

Launched in 2003 by the Carbon Trust, the Local Authority Carbon Management (LACM) Programme was set up to provide local authorities with practical advice on developing good carbon management practice. Its main objective is to deliver improved carbon management to reduce emissions under the direct control of the local authority, such as buildings, vehicle fleets, street-lighting and landfill sites.

As part of the LACM, Shropshire Council needed to establish its current level of carbon emissions, in order to allow it to identify potential targets and savings.

The council included emissions from of the actions it undertakes (or for which they are responsible). This included:

- corporate buildings including schools;
- street lighting;
- council owned housing stock;
- council owned transport – buses, vans, gritters, road sweepers, pool cars, garden maintenance vehicles;
- key indirect sources of emissions; and
- domestic waste collection vehicles and key contract maintenance vehicles.

The data collected was a mixture of both metered and estimated data from a variety of sources. Carbon emissions are calculated from this data using Carbon Trust approved CO2 factors from DECC.

Using the baseline tools provided by the Carbon Trust for the LACM programme the authority identified 90,608 tonnes of CO2 emissions during the baseline year. Buildings and streetlights accounted for 44,991 tonnes, Housing 33,728 tonnes and Transport 11,889 tonnes of CO2 emissions.

Data will be evaluated on an ongoing basis as more detailed information becomes available, and will ultimately become 100% accurately metered following the introduction of AMR (automatic meter reading). It is the authority's intention to include staff travel to and from work once a complete survey is carried out in 2010.

The authority's target is to reduce emissions by 35% over the next 5 years to 58,895 tonnes of CO_2 in 2013/14. Emission savings from the authority's buildings are anticipated to form the largest contribution although the authority has not allocated carbon budgets for each individual sector within the organization.

Carbon Reduction Commitment (CRC) Energy Efficiency Scheme

The CRC Energy Efficiency Scheme (formerly known as the Carbon Reduction Commitment) is a mandatory cap and trade scheme which started in April 2010 across the UK. During interviews,

Bristol and Shropshire stated that the CRC was one of the key drivers behind actions to reduce CO_2 emissions from council operations, and it was also mentioned by Worcestershire County Council as one of the drivers behind the council's carbon reduction strategy.

The scheme is designed to encourage organizations with high energy use[10], which are not already involved in the EU Emission Trading Scheme (ETS), to improve their energy efficiency. It covers large public and private sector organizations (responsible for about 10% of the UK's emissions). This will affect around 20,000 organizations, including local authorities, banks, supermarkets, water companies and large private sector employers.

Case Study 4: The CRC timetable

2010 - The first compliance year (April 2010 - March 2011) is the 'Footprint Year', with the registration period closing in September 2010. The financial year 2010-2011 is also the qualification year for the second phase of the CRC.

2011 - First sale of allowances in April 2011. Participants can buy allowances from Government at a fixed price of £12/tCO_2. Participants will only have to purchase allowances to cover their forecast emissions for 2011/12.

2013 - First capped phase: auctioning of carbon allowances begins.

Participating organizations will have to monitor their emissions and establish a 2010 baseline. They will have to purchase an annual allowance for each tonne of CO_2 (at £12 per tonne) they emit above this established baseline. Once the scheme is in place, organizations' performance will be published annually, showing the comparative performance of participants. The revenue raised from selling allowances will be "recycled" back to participants and their performance will affect how much revenue each organization receives[11].

Emissions for which participants will need to purchase allowances each year are mainly related to energy use and **exclude transport emissions**[12].

2.1.3 Climate change adaptation

The main commitment from local authorities on climate change adaptation is linked to the selection of NI188 in their LAA. The overall aim of NI188 is to embed the management of climate risks and opportunities across the local authority and partner's services, plans and estates and to take appropriate adaptive actions where required[13].

Local authorities report on the level of preparedness they have reached against levels of performance, which are graded zero to four. A higher number represents further progress made in planning to adapt. The levels are:

- Level 0 - getting started;
- Level 1 - public commitment and impacts assessment;
- Level 2 - comprehensive risk assessment;

[10] An organization qualifies as a full participant in CRC if at any point during the qualification period, it had at least one half hourly meter (HHM) settled in the half hourly market and its 2008 annual electricity supply through all HHMs was at least 6,000 MWh. Organizations that had at least one HHM settled on the half hourly market, but whose annual energy supply is less than 6,000 MWh do not have to participate in CRC but do have to make an information disclosure. Source: The CRC Energy Efficiency Scheme User Guide, Environment Agency, Northern Ireland Environment Agency, Scottish Environment Protection Agency, 2009

[11] Source: The CRC Energy Efficiency Scheme User Guide, Environment Agency, Northern Ireland Environment Agency, Scottish Environment Protection Agency, 2009.

[12] Other emissions excluded from the CRC scheme are emissions from domestic accommodation, emissions from activities covered by a Climate Change Agreement or the EU Emissions Trading System and emissions from consumption outside the UK.

[13] 'Adapting to Climate Change, Guidance notes for NI188', The Local and Regional Partnership Board, 2008.

- Level 3 - comprehensive action plan; and
- Level 4 - implementation, monitoring and continuous review.

Table 2.2 below shows the climate change adaptation LAA target selected by the local authorities studied during the desktop review.

Table 2.2 - 2011 LAA adaptation targets

Local authority	NI188 – adapting to climate change
Bristol	-
Cambridgeshire	Level 3
Darlington	Level 3
Hampshire	Level 3
Herefordshire	-
Hertfordshire	-
Kent	Level 3
Kingston upon Hull	-
Lancashire	Level 3
Leicester	-
Norfolk	Level 3
Northumberland	Level 4
Nottingham	Level 3
Oxfordshire	Level 3
Plymouth	-
Poole	Level 3
Shropshire	-
Warrington	Level 3
Worcestershire	Level 3
York	-

All authorities who adopted NI188 are aiming to achieve Level 3 by 2011 which means that, "the Authority has embedded climate impacts and risks across council decision making. It has developed a comprehensive adaptation action plan to deliver the necessary steps to achieve the existing objectives set out in council strategies, plans, investment decisions and partnership arrangements in light of projected climate change and is implementing appropriate adaptive responses in all priority areas. This includes leadership and support for Local Strategic Partnerships in taking a risk based approach to managing major weather and climate vulnerabilities/opportunities across the wider local authority area[14]".

[14] 'Adapting to Climate Change, Guidance notes for NI188', The Local and Regional Partnership Board, 2008.

The final reporting includes the identification of the most effective adaptation responses to achieve Level 2 of National Indicator 188 (Planning to Adapt to Climate Change) and the development of an Adaptation Action Plan to achieve Level 3 of NI188.

Northumberland is the only authority to target Level 4, which involves implementing, monitoring and reviewing the action plan produced as part of Level 3.

Research undertaken for this study did not identify transport sector specific climate change adaptation targets in relation to NI188, which is due to the procedural nature of NI188. The transport sector is however considered in authorities' climate change adaptation plans and strategies and their Transport Asset Management Plans (TAMPs).

Case Study 5: 3CAP Climate Change Adaptation

The 3CAP project is looking at the current and likely future impact of climate change on the Highway Network Policies and Standards for the three counties of Derbyshire, Leicestershire and Nottinghamshire.

The climate change adaptation action plan is based on a risk and probability management approach. It involved the production of a comprehensive, local risk-based assessment of current vulnerabilities to weather and climate, both now and in the future, and begins to identify possible adaptation responses.

Highways are likely to be seriously affected by climate change induced effects such as flooding in some areas and drought effects in others. The increased speed of runoff from areas adjoining highways will create drainage problems, while drought conditions will adversely affect highway landscapes.

Thus in the 3CAP study, seven policy areas were identified as likely to be the most significantly affected by climate change and offer the greatest opportunities for adaptation. These were bridges and other structures, drainage, grass cutting, materials, resurfacing, tree and hedge maintenance and winter maintenance.

2.2 Transport specific commitments

2.2.1 Local Area Agreements

Authorities which have adopted NI186 within their LAA have set targets for an overall per capita carbon emission reduction within their area. However the majority of LAAs did not set separate targets for CO_2 reductions from transport.

There were some exceptions – Lancashire for example has targeted transport to account for 15% of the 30% overall emissions reduction target within their Climate Change Strategy (CCS).

Of the 12.5% reduction target for NI186 in Lancashire's LAA, 9.75% will come from national measures, and the remaining 2.75% from authority measures. Similarly, Norfolk's 11% reduction target is split 8% / 3% between national and local measures. However most LAA documents do not single out CO_2 reduction targets from transport.

In all of the above cases, national measures are expected to contribute significantly more than local measures, perhaps reflecting the extent to which local authorities feel that they can influence CO_2 emissions.

Case Study 6: Analysis to support Climate Change Indicators for Local Authorities

This report, produced by AEA for Defra in 2008 is often cited as the key source of guidance for local authorities adopting NI186 by Defra (2008). The report develops the indicator and predicted savings through drawing up a list of measures that can be taken to reduce emissions to meet NI186 targets.

The large majority of measures included within this report are not locally-led programmes. Of 51 suggested measures, only seven are listed as 'purely local measures implemented by LAs [local authorities] or other organizations', while nineteen are 'purely national measures'; the remainder are 'national measures with local influence by LAs'

In the transport sector, 'National measures' included the Renewable Transport Fuel Obligation (RTFO) and the Fuel Duty Escalator. 'National measures with local influence' include speed limit enforcement and speed limit changes.

Of the 51 suggested measures across the Business, Domestic and Transport sectors, the only purely local measures used were within the Transport sector. These are:

- smarter choices;
- restrictive measures on transport use;
- vehicle maintenance (e.g. tyre pressure);
- driver training (behavioural measures);
- municipal clean fleet switch; and
- measures that can be used to reduce urban sprawl.

2.2.2 LTP2

Most LTP2 documents do not include targets to reduce carbon emissions from the transport sector although most LTP2 strategies and associated documents include air quality targets (as noted by Bristol, York and Northumberland).

The majority of targets set in LTP2 relate to the "shared priorities" of congestion, accessibility, road safety, air quality and quality of life listed in the DfT guidance[15] in 2006, when LTP2 were developed. CO_2 emission reduction is not the primary focus of LTP2 initiatives, but many of them influence factors which have a strong impact on transport sector emissions. This includes for example:

- reduction in area-wide vehicle kilometres;
- increase in public transport patronage, improved satisfaction with local bus services;
- reduction of car use in mode share of journeys to school;
- increase in cycle trips; and
- reduction in peak period traffic flows.

Within LTP2, only three local authorities were identified through this research as having set a target for CO_2 reduction from transport:

- Norfolk County Council's LTP2 aims to reduce per capita transport emissions by 10% over the LTP period. Initiatives being delivered fall into two broad categories, those which are being delivered to encourage a modal shift to sustainable modes of travel like walking,

[15] Full guidance on Local Transport Plans, DfT, 2006.

cycling and public transport, and those which help to reduce the carbon impact of travel, including alternative fuels. More innovative measures include Norfolk's carbon sequestration programme. To measure the impact of some of these initiatives, the authority has developed its own model for quantifying CO_2 reduction. The model uses road transport emissions from Defra as a baseline, but factors in and quantifies reductions from the measures being delivered locally in Norfolk. More information on these initiatives and this carbon tool are included in later sections.

- Cambridgeshire County Council set a target to reduce CO_2 emissions from road transport to 1.474 $MtCO_2$ by the end of the LTP2 period, from a baseline of 1.657 $MtCO_2$ in 2003, countering an upward trend identified in the baseline assessment. This non-mandatory target is however no longer monitored following the 2008 progress report, instead being subsumed within NI186; and
- Worcestershire included indicator WCC10 in their LTP2 'CO_2 emissions from traffic', with a stretch target to reduce CO_2 emissions from traffic to 1.380 $MtCO_2$ 2010/11 from a baseline of 1.432 $MtCO_2$ in 2004/5.

The lack of transport sector specific commitments to reduce CO_2 emissions can be attributed to several factors including:

- the lack of focus on CO_2 emissions in LTP2 guidance, reflecting the lower level of priority of CO_2 emissions across central government at the time;
- perceived and actual difficulties in meaningfully influencing transport sector CO_2 emissions at the local level;
- difficulties in monitoring local transport emissions (especially pre NI186) and evaluating the impact of transport interventions implemented by the authorities on overall CO_2 emission levels; and
- the local authority focus on emissions reduction being driven at a corporate level and in non-transport areas such as their estate and building energy use, in part driven by the Carbon Reduction Commitment (CRC).

Case Study 7: Transport Asset Management Plans and climate change adaptation

The DfT recommended that local authorities include a statement in LTP2 outlining how they planned to develop Transport Asset Management Plans (TAMPs) in the LTP2 period.

TAMPs provide authorities with:

- detailed information on the assets held by the whole authority;
- a clear relationship between the programme set out by the TAMP and the authority's LTP targets and objectives; and
- better understanding of the value and liability of their existing asset base to ensure that this base is exploited to its full potential and its value safeguarded for future generations.

A good quality TAMP will assist each authority in understanding the value and liability of the existing asset base, and allow decisions to be made in an informed way that will not compromise its future value.

The TAMP aims to set out not only the practices and systems that are currently being applied to the management of the transport assets, but also the aspired levels of service and their associated funding requirements. TAMP's can help authorities to adopt smarter working practices to bring about cost savings in terms of both ongoing investment in the existing transport network and its medium/long term renewal.

In addition, since 2006 all local authorities have been required to produce a valuation of their highway assets. Under these requirements from 2007/08, local highway authorities are expected to determine not only the value of their assets, but also monitor year on year whether they are depreciating or not following investment. This also provides an indicator to the Government on how effectively each authority is investing their capital LTP structural maintenance funds. There is therefore now an intimate relationship between asset management and asset valuation.

Atkins 2008 Report, 'Review of Transport Asset Management Plans' found that all local authorities (101 authorities contacted out of total 117) expected to have a TAMP in place by the end of 2008.

2.2.3 LTP3

Most local authorities are currently undertaking consultation on LTP3, with limited information available in the public domain.

Thirteen authorities studied during the desktop review had some LTP3 information publicly available, which usually presented strategic objectives for LTP3, but did not include specific policies and interventions at this stage.

More emphasis on carbon and climate change was evident in LTP3 objectives compared to LTP2 objectives, reflecting the change of emphasis in the guidance issued by DfT, but limited information was publicly available in terms of targets and evidence. Nearly all of the published LTP3s included an objective to reduce carbon.

Poole

Poole's LTP3 will focus on five broad scenarios; Public Transport, Smarter Choices, Demand Management, Spatial Land Use and Highway Road Building, and it is planned to link the document with the Bournemouth, Dorset and Poole Renewable Energy Strategy.

York

York's targets for LTP3 will be based upon a review of LTP2 targets, which will include the ease with which these targets were able to be monitored. York's LTP3 will tie in with the established LAA targets on climate change, as well as with the ten national indicators relating to transport. The LTP3 team is planning to use evidence coming out from the consultation process to decide on targets for transport.

Lancashire

Lancashire's LTP3 targets will be informed by ongoing research by 4NW. Recent research investigated the potential carbon savings that could be achieved by the North West and its five sub-regions by 2020 through the implementation of international and national policies as well as existing and planned measures at the regional level[16].

[16] 'Assessment of Potential Carbon Savings Achievable in the North West Region by 2020', 4NW (2009).

Case Study 8: 4NW 'Wedges Research'

In 2008 a report entitled 'Assessment of Potential Carbon Savings Achievable in the North West Region by 2020' was produced for 4NW (the North West Regional Development Agency), by consultants UBS.

This report outlined a top-down assessment of the carbon savings achievable in the region, broken down by different measures and by each local authority. The report is known informally as the 'wedges research' because it references a particular approach to understanding carbon savings from different measures based on the idea of wedges.

The report provided three broad recommendations, backed up with more detailed numbers. The broad recommendations were:

"Maximise potential carbon savings from the implementation of national policies in the region."

The national policies identified and quantified were primarily those in the 2007 Energy White Paper. For transport, this meant the Renewable Transport Fuels Obligation, and the successor to EU voluntary agreements on new car fuel efficiency, over which the regional authorities were considered to have very little control.

"Maximise potential carbon savings from existing regional measures and up-scale existing regional measures where possible."

For transport, almost all of the regional policies considered were the Local Transport Plans (LTP2).

"Implement additional carbon reduction measures in the areas identified … as presenting significant scope for greater carbon savings."

The report suggested that regional authorities could derive additional emissions savings by pursuing many of the measures contained within the DfT's ten year transport plan more vigorously than currently projected.

A second category was potential measures considered completely additional to existing/planned policies already covered – these were 'smarter choices', eco-driving, low carbon bus fleets, and congestion charging combined with public transport improvements in the region's main cities.

Although purely based on a top-down, high-level analysis, this report provides an extremely useful quantitative framework for development of climate change targets across the region. For both the region as a whole, and then for each individual local authority, it provides a starting point for assessing the potential contribution of different types of policy and comparing this against the overall emissions reduction target.

Case Study 9: Norfolk's LTP3 progress

Norfolk has yet to set targets as part of LTP3, but have confirmed that the reduction of carbon emissions from the transport sector is one of the five key strategic priorities that they have selected.

The consultation leaflet which has been issued (climate change is the first topic) states that the following three challenges are faced with in Norfolk.

1. Norfolk's vulnerability to climate change.
2. Maintaining the current transport network as well as its ability to adapt to current and future impacts of climate change.
3. Reducing emissions from transport.

The information on climate change within the consultation document is set out in three sections: flooding / temperature rises; maintenance; and carbon emissions from transport. The document sets out actions which the council is planning to take to address each of these topics. These are set out below:

Flooding / Temperature Rises

- Assess the roads and railways that are most at risk of flooding, higher temperatures or coastal erosion.
- Target measures, such as heat and flood resistant road surfaces, on the key routes.

Maintenance

- Target the limited funding available for maintenance on key roads, key rural links and town and village centres.

Carbon Emissions

- Encourage the take up of low emission vehicles and low carbon travel. This would be carried out by supporting financial incentives and delivering infrastructure, for example electric charging points for vehicles.
- Focus investment in green travel options for journeys of 10-25 miles. This would be carried out by providing better alternatives such as public transport links, Park and Ride, car clubs and car sharing.
- Encourage and promote the use of green travel options through measures like travel planning.

2.3 Target setting

Most local authorities have set ambitious targets for their area through NI186, aiming for a 9%-13.8% reduction in per capita CO_2 emissions by 2011. A large number of authorities also aim to reach Level 3 of NI188 with a comprehensive action plan adopted for their area by 2011.

Two main processes leading to the adoption of a climate change commitment or target were identified through the desktop review and interviews with selected authorities.

On one hand, some goals and targets are the direct consequence of a local authority signing up to a commitment. An example of this is City of York Council where the council is committed to the

10:10 Campaign[17] (focusing on operational emissions), the Covenant of Mayors (signatory authorities to curb their CO_2 emissions by at least 20% by 2020) and the Friends of the Earth 2020 Climate Change Target (42% reduction in CO_2 emissions by 2020).

However targets are more frequently set by the local authority itself, through the development of its LAA, LTP or climate change strategies. Authorities interviewed tend to use the following methods when setting their climate change targets for the transport sector:

- top down, through benchmarking against UK and international CO_2 reduction targets (Lancashire for example) and against other local authorities;
- bottom up, based on baseline data for emissions on the area and the planned impact of initiatives included in the strategies:
  - Norfolk County Council used baseline analysis on the vehicle mix in the area at the time and assumptions on future changes to this mix and public transport improvements to set the CO_2 target for LTP2; and
  - Cambridgeshire County Council set a target to reduce CO_2 emissions from road transport to 1.474 $MtCO_2$ by the end of the LTP2 period, from a baseline of 1.657 $MtCO_2$ in 2003, countering an upward trend identified in the baseline assessment. This target was based on a modelling assessment of the vehicle fleet's emissions, based on mileage on various classes of road across the county. This non-mandatory target is however no longer monitored in LTP2 following the 2008 progress report, instead being subsumed within NI186;
- mix of top down and bottom up approach, taking national targets into account but also considering the scale of change achievable at the local authority level through evidence emerging from the consultation process (York for LTP3, Shropshire through LAA process).

Case Study 10: Target setting in Staffordshire

For LTP2, targets were set by reviewing progress against LTP1 targets, and liaising with colleagues in the relevant field to determine appropriate outcomes to form the new targets. The public were consulted on priorities via a household survey of 8,800 properties. Existing targets are reviewed on an annual basis looking at the risks to delivery and value for money.

For LTP3, targets will be set following a similar process. National indicators are currently being reviewed to determine the most appropriate for inclusion. Staffordshire sits on a Regional Transport Monitoring and Implementation Panel which covers all the local authorities in the West Midlands, the Government Office and the Highways Agency. This group is currently working to establish a standard set of local indicators and a methodology for setting targets and for monitoring progress to enable regional benchmarking.

Authorities covering a mix of rural and urban areas noted the difficulties they encounter in assessing the baseline and setting CO_2 emission reduction targets across their area, with these difficulties increasing when authorities develop joint cross boundary strategies[18]. This was the case for Poole for example, where the authority is developing a Transport Strategy and LTP3 jointly with Bournemouth and Dorset and across a range of rural and urban areas.

In the case of Plymouth, the authority decided to set relatively cautious targets for LTP2 for two main reasons: a weak evidence base and Plymouth's strong growth agenda as part of regional planning. The growth agenda in this case meant that successful strategies were likely to result in "running to stand still" in terms of CO_2 emissions. This means that the implementation of

[17] 10% reduction in CO_2 emissions in 2010, see www.1010uk.org.
[18] More information on the NI186 baseline is included within Section 6.

successful initiatives to reduce carbon emission are likely to be balanced by a growth in emissions related to new development in the area.

In terms of NI185, Shropshire stated that the Carbon Trust recommended setting quite challenging targets. A 35% cut in council CO_2 emissions by 2014 was originally proposed by a senior officer within the authority, and subsequently received unanimous political support.

Evidence from DfT's assessment of the second round of Local Transport Plans found that the robustness and quality of target setting and monitoring in LTP2s was a weakness, with only 62% of authorities scoring good or excellent for this aspect of their LTP2[19].

Findings from the desktop review and interviews show that target setting for CO_2 emission reduction, especially for transport sector emissions, is often more problematic than for interventions that have become established components of LTPs (such as bus patronage for example) which have more established monitoring and reporting procedures.

Target setting for CO_2 reduction for transport is problematic for a number of reasons:

- establishing a local baseline for CO_2 emissions from transport is not always straight-forward (as discussed in Section 6);
- procedures to predict the impact of local initiatives (as opposed to national initiatives and national initiatives with a local influence) are at early stages of development. Bespoke models to appraise the impact of specific schemes (and hence aid target setting) are not always available, and can be expensive to build and maintain;
- quantification of carbon reduction from transport is a relatively new field for local authority transport planning practitioners, and there is no historic precedence to aid target setting; and
- targets which are set require monitoring and reporting. Local authorities are not always sure how to go about monitoring CO_2 emissions (other than through NI186 data, which as discussed in Section 6 has limitations associated with it).

Many of the strategies reviewed for the desktop research included high level objectives and commitments without agreed CO_2 reduction targets for the area.

[19] Long Term Process and Impact Evaluation of the Local Transport Plan Policy, DfT (2007).

3. Who is in charge of climate change issues?

This section discusses the different roles and responsibilities within authorities, and the wider partnership arrangements that exist across authority areas. Also included is a summary of roles across wider regions and city regions.

The range of responsibilities presented below reflects the way in which authorities have set out to meet the goals and commitments discussed within Section 2.

3.1 Roles within local authorities

3.1.1 Authority departments

Responsibility for transport and climate change within local authorities residing mainly in the following areas of expertise:

- sustainability, climate change and carbon emission reduction;
  - for the area, with roles such as Sustainability Officer, Climate Change Officer, Environment Officer, Strategy and Policy Manager,
  - or for the authority's own operations and buildings, with roles such as Carbon Reduction Manager, Property Services Manager;
- transportation, with roles including Transport/Transportation Manager, Local Transport Plan Manager, Head of Transport Strategy, Travel Plan Co-ordinator; and
- air quality, including roles such as Air Quality/Environmental Protection Manager.

A few authorities also mentioned the role of the emergency planning teams in relation to climate change adaptation. Some authorities have a dedicated Climate Change Adaptation Officer. This was the case for Norfolk County Council for example.

The above teams are required to work together to produce various cross-cutting strategies and documents (such as Climate Change Strategies, Carbon Reduction Strategies and Local Development Frameworks). The effectiveness of this joint working varies from authority to authority, and is largely dependent upon the quality of formal (through existing structures) and informal (personal contacts) communication between departments. However, the interviews which were undertaken showed that on the whole current arrangements were deemed to be satisfactory, regardless of whether teams sat within the same directorates or departments.

3.1.2 Across the local authority area

Local authority teams described in the previous section are however generally working within much wider partnership arrangements established through Local Strategic Partnerships (LSP) for the development and implementation of Local Area Agreements (LAA) and community strategies.

The influence of these wider partnership arrangements on climate change issues is clear both from the desktop review and the interviews conducted with selected local authorities. LAA partners typically include local authority elected members as well as representatives from the Police Authority, Fire and Rescue, NHS, the voluntary and community sectors and business.

Within LAAs, Local Climate Change Partnerships (or equivalent groups), often led by the local authority, are typically responsible for developing and monitoring the delivery of Climate Change Strategies, of which emissions from transport is a component part.

In some cases, these partnership arrangements extend outside the administrative boundaries of the local (transport) authority. For example, the Lancashire Climate Change Partnership consists of Lancashire County Council, the twelve District Councils, the unitary authorities of Blackburn with Darwen and Blackpool, the Environment Agency, the local Primary Care Trusts as well as representatives from several major organizations and employers.

For the development of LTP3, similar partnership arrangements (often using existing LSP structures) are also in place or being set up across authorities. Examples include:

- Bristol – Transport Commission established to steer the development of the Joint LTP3 with a dozen members from various sectors such as business, health and education; and
- Poole – developing a joint LTP3 with Bournemouth and Dorset, building on the Multi Area Agreement between the authorities and including a dedicated Climate Change Working Group tasked with the development of the low carbon transport strategy which will sit under the area's transport strategy.

Some authorities interviewed noted that this partnership approach is beneficial to climate change mitigation and adaptation objectives as it enables the dissemination of information and generates stakeholder buy-in across the area.

The pooling of funds (and securing extra funding) across wider partnerships was not specifically mentioned during interviews, although this is a possibility.

Some however noted that it is easier to engage with stakeholders when developing strategies than achieve delivery in partnership which would include the implementation of jointly funded initiatives.

3.2 Regions and city regions

3.2.1 Sub-regional approaches

As noted in the previous section, partnership arrangements for Local/Multi Area Agreements, Climate Change Strategies or Local Transport Plans cover areas across local (transport) authority boundaries in some cases.

Examples include the Poole, Bournemouth and Dorset MAA, or Bristol as a member of the West of England MAA, as well as the participation of Northumberland or York in city regional structures.

In the case of the Tyne & Wear City Region, of which Northumberland is a constituent authority, the city region's MAA includes NI186.

Case Study 11: The Bournemouth, Poole and Dorset Multi-Area Agreement

Outside the city regions, Bournemouth, Poole and Dorset have a single MAA, and these three authorities are also producing a joint LTP3. Interviews with Poole discovered that the focus within the authority is now on the MAA rather than Poole's LAA, showing a shift in emphasis to the regional rather than local level.

The focus of the MAA is on economic growth and job creation. The outlined vision is, "to develop a strongly performing economy characterised by a greater concentration of higher skilled, higher paid jobs than now and to do this while respecting and protecting our unique environmental assets".

The success of this vision will be measured by an increased Gross Value Added (GVA) per head and increased average weekly earnings.

The MAA's ambition in terms of transport is to, "create an efficient and reliable transport and communications system that improves inter-and intra-regional and sub-regional connectivity in getting people to jobs, raw materials to production and finished goods to market". Again, the emphasis is very much on transport and the economy, although a more efficient transport network will play a role in reducing emissions.

The MAA identifies key existing issues for the sub-region relating to congestion, access to employment and connectivity, recognising that addressing accessibility issues is a long term process. The agreement states that during the three-year MAA period the partnership will need to achieve certain milestones including producing a sound delivery programme for major transport improvements – £80m will be found from existing budget allocations to deliver the required transport programme.

The MAA recognises the need for a closer working relationship with the Highways Agency on the South East Dorset Multi-Modal Transport Study, and in considering planning applications for key employment sites.

The table below sets out the transport aims, milestones and responsibilities of local partners.

Aim	Target	Activities/ Milestones	Partners	Enabling Measure
Reduce growth in congestion	NI 167	**Activity 1:** South East Dorset Multi-Modal Study (SEDMMTS). Model by summer 2009. Access for new key employment sites identified by summer 2010, by joint working arrangements with Highways Agency. Delivery strategy for A31 improvements by summer 2010.	Local Transport Authorities Highways Agency, SWRDA, SWRA, GOSW	T1
		Activity 2: Bus Showcase Corridors. All buses GPS fitted by end 2010. Poole-Boscombe journey reliability improved by Summer 2011. Major scheme business case submitted by end 2010. Additional P&R Sites identified by summer 2010.	Bus operators Local Transport Authorities Highways Agency	T1
Provide new key employment sites with good access		**Activity 1:** See above.	See above	See above
Improve access to employment by public transport	NI 176	**Activity 1:** See above.	See above	See above
		Activity 2: See above.	See above	See above
Improve connectivity to South Hampshire ad London		**Activity 1:** See above.	See above	See above
Improve connectivity to Bristol and the North		**Activity 1:** See above	See above	See above

Source: Table 2, 'Multi-Area Agreement for Bournemouth, Dorset and Poole' (2008)

NI167 relates to reduced growth in congestion and NI176 to accessibility by public transport. Neither NI186 nor NI188 is cited within the MAA as a target, but Poole has a separate NI186 target (12% reduction on baseline by 2010/11). Given the authority's stated emphasis on the MAA rather than the LAA it is uncertain what priority initiatives to improve NI186 will be given within the area, although some of the activities within the above table should prove complementary.

The signed MAAs are shown in Table 3.1.

Table 3.1 – Signed Multi-Area Agreements

Area	
Tyne and Wear	PUSH (Partnership for Urban South Hampshire)
Tees Valley	Birmingham, Coventry and Black Country City Region
Pennine Lancashire	North Kent
Leeds City Region	West of England
Greater Manchester	Olympic Boroughs
Liverpool City Region	Fylde Coast
South Yorkshire	Leicester and Leicestershire

Areas working towards or considering MAAs are shown in Table 3.2.

Table 3.2 – Areas considering Multi-Area Agreements

Area	
Regional Cities East	Nottingham
Hull and Humber	Milton Keynes South Midland
Gatwick Diamond	

The MAA approach in itself potentially offers some benefits in terms of both delivering carbon reduction and adapting to climate change, particularly where the MAA corresponds to a PTE.

The arguments for this are the same as those for developing a unified transport strategy for a region or a city-region, which functions as an integrated area in terms of its commuting, retail and transport patterns. The existence of a co-ordinating transport body provides a unified, coordinated approach to transport (and carbon) planning. This means that initiatives can be implemented across the area in a consistent manner to address common goals, rather than being introduced on an authority-by-authority basis. One of the benefits of PTEs is their ability to provide integrated ticketing systems and integrated public transport services. This does not necessarily imply that a regional body is required in order to bring about service integration and integrated ticketing and fares, but it is an advantage.

There are also benefits in terms of pooling resources to achieve economies of scale. Such an example would be in creating an area-wide transport monitoring programme, or compiling an infrastructure inventory. Individual local authorities may not be able to afford to develop a bespoke model to predict and appraise carbon emissions, but could contribute to the development of a regional model.

MAAs reflect the need to deal with climate change mitigation (as well as adaptation) across administrative boundaries to reduce the risk of simply displacing emissions or risks linked to the changing climate

3.2.2 Metropolitan areas

Each metropolitan county has a Passenger Transport Executive[20] (PTE), which is responsible for public transport within the area.

PTEs are responsible for producing LTP3, which are currently under development in each area. As for individual local authority's LTP3, carbon reduction is likely to figure prominently in these documents.

Whilst carbon reduction from transport will be considered in each area's LTP3, some PTEs have produced separate Climate Change Strategies.

Centro has signed a public declaration on climate change which pledges that the PTE will:

- work with central government to contribute, at a local level, to the delivery of the UK Climate Change Programme, the Kyoto Protocol and the target for carbon dioxide reduction by 2010;
- participate in local and regional networks for support;
- within the next two years develop plans with partners and local communities to progressively address the causes and the impacts of climate change, according to local priorities, securing maximum benefit for local communities;
- publicly declare, within appropriate plans and strategies, the commitment to achieve a significant reduction of greenhouse gas emissions from the authority's operations, especially energy sourcing and use, travel and transport, waste production and disposal and the purchasing of goods and services;
- assess the risk associated with climate change and the implications for services and communities of climate change impacts and adapt accordingly;
- encourage all sectors in the local community to take the opportunity to adapt to the impacts of climate change, to reduce their own greenhouse gas emissions and to make public their commitment to action; and
- monitor the progress of plans against the actions needed and publish the results.

Elsewhere, GMPTE's Climate Change Strategy is currently under development, and will see the PTE working in collaboration with communities, other public sector agencies, and the private sector to ensure a joined up approach.

Whilst not currently having a separate Climate Change Strategy, Merseytravel has recently appointed a 'Climate Change officer' whose role is to support all of the Merseyside Transport Partnership (MTP) authorities in developing, preparing, implementing and monitoring the partnership's response to climate change and improving quality of life, within the framework of the Local Transport Plan. Specifically, the duties of the officer are:

- to support the MTP in co-ordination, development and performance monitoring of a climate change strategy for LTP3, ensuring consistency with national climate change targets and regional and city region priorities and targets;
- to work with internal and external partners to develop joint initiatives that meet current and future LTP objectives and address transport issues in wider strategies; and
- to place the partnership's climate change strategy at the heart of its priorities to support the continuing regeneration of the City Region.

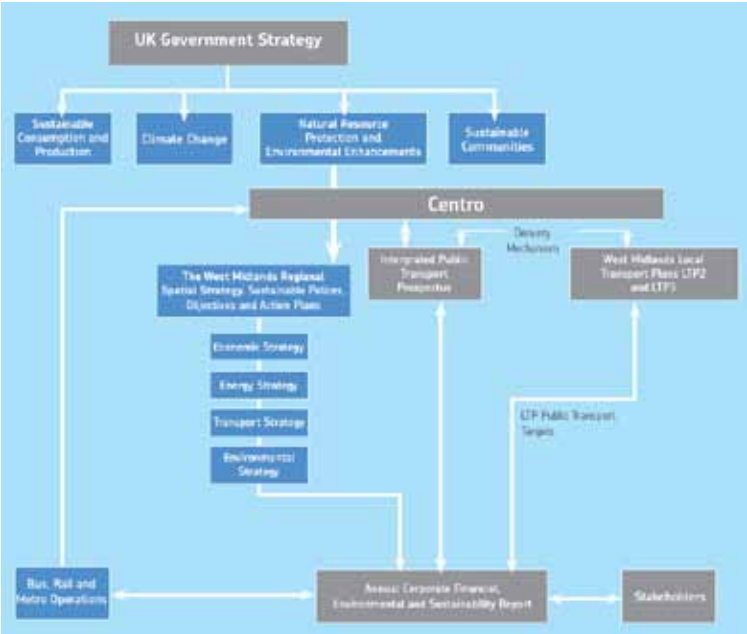
[20] Since 2008, PTEs have been operated by Integrated Transport Authorities. They are responsible for funding the PTEs, and making the policies which the PTEs carry out on their behalf. PTEs secure services on behalf of the ITA but it is the ITA that pays for them.

Case Study 12: Centro's Environmental Strategy

Centro's Environmental Strategy (ES) for the period 2009 to 2014 builds upon and implements Centro's adopted Environmental Policy. The strategy considers key areas where Centro's activities impact on the environment and on those areas of activity where Centro as an organization has a degree of control or authority (and hence greatest capacity to influence outcomes) as well as potentially influencing the performance of stakeholders and suppliers.

The ES is supported by an internal Action Plan that sets out specific actions to deliver the key priorities identified in the strategy. Key Performance Indicators (KPIs) are set out for all targets. The Action Plan also establishes responsibilities, resources and timescales. Figure 3.1 below shows where Centro's ES sits with regard to other national and regional strategies.

Figure 3.1 - Centro's Environmental Strategy



The seven West Midlands Local Authorities are Centro's major stakeholders. Each of the councils has demonstrated a commitment to environmental conservation and sustainable development through environmental strategies, Agenda 21 and shared transport priorities through LTP Transport Plans.

Each council has committed to using its regulatory and advisory powers to develop environmental strategies that are in line with national and regional policies and targets. Some of these include:

- promoting safe pedestrian and cycle routes;
- preventing pollution (many Local Air Quality Management Areas have been declared to date due to road traffic pollution); and
- improving air quality and decreasing congestion.

The ES states that Centro can support the local authorities in achieving national indicators, i.e. targets NI167 (congestion – average journey time per mile during the morning peak) and NI198 (children travelling to school). These national targets aim to reduce car use and encourage people to travel by public transport, on foot and by bicycle, particularly during peak periods.

Case Study 13: Carbon footprinting research for PTEG

This work investigated approaches and methods of carbon footprinting for the UK's Passenger Transport Executive Group (PTEG). PTEG represents the six English Passenger Transport Executives (PTEs), with Strathclyde Partnership for Transport (SPT) and Transport for London (TfL) as associate members. The work was carried out by consultants AEA in 2008.

The aim of the study was to establish a common basis for estimating the carbon emissions from the range of PTE/SPT activities – and where appropriate, the emissions saved compared with an alternative course of action.

In order to achieve this, the project reviewed the existing approaches, carried out primary data collection, and then directly tested the possible methods for bus, rail and light rail.

Two distinct approaches were identified – 'top down', and 'bottom up'. The top down approach makes use of overall fuel data, which has the advantage of being simple and accurate, but doesn't provide much breakdown of the results.

The bottom up approach builds a picture of emissions from each route or vehicle, by estimating fuel use based on the vehicle efficiency and distance travelled. This involves various assumptions and is therefore less accurate than the top-down, but it does provide detailed results, reflecting the detail available in distance data regarding routes and services, and details of the various vehicle types.

Based on the data available, both approaches were found to provide comparable results and can be considered valid. The top down approach is more widely used in the private sector, where fuel use data is easily accessible, whereas the public sector was found to use a mixture of both methods.

Having assessed the data available and compared both methods, the report recommended the method to use for each mode as follows.

- **Bus** – good data was available for the bottom up approach, and this was recommended as the primary method. However, it was also suggested that this should be validated against a simpler top down calculation based on national fuel use data.
- **Rail** – continued use of both methods was recommended, in light of the variability of data available from different operators.
- **Light rail** – the top-down approach was recommended since the energy consumption data are readily available, and there is little variability between vehicles, making the breakdown provided by the bottom up approach less useful. It was further recommended that only energy used for traction should be considered.

For all modes it was found to be possible to calculate emissions per km, per passenger km and per passenger journey, although this did require some assumptions. It is therefore possible to make robust comparisons with other modes, especially the passenger car. The report also considered the full lifecycle analysis (LCA) of public transport vehicles, and the possible emissions arising from construction of public transport infrastructure.

The LCA work concluded that for the current vehicle fleet, emissions from vehicle use far outweighed emissions from other aspects (i.e. vehicle construction and disposal, and fuel refining). However, it was noted that this might not be the case for new vehicle technologies, such as hybrid, electric or hydrogen.

3.2.3 Regional approaches

Climate Change Strategies (CCS) and associated action plans have been adopted at the regional level, as shown in the examples listed below. This work tends to be led by regional climate change partnerships (or equivalent groups) which include representatives from local authorities as well as a wide range of sectors. This reflects the current role of the regions as planning entities as well as the need to deal with climate change mitigation (as well as adaptation) across administrative boundaries to reduce the risk of simply displacing emissions or risks linked to the changing climate.

These regional strategies usually complement local strategies. For example, Stockport (North West), Newcastle (North East) and Leeds City (Yorkshire and Humber) all have individual CCS.

Table 3.3 - Examples of city region and regional strategies

Region or city region	Climate Change Strategy, Action Plan or target
Birmingham, Coventry and Black Country City Region	City Region Development Programme commits the City Region to carbon neutrality from 2040
East of England region	East of England Climate Change Action plan
East Midlands region	East Midlands Climate Change Programme of Action
North East region	North East Climate Change Action Plan
North West region	Climate Change Action Plan for the North West
South West region	South West Climate Change Action Plan
West Midlands region	West Midlands Regional Climate Change Action Plan
Yorkshire and Humber	Climate Change Plan for Yorkshire and Humber

In the East of England, the Regional Development Agency (EEDA) partnered with the local authorities and regional stakeholders to undertake a Transport and Carbon Study (TraCS) for the region[21]. The study conducted in 2008/09 assessed future transport sector emissions for the region in a business as usual scenario, identified and assessed possible emission reduction scenarios and examined the impact of these possible scenarios on the region's economic, social and environmental objectives.

The results from the TraCS study indicate that the growth in carbon emissions from transport are forecast to increase by 35% between now and 2031, and will come primarily from the growing use of private vehicles. It showed that significant cuts in transport sector emissions in the East of England can only be achieved through a mix of interventions including vehicle and fuel efficiency, behaviour change and pricing signals. This mix is required to offset the potential for unintended consequences (also called the "rebound effect"), of measures which reduce the cost of driving (such as improvements in vehicle efficiency) or reduce congestion, allowing suppressed demand to emerge.

A similar study was undertaken in 2007/08 in the Yorkshire and Humber region, commissioned by the Regional Assembly[22]. The study used the Stockholm Environment Institute REAP (Resource and Energy Analysis Programme) model to assess what measures would be needed to achieve

[21] East of England Transport and Carbon Study (TraCS), Atkins and University of Aberdeen on behalf of East of England Development Agency (EEDA), 2009 (see: www.eeda.org.uk/4603.asp).
[22] Stepping off the gas, Achieving low carbon and sustainable transport systems in Yorkshire and Humber, JMP and Stockholm Environment Institute on behalf of Yorkshire and Humber Assembly, 2008.

reductions in CO_2 from transport, concentrating on interventions which could be delivered by organizations within the region.

It concluded (amongst other things) that:

- the far reaching programme of modelled interventions, implemented on an unprecedented scale did not reduce carbon emissions from transport in line with the theoretical levels of reduction required to deliver transport's share of carbon reduction targets within the region;
- each individual transport intervention modelled had a broadly similar impact, and no one measure or intervention provided the answer to reducing carbon emissions from transport on its own - it is the sum of a combination of measures that will therefore make a difference; and
- whilst the influence of the region and regional transport policy makers is significant for measures that influence land transport, the effect of transport that lies broadly outside the direct influence of regional policy, such as aviation, must be considered, and approaches to influencing such policies developed.

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4. Acting on climate change

This section presents a range of policies and interventions that local authorities are using to act on climate change. The section is structured to present case studies and best practice examples identified through the desktop review and interviews with selected local authorities.

4.1 Strategy development and delivery

4.1.1 Developing the evidence base

Developing the evidence base for areas in which the local authority plans to act is an important first step in formulating a strategy and developing targets.

Case Study 14: Norfolk's evidence base

Norfolk County Council, like other transport authorities, is currently developing its new transport strategy to 2031, "Connecting Norfolk" and its third LTP. The council aims for the new strategy to consider issues faced by the area as a whole across all sectors, and not just for transport.

Connecting Norfolk will cover five key themes for which the council has published evidence base reports:

- climate change;
- growth and regeneration;
- safety and security;
- equality of opportunity; and
- quality of life and health.

The climate change evidence base considers the policy context at the national, regional and local levels. It also presents detailed analysis of statistical evidence related to the impact of the transport sector on emissions now and in the future, and examines how a changing climate will affect the area.

Key points from the Connecting Norfolk climate change evidence base are:

- mitigating climate change;
  - Norfolk has high per capita road transport CO_2 emissions,
  - emissions, both absolute and per capita from road transport were growing, but have recently stabilised,
  - a 'business as usual' transport strategy will increase emissions,
  - the vehicle fleet in Norfolk has a high average level of emissions, with only 2% being low emission,
  - there is a strong opportunity to reduce emissions through reducing traffic and achieving modal shift, and
  - a focus on the public sector and journeys of 10 to 25 miles should prove effective in reducing emissions.
- adaptation;
  - a large number of main roads are vulnerable to flooding,
  - disruption could have a greater impact on economically important routes, and some of these are vulnerable to flooding, and
  - as a result of coastal erosion, some road links between settlements will be lost, as will coastal footpaths and accesses to the seafront.

The Norfolk Climate Change Partnership is involved in the development of the area's transport strategy and LTP3 and has recently commissioned research on behaviour change.

The research concludes that "the role that local authorities, individuals and organizations play in working together to bring about the transformation to a low carbon society is key" and that this will require "a clear and positive vision of a low carbon future to be created and promoted".

Renewable energy, land use planning and transport

Some of the local authorities interviewed were making the link between land-use planning and transport, and also taking steps to incorporate renewable energy into future developments.

City of York Council is currently proposing to develop three new Park and Ride sites[23]. The proposals require planning approval and confirmation of Government funding but could be completed in 2012 if this is obtained. Through the planning approval process, the sites will be subject to the council's Interim Planning Statement on Sustainable Design and Construction[24] which requires large scale commercial development (over 500m^2) to:

- demonstrate that at least 10% of the expected energy demand for the development will be provided for through on site renewable generation for heat and/or electricity; and
- identify parts of the development which could accommodate renewable energy installations in the future (number/area of south facing roofs and potential wind turbine locations).

The new Park and Ride sites will include renewable energy/heat provision, through ground source heat pumps, solar or small scale wind energy generation. The council is also planning for the sites to provide electric vehicle charging points for users.

Case Study 15: The Bournemouth, Dorset and Poole Renewable Energy Strategy

Bournemouth, Dorset and Poole adopted their Renewable Energy Strategy & Action Plan in 2005. The plan focuses on the use of renewable energy for electricity and heat, although the importance of reducing greenhouse gas emissions from transport is also recognised. The plan identifies:

- why the area should reduce energy consumption, and develop renewable sources of energy;
- the potential for renewable energy in Dorset; and
- priority areas for action;
  - developing positive planning policies for renewable energy,
  - developing biomass energy and renewable energy from waste, identifying the potential to use biofuels for the transport sector,
  - increasing application of sustainable energy in buildings,
  - raising awareness and understanding about sustainable energy,
  - developing community renewable energy initiatives and exemplars, and
  - researching and developing new areas for action on sustainable energy.

Both Worcester and Poole are working with developers to ensure that sustainability is incorporated in development briefs. Within Bristol, developers are required to ensure that new developments minimise car use and that their design encourages walking, cycling and the use of public transport. Developers are required to produce a sustainable travel plan and to monitor resultant traffic flows.

Within Poole financial penalties are triggered if development trips rise above a certain level. Encouraging results have been obtained for the two major sites where this approach has been

[23] See Section 7. The effectiveness of Park and Ride operations in reducing carbon is currently the subject of debate.
[24] City of York Interim Planning Statement On Sustainable Design and Construction, approved by Planning Committee in 2007 for the purposes of Development Control.

used. The reason for the success are felt to be a sufficiently substantial financial penalty and keeping levels of bureaucracy low so that it is not too time consuming for developers to co-operate.

4.1.2 Delivering in partnership

Most authorities, considered through the desktop review and interviews, work in partnership to develop their strategies and targets. Some however identified difficulties in translating this partnership work into joint delivery. The main reason for this seems to be pressure on funding within each organization.

Several authorities identify the emphasis on the delivery of LAA targets as an opportunity for multi-agency delivery in their local area. One example often cited is the potential to deliver initiatives and programmes jointly with the health sector, both with regards to climate change adaptation (resilience and emergency planning for extreme weather for example) and when considering emission reduction (promotion of active modes). This is also seen as an opportunity to address the lack of revenue funding available in the transport sector.

In practice however, interviews show that multi-agency delivery at the local level is still very limited[25]. Anecdotal evidence gathered during interviews conducted as part of this study suggest that funding (capital, maintenance and resources for development) is currently the biggest barrier to multi-agency delivery, with local authorities still being required to provide the majority of this.

Case Study 16: Plymouth joint Accessibility Strategy

Plymouth City Council and Plymouth Hospitals NHS Trust developed a joint Accessibility Strategy for the 2006-2011 period, which led to the adoption of:

- a target to increase accessibility by public transport to Derriford Hospital for Plymouth residents from 78% in 2005/6 to 85% in 2010/11 also included in the LAA); and
- an action plan with responsibilities shared between the health trust, the primary care trust and the council including:
  - improve Derriford interchange: level boarding, drop-off bays, cycle racks (health trust and council),
  - prioritise Derriford cycle network improvements (council),
  - include travel info in appointment letters & other hosp literature (Traveline website address and phone number & cycle route map - health trust),
  - Northern corridor bus priority project (council),
  - explore relocation of disabled bays to maternity car park (health trust), and
  - allocation of 250 George park-and-ride parking spaces for hospital staff and visitors (council).

Another example of joint delivery was the recent decision by Durham Primary Care Trust (PCT) to contribute £500,000 per annum to the council's gritting costs for two winters, to cover 35 miles of

[25] At the national level, DfT is funding Cycling England with a budget of £140m over three years from 2008, including a £15m contribution from Department of Health and the Department for Children, Schools and Families have co-funded the Travelling to School Initiative with DfT.

bus routes. The PCT explained that this contribution would help reduce injuries linked to the icy winter conditions[26].

4.1.3 Climate change and governance

Reflecting the importance of climate change adaptation and mitigation at the local level, some authorities have set up dedicated governance structures for elected members to discuss climate change policies and decide on priorities for the area.

Examples include the establishment of cross party groups such as Kent's Select Committee on Climate Change[27] or Northumberland's Climate Change and Environmental Sustainability Working Group.

Case Study 17: Kent's Select Committee on Climate Change

In response to growing public concern about climate change and its increasing priority for governments at all levels, Kent established a cross-party Select Committee on Climate Change in 2005. The committee heard evidence from a range of experts, witnesses and members of the public and in October 2006, produced a comprehensive set of recommendations to the council in the Select Committee Report on Climate Change. This was followed in December 2006 by the Cabinet Working Group's response, which committed the council to a range of actions, including the development of a climate change action plan and robust targets for the Kent Partnership.

4.2 Delivering cuts in emissions

This section presents examples of local initiatives aimed at reducing CO_2 emissions from the transport sector. This information is not intended to present an exhaustive list of current and future initiatives but rather a snapshot of activity in local areas, identified through the desktop review and the interviews with selected local authorities.

4.2.1 Beacon Councils for climate change

In 2008, six local authorities were awarded 'Beacon Council' status for tackling climate change. Authorities were chosen for the impact and breadth of their work and included[28]:

- City of London – linked to achievements in the construction sector, green purchasing (including energy) and the council's fleet management system;
- Eastleigh Borough Council – linked to the council's CarbonFREE funding energy efficiency measures for households and school travel planning. 54% of state school children now travel by means other than the car within the Eastleigh area;
- Middlesbrough Council – with achievements in reducing the council's own emissions, notably through smarter driving training for staff, free vehicle emission testing offered to the public and an urban farming initiative, encouraging people to grow food in allotments, and at their homes and schools;

[26] This decision was not without controversy however and resulted in the resignation of one of the governors for County Durham and Darlington NHS Trust Foundation.
[27] See: www.kent.gov.uk/environment_and_planning/environment_and_climate_change/climate_change/what_are_we_doing.aspx).
[28] Source: Improvement and Development Agency for local government (IDeA) and Local Authorities Coordinators of Regulatory Services (LACORS). Case studies available on the IDeA website (www.idea.gov.uk).

- Woking Borough Council – with a showcase energy efficient house to be used to inform residents and the introduction of environmental criteria for the council's lease cars; and
- Worcestershire County Council – integrating air quality and climate change, reducing the council's footprint and delivering the sustainable travel town programme.

4.2.2 Community led initiatives

Alongside local authority actions, community initiatives are being set up by residents, sometimes with the help and support of the local authority but also fully independently in some cases.

The Shropshire Low Carbon Network is an example of such a community led initiative, facilitated by the council. In Northumberland, community led initiatives include Transition Town Alnwick as well as the Berwick Low Carbon Community Challenge.

Table 4.1 - The Shropshire Low Carbon Network

Group	Description
Bishops Castle Wasteless Society (www.wasteless.co.uk)	The small town of Bishops Castle formed the Wasteless Society around small scale recycling initiatives, which were expanded to include waste management using anaerobic digestion (for energy production). The society converted itself into a publicly owned company in 2002, since when the Society has produced its own Community Climate Change Strategy. In 2006 the Society purchased its own bio-diesel pump, and launched the Escape project with the aim of surveying 400 homes in the area, and then following this up with reports to householders with suggestions on how they could improve their carbon footprint.
Stretton Climate Care (www.strettonclimatecare.org.uk)	Stretton Climate Care is a community based initiative which provides residents with advice on how to reduce their own carbon footprint. They have undertaken free energy checks in over 300 homes and given presentations in local schools to encourage them to become 'Eco-schools'. In addition to this there are regular community events (such as the screening of 'An Inconvenient Truth) and the group have undertaken trials of electric bikes and motor-cycles.
Ludlow 21, including the Ludlow Cycling Support Group (www.ludlow21.org.uk)	Ludlow 21 is a local voluntary group established in 1998 to promote sustainable living in the Ludlow area. The Cycling Support Group's Cycling Manifesto for Ludlow , published in February 2008, has received support from many local organizations, including Ludlow Town Council. Linked to this, the full Cycle Plan to make Ludlow and its environs more cycle-friendly has now been published, in conjunction with Shropshire Council.
Little Wenlock C Red, including a Transport Group (www.littlewenlock.org)	Little Wenlock Carbon Reduction Action Group (LW C Red) was formed following a carbon footprint survey of the parish conducted by the Energy Efficiency Advice Centre. This found that the village's average household carbon emissions were above the national average, and a target of 20% reduction (by the end of 2007) was subsequently set. The Transport group has published local examples of CO_2 savings which have been achieved through fuel efficiency, car saving and eco-driving.

Group	Description
Cleobury County Environmental Forum (http://pages.cleoburycountry.com/cmef)	The CCEF is intended as Cleobury Mortimer's response to the United Nations' Agenda 21 – 'sustainable development programme local environmental initiatives'. It aims to address the ecological imprint which Cleobury Mortimer and the surrounding area make on the countryside, and examine ways to control this impact. This involves the development of specific projects focusing on such areas as refuse management (household and commercial), agricultural and garden waste handling, expansion of material recovery schemes (i.e., plastics, metals, cardboard), transport, effective sewage treatment and sustainable drainage.
Shrewsbury Friends of the Earth (www.shrewsfoe.org.uk)	FoE Shrewsbury are a pressure group concerned with all aspects of the Environment. They support and publicise green transport initiatives (such as Shrewsbury's 'In town without my car day') and highlight the transport benefits of buying locally.
Marches Energy Agency (www.mea.org.uk)	Marches Energy Agency (MEA) is a sustainable energy and climate change social enterprise and an independent, registered charity. The Agency's aim is to encourage the three D's - Demand reduction (using less), Decarbonisation (low carbon sources of energy) and Decentralisation (more local energy production and supply). The organization itself is dedicated to using greener transport models. Employees almost always use public transport, and when this is not possible they have a fleet of alternative vehicles including a Honda Insight electric hybrid (currently the most fuel efficient car on the road - 83 mpg average). Employees also have access to a pure plant oil powered van and company bikes MEA has produced a 'Green Driving Guide', and was part of an EU wide project to increase understanding of the complex issues surrounding transport and climate change; a project involving 17 EU partners. Part of MEA's response was to produce an Eco Vehicles 'Top Trumps' pack.

4.2.3 Encouraging the take-up of low carbon technologies

Many authorities are aiming to encourage the take up of low carbon vehicles and fuels by providing electric vehicle charging facilities, purchasing or leasing low carbon vehicles for the Council's fleet and encouraging operators to use low carbon buses. Examples of such initiatives are presented in the following case study.

Case Study 18: Encouraging the take-up of low carbon technologies

Low carbon buses – Cambridgeshire Guided Busway

The Cambridgeshire Guided Busway project is scheduled to open in 2010. It will run from Cambridge to St Ives and on to Huntingdon, a distance of around 25km, making it the longest in the world.

Ten buses powered entirely by biofuel, will run on the route. The busway is expected to attract over 3.5 million trips each year, increasing to over 6 million trips once the 10,000 house new town of Northstowe has been built.

Over 1.8 million tyres, which must be recycled by law, have been used in the construction to fill and help drain the space between the busway tracks.

Alternative fuels - Norfolk

Norfolk County Council undertook alternative fuel trials for buses running services in the area through the European CIVITAS project.

A supply chain for sustainable biodiesel and biodiesel blends was set up and fuel economy and NOx emissions measured in real time from buses on a route near the Anglian Bus depot in Beccles. The B20 biofuel blend used gives a good combination of fuel economy, emissions and year-round useability.

The conclusions of the study were that a B20 blend is likely to be optimal under conditions in Norwich, and that biodiesel from used oil provides over eighty per cent CO_2 saving relative to fossil diesel. Trials results estimated that if Anglian Bus, a partner in the trial. were to use a B20 blend across all its fleet there would be a CO_2 saving of around 600t per year.

Taxi and bus fleet regulation - Shropshire Council

Shropshire Council aims to reduce vehicle emissions in the area by limiting the age of the taxi fleet and requiring subsidised bus services to operate with lower emission buses. Voluntary vehicle emission tests are also being offered to residents. If a vehicle fails a voluntary test then the authorities can provide remedial advice to the driver to endure that exhaust emissions meet minimum standards. This is as opposed to a formal spot-check, which would result in a fine if a vehicle failed.

Plugged-In Places – North East authorities

The North-East were successful in being granted £7.8m to roll-out electric vehicle charging points across North East England out to 2013, announced by One North East and the Office for Low Emission Vehicles (OLEV) in February 2010.

The regional bid, coordinated by One North East, is supported financially by more than 40 regional partners from the public and private sector, including all 12 of the North East's local authorities, who have in total pledged more than £1m for charging points to be installed at their premises.

Green Badge Parking - Manchester

In July 2007, Manchester City Council and NCP Manchester Limited launched the UK's first 'Green Badge Parking' scheme, offering a substantial discount in parking fees to drivers who use more environmentally friendly vehicles. Commuters who run low emission cars are able to take advantage of a special offer giving a 25% reduction in the cost of an annual season ticket in all NCP's main car parks in Manchester city centre.

4.2.4 Promoting low carbon alternatives and changing behaviours

Many authorities aimed to provide improved public transport, walking and cycling infrastructure and services through their LTP2 and this is expected to continue through LTP3. In terms of monitoring, most LTP2 Progress Reports reviewed for shire and unitary authorities showed positive progress against public transport, walking and cycling indicators, but these were not linked to carbon savings.

Other key initiatives, identified through the desktop review and the interview process are discussed below.

Sustainable travel towns and cycling towns

Darlington, Worcester (and **Peterborough)** were designated Sustainable Travel Towns, implementing a programme of measures intended to reduce car use from 2004 to 2009. There is strong evidence that the Darlington's 'Local Motion' initiative has impacted on travel behaviour, most notably in substantially increasing cycling and walking trips and in reducing car driver trips[29]. Based on a UK fleet average CO_2 emissions factor, the reduction of approximately 34 million car kilometres per year would result in annual savings of around 7,000 tCO_2.

Results from Worcestershire's 'Choose how you move' campaign showed that the calculated reduction of approximately 19 million car kilometres per year would result in annual savings of around 3,900 tCO_2.

Cycling demonstration towns / cities

The first phase of the Cycling Demonstration Towns programme, from 2005 to 2008, saw six towns across England receive European levels of funding to significantly increase their cycling levels.

Within Darlington the original target for the strategy was to increase cycling from 1% to 3% of all trips, which was achieved. Results showed that cycling within the town increased significantly between 2005 and 2009. The overall change in Darlington over the projected period relative to the 2005 baseline was +56.8%.

In 2008, as part of the second phase of the Cycling Demonstration Towns project, Bristol was named as England's first Cycling City, and 11 new Cycling Towns were named.

Smarter Travel and Active Travel programmes –Northumberland and Cambridgeshire

Initiatives implemented by the Sustainable Travel Towns included Smarter Travel and Active Travel programmes. Some other authorities are however also implementing similar initiatives in targeted areas.

In **Northumberland**, the local authority has worked in partnership with Sustrans to deliver the 'Active in Ashington' programme since 2008[30].

Within their Climate Change Strategy Action Plan, **Cambridgeshire** County Council pledged to have a new 'smarter travel' team established and in place by 2011, using monies from the Transport Innovation Fund bid. This team will provide the council with a greater capacity to deliver sustainable travel initiatives, through a more integrated and better supported programme.

[29] 'Darlington Transport Forum' (July 2009).
[30] Source: Sustrans and Northumberland County Council.

Community car clubs - Norfolk

The Norfolk Car Club launched in Reepham in July 2009 after receiving £60,000 in support from Norfolk County Council and the Commonwheels Car Club started operating in Norwich in February 2010 as an extension of the successful Reepham club.

The Reepham car club is part of a wider programme being delivered through the Low Carbon Community Challenge funded by the Department of Energy and Climate Change (DECC).

Personal Carbon Footprint - Staffordshire

The council has developed the 'Our County, Our climate, Our choice' website to raise awareness with local residents and highlight action that can be taken. The website provides a transport assessment to enable people to work out their personal transport carbon footprint and information on actions that can help to reduce this footprint including car share and eco driving tips.

4.2.5 Reducing the need to travel

Many of the local authorities considered through the desktop review and the interviews are considering establishing links between transport and land use planning frameworks to ensure that the need to travel is minimised where possible. Some authorities are also actively considering the potential to reduce the need to travel through the use of communication technologies.

Bristol has undertaken a digital network study to assess the opportunities for carbon emission savings offered by improved digital connections, including the use of the 8km of Council owned fibre optics. Manchester published a digital strategy in 2008. More details are included below.

Case Study 19: Manchester's Digital Strategy

The Manchester Digital Strategy provides a strategic framework within which practical proposals for developing 'next generation' broadband across the city and the city-region as a whole can be developed. The Digital Strategy includes the idea of creating a 'digital masterplan' for the city which would guide future investment and implementation.

The main outcome of the project is to provide accessible and affordable broadband which his based on the proven capabilities of fibre and advanced wireless such as in Paris where fibre connectivity is becoming available to all a 100-1000 times the speed of that available in the UK at a fraction of the cost.

Manchester plans to establish the UK's first 'fibre to the premises' (FTTP) open network, complemented by advanced wireless connectivity. This will deliver next generation connectivity to residents, businesses and institutions to support job creation, skill development, business growth, public services and digital inclusion.

The key transport benefit is increased teleworking resulting in a reduced need to travel, but there are many other possible applications. In 'Telehealth Care', a national pilot project running in Hull patients use a video link to talk to their healthcare providers and specialists, which allows them to stay at home instead of making daily journeys to the hospital or GP. Patients also monitor their own blood pressure and weight daily and the results are sent via their phone line.

The service allows accurate monitoring without the person needing to visit their GP and helps to avoid hospitalisation, while notifying staff if early medical intervention or assistance is needed.

4.2.6 Reducing the authority's own footprint

As shown by the following examples, local authorities are committed to reducing their own carbon footprint to act as a role model within the community but also to reap the financial benefits of more energy efficient practices.

In Manchester, the City Council's fleet, fuelled by 5% biofuel, is Euro3 compliant and a move to a Euro4 standard is being progressed. The council is also about to take delivery of an electric Smart car (powered from solar cells) as a demonstration vehicle to evaluate its environmental benefits and the potential for wider use.

In Kent, all council fleet vehicles run on a fuel mixture of 5% biodiesel and Kent was the first local authority to 'bulk replace' traditional tungsten-halogen bulbs with light emitting diode (LED) signal lights. These are estimated to use 70% less energy than traditional bulbs, and should save the council around £1.8million over the first five years[31]

Kent also took part in the Local Government Information Unit Carbon Trading Councils programme to prepare for the implementation of the Carbon Reduction Commitment[32].

In 2009, Essex County Council were winners of the Public Sector Fleet of the Year (over 500 vehicles) at the Green Fleet Awards. They predicted overall CO_2 savings of 7% between 2008 and 2010 through initiatives targeted at minimising the need to travel, and through greening essential fleet use. Car sharing and teleconferencing were encouraged in an effort to reduce business

[31] http://www.sustainabilityatwork.org.uk/casestudies/view/45.

[32] The Carbon Trading Councils programme was set up as a simulation of a carbon trading market that allowed councils to learn about trading in a safe environment before the introduction of the government's mandatory Carbon Reduction Commitment programme, 34 councils took part. More information is available at https://member.lgiu.org.uk/whatwedo/Publications/Pages/takingstock.aspx.

mileage whilst low emission vehicles were purchased, and all drivers were trained to SAFED33 standards.

Gateshead Council won the 2009 Green Fleet Award for fleets under 500 vehicles. The measures introduced by Gateshead reduced the fleet annual mileage by 62,000 miles between 2007 and 2008. These included limiting of all new vehicles to a maximum speed of 56mph, the purchase of 'low rolling resistance' tyres and a CO_2 cap when procuring new vehicles. CO_2 emissions were reduced by 300 tonnes per year over the 2007/8 period.

Worcester has undertaken a Green Fleet Review with action being taken to implement the recommendations. Low emissions vehicles (that exceed the current standards) have been introduced for the council's bus and social services. Effort is also being made to reduce emissions from other fleet vehicles, for example with the use of eco tyres.

Staffordshire has introduced fuel consumption and emission specifications for its fleet vehicles, and of those to be made available under the car leasing scheme. Cars to be supplied to staff under the leasing scheme will be restricted to those with CO_2 emission figures of no more than 185g CO_2/km. Measures will be taken to ensure that all diesel engine vehicles procured for the County Council fleet will be capable of using a 5% bio diesel mix without contravention of the manufacturer's warranty.

Case Study 20: Street lighting in Wigan

Wigan Council is committed to using the latest energy efficient street-lighting technology and recyclable materials as standard in lighting schemes around the borough.

A high tech computerised data inventory system is used to manage the council's lighting all around the borough. This enables the street-lighting team to easily identify where to replace lamps based on age, condition and wattage.

All the borough's lighting is 100% green, coming from wind power: Wigan is one of just a handful of councils nationally to get all its street lighting energy generated by wind turbines.

Other key facts include:

- all used road lighting lamps have been recycled since 1995;
- electronic control gear now being installed is 10% more energy efficient than the standard;
- full recyclable, maintenance free stainless steel columns are used which have a 70 year minimum life expectancy;
- reduced wattage burn of units from 1W down to 0.25W of energy;
- 67% cut in carbon emissions from traffic sign lighting per year and £28,192 in energy savings; and
- 39.5% cut in carbon emissions from bollard lighting and £7,336 in energy savings per annum.

The street lighting team expect a payback period for their new bollards of just 13 months, and 5 years for the new sign technology.

Shropshire has adopted a joined-up approach to procurement across the authority through the publication of the council's Sustainable Procurement Policy. The policy gives guidance on the

[33] 'Safe And Fuel Efficient Driving'

types of vehicles to purchase, emission requirements, fuel costs, the best application of different fuels, delivery arrangements to council sites and discusses the need for eco-driver training.

4.2.7 Carbon offsetting

Carbon offsets can be a controversial subject when considering ways to reduce a local authority (or an individual's footprint). Nevertheless they represent an attractive way for authorities to balance increased CO_2 levels from their activities.

Case Study 21: Carbon offsetting in Norfolk

Norfolk County Council took the decision when preparing its LTP2 that the strategy should have an intention to "deliver carbon neutral transport schemes by mitigating or sequestering projected increases in CO_2 emissions for transport improvements that result in additional traffic being induced onto the network".

Although this was recognised as an aspirational target which would be difficult to achieve, the Local Transport Plan team developed offsetting schemes with the Council's Environmental team, supporting local woodland projects in the local area and working in partnership with the Forestry Commission and community woodland management structures. Two new woodlands were planted during the LTP2 period as a result of this programme.

In total 16,000 new trees were planted. Based on a carbon absorption rate of 4.1tCO_2 over the lifetime of each tree, this equates to a total of 49,200tCO_2 removed.

4.2.8 Being prepared for a changing climate

Under NI88, local authorities report on the level of preparedness they have reached against levels of performance, graded 0 to 4. A higher number represents further progress made in planning to adapt. As presented in Section 2, all of the local authorities surveyed were planning to reach grade 3 by 2011.

NI 188 is not prescriptive about how an authority has to achieve each level. The extent to which transport is considered under NI188 in each local authority will therefore be dependent on local circumstances, for example the extent to which the risks of climate change to transport are prioritised over risks to other service areas.

To reach Level 1 of NI188 a local authority has to undertake a local risk-based assessment of significant vulnerabilities and opportunities to weather and climate. A Local Climate Impacts Profile (LCLIP) can provide a key part of the evidence to support achievement of Level 1. A LCLIP focuses on identifying the consequences of weather events and on the role of agencies with responsibility for dealing with these consequences. Of the 20 authorities involved in the desktop review stage seventeen have undertaken a LCLIP, with those not having done so being Darlington, Kingston Upon Hull and York. For the transport sector the issues explored will vary depending on the local circumstances but may include the impact of flooding, heavy snow and summer temperatures on transport infrastructure or services, for example:

- the costs of damage to infrastructure and implications for resource availability for routine maintenance etc;
- the adequacy of draining capacity;
- the emergency planning implications of extreme weather events; and
- the impacts on transport service provision.

Where authorities have already produced an adaptation plan, transport is likely to be mentioned as a key sector where there is a need to adapt. Actions proposed range from responding to the risks of extreme weather events, via emergency planning and responding to the gradual changes expected via building adaptation responses into routine maintenance, capital programmes, service provision and risk assessment processes. Table 4.2 below highlights some of the actions proposed within the adaptation plans for the authorities included in this study, where these are available.

Table 4.2 - Local authority adaptation plans

Local authority	Transport commitments and actions
Kingston Upon Hull and York	Yorkshire and Humber's regional adaptation plan covers both Kingston Upon Hull and York. Planned transport actions include: • multi-agency response plans to co-ordinate responses during extreme events; • protection of critical infrastructure and emergency services; • building climate adaptation into routine maintenance and upgrade cycles; • provision of weather and travel warnings to users of principal roads during storm events and consideration of the increased resource requirements for emergency responses; • consideration of improved sewer and drainage design in capital programs; • re-evaluation of resources and approaches for inspection and clearance of drain, culvert and gulley blockages; • increased awareness of inter-dependencies between critical infrastructures, leading to improved resilience planning; and • consideration of increased flood defence to rail lines and/or relocation of sections.
Leicester	Leicester has produced an adaptation action plan, which has been prioritised following risk and probability assessments. The action plan focuses only on the impact of major weather events on transport but also the impacts from the gradual changes expected (e.g. changing road surface materials, longer growing seasons for highway verges).
Northumberland	The North East Regional adaptation plan covers the whole region, including Northumberland. Examples of the actions proposed, which if implemented effectively, could help to reduce the future vulnerability of infrastructure include: • the collection of information on climate change trends, impacts assessments, and adaptation activities across the region; • risk awareness and risk-based management; • improved warnings to enable preventative actions; • prioritisation and delivery of adaptation actions; • encouragement of cross-sectoral, partnership-based awareness and responses; • exploitation of the opportunities presented by climate change (such as a warmer climate attracting more tourists); and • reviews of the effectiveness of adaptation approaches and revisions as necessary.

Poole	The Highways Management Service of the county council, have identified the need to plan for climate change over the medium to long term and are collating information on the location of critical infrastructure to ensure that the road networks supporting such infrastructure are kept open during snow and ice, and flooding events. Other actions proposed and already undertaken include: • a review of the way that the roads network is salted in light of ice and snow events. The results will be used to improve the service, for example it is likely that route based weather forecasting will be implemented which will enable more targeted salting; • the scheduling of surfacing dressing works on the highways has already been changed to reflect the hotter summer temperatures; and • the grounds maintenance teams have changed their working schedule to reflect the impacts on the service of the longer growing season being experienced.
Worcestershire	Infrastructure is likely to be prioritised in Worcestershire's forthcoming adaptation plan. The council recognises the importance of maintaining the highway network to the effective delivery of services by departments across the council area.

Case Study 22: Adaptation in Norfolk

Norfolk County Council reached NI188 Level 2 (comprehensive risk-based assessment and prioritised action in some areas) in 2010 and is aiming to reach Level 3 (comprehensive action plan and prioritised action in all priority areas) by March 2011. Reaching Level 2 means that the authority aims to disseminate information and best practice on climate change adaptation across the council by considering all areas of service delivery which could be affected.

Norfolk staff are currently writing a report detailing the vulnerabilities and opportunities that a changing climate may pose to Norfolk County Council and its service provisions, including highways and transportation. This includes a consultation process preparation of a number of presentations and events. The council is also developing a climate change adaptation assessment tool to be completed once the review is complete. This tool will aim to help service providers across the council understand how climate change might impact their services and what they can do to avoid or mitigate these impacts.

When considering Norfolk's roads, the council aims to adapt to extreme weather events and the changing climate through the development and implementation of its Transport Asset Management Plan (TAMP).

When considering the impacts of a changing climate on transport infrastructure and services, Kent Highways Services are using their ISO14001 certified Environmental Management System (EMS) to manage risks, as well as monitor emissions.

Staffordshire have implemented business continuity planning[34]. Recognising that the county is very susceptible to flooding, which can cause widespread disruption to the road network and thus to businesses, the council is looking at innovative ways to help reduce the impact on businesses, for example through working in partnership with local business to develop continuity plans.

[34] http://www.staffordshire.gov.uk/business/continuity/.

5. Challenges, drivers and barriers

This section builds mainly on discussions with local authorities during the interview stage of the study. Local authorities were asked to identify challenges (and opportunities) they are facing in relation to climate change mitigation and adaptation.

5.1 Drivers

Local authorities cited a range of drivers behind their actions on climate change. These included:

- strong political leadership and senior management support providing high-level impetus;
- working towards high level commitments or transport specific targets;
- commitment from council officers was seen as being particularly important within local authorities, with the presence of motivated individuals often key in driving initiatives forward;
- community support, as evidenced in developing initiatives and environmental groups;
- the financial savings which could be achieved from reductions in energy use (and carbon emissions) from authority operations; and
- to mitigate against (and plan for) the impact of climate change within the local area.

Case Study 23: Planning for peak oil

The Bristol Green Capital Momentum Group and Bristol City Council recently published "Building a positive future for Bristol after peak oil", the first study of its kind in the UK, considering the issue of peak oil and its probable effect on the future prosperity of the city as well as actions which could be taken to address the issue.

When considering the impact of peak oil on the transport sector for the city, the report notes that "in the event of a major global oil shock, petrol and diesel based transport could become redundant almost overnight. Fuel shortages and escalating prices would mean the vast majority of people would not be able to use their cars. Alternative fuels to petrol or diesel, irrespective of cost, simply do not exist on the scale currently required for normal functioning of the city. Options lie in reducing the number and distance of journeys made. This means that employment and services need to be located closer to where people live. Investment in bus and rail services and other forms of mass transit is needed as well as better provision for cyclists and pedestrians. More efficient and strategic use of alternative fuels will also be important".

This seems to be a driving force for Bristol, but it must be stressed that the subject of peak oil is an emerging theory which appears to be gaining momentum.

In February 2010, six UK companies (Arup, Foster + Partners, Scottish and Southern Energy, Solarcentury, Stagecoach Group and Virgin) joined together to launch the second report of the UK Industry Task-Force on Peak Oil and Energy Security (ITPOES).

The report, titled "The Oil Crunch - a wake-up call for the UK economy", finds that oil shortages, insecurity of supply and price volatility will destabilise economic, political and social activity within five years.

The Task-Force warns that the UK must not be caught out by the oil crunch in the same way it was with the credit crunch and states that policies to address Peak Oil must be a priority.

5.2 Challenges and barriers

5.2.1 Securing support

Interviews conducted for this study were organized with local authority officers and their views reflect their position within their organization and the community. Although many pointed to strong political and senior management support for climate change strategies, some also pointed to difficulties linked to climate change scepticism amongst the local community, elected members or local authority officers.

Recent evidence from York's LTP3 public consultation showed that supporting the economy and contributing to an improved quality of life were thought to be the two most important key goals for transport, with climate change, equality and safety and health being equal third. Another key finding was that, "winning hearts and minds for reducing the need to travel and changing travel behaviour will be a challenge, but a behaviour change programme (including positive – not preaching – campaigns) is essential[35]".

Rural areas also pointed to the lack of local air quality and congestion issues as a threat for climate change mitigation in the transport sector. Northumberland County Council for example has identified two climate change challenges within its LTP3 consultation documents (delivering quantified reductions in greenhouse gas consistent with the Climate Change Act and EU targets and delivering quantified reductions in greenhouse gas emissions within cities and regional networks) but these priorities might not be selected as highest priorities for the area.

Some authorities identified the harsh winter (2009/10) and the recent University of East Anglia climate change email incident as additional factors contributing to this scepticism. It was however generally agreed that the need for energy efficiency remained powerful amongst the community, elected members and council officers alike and that this could be used to support climate change mitigation interventions.

The Government has recently announced a revision to the Carbon Reduction Commitment which means organizations do not need to account for the financial implications of not meeting their CRC targets in next year's budget[36].

This is potentially partially driven by the economic downturn, but is also likely to be driven by the fact that the public sector may not be fully ready to implement the CRC at present. A recent Carbon Trust survey found that only 1% of councils surveyed were fully prepared for the launch of the CRC in April 2010. Part of the apparent lack of readiness stems from the councils' delay in implementing energy measurement programmes to produce a baseline. Forty percent of the respondents claimed that a lack of government financial incentives was the biggest hurdle they faced. But 25% also said there was a problem of a "lack of will" in local politics.

The Carbon Trust survey also stated that councillors also seem to be less informed than council officers and therefore are possibly not as aware of the challenges[37].

5.2.2 Prioritising conflicting objectives

During the interviews, the issue of conflicting priorities promoted by central government as well as at the regional, sub-regional and local levels was identified. Climate change, economic development and growth, social and other environmental priorities can sometimes conflict and this

[35] http://democracy.york.gov.uk/ieDecisionDetails.aspx?ID=2736.
[36] As discussed in Section 2.1.3.
[37] http://carbonreduction.wordpress.com/category/local-authorities/.

was highlighted as an issue for climate change interventions as officers felt conflicts often result in less being done in this area.

York noted that there are some conflicts which need to be recognised between reducing carbon emissions and other pollutants. For example, reallocating road space for low carbon modes might mean creating additional congestion and local air quality problems.

Within Dorset, conflicting Government strategies were deemed to be problematic. The following were all felt to be increasing trip length across the area:

- hospitals in Bournemouth and Poole now specialise to become 'Centres of Excellence' in a particular type of care, this has increased journey length as patients no longer automatically visit the nearest hospital;
- the 'Schools for the Future' Strategy has increased centralisation of services; and
- the allocation of new housing developments on the outskirts of conurbations rather than centrally.

Several authorities identified the current economic climate and the prospect of very significant cuts in local authority budgets as a threat to climate change interventions, especially where these do not result in short term cost savings. Some authorities also linked the current economic climate to a stronger need for local authorities to attract developers and economic activities which might result in climate change and the need to reduce emissions from the transport sector being put to one side.

Efforts to reduce congestion could potentially conflict with carbon reduction. Capacity enhancements to the transport network (without mitigation measures) could result in increased and faster travel, and hence emissions.

Case Study 24: A statutory duty?

The Local Transport Act 2008 defines the nature of the "duty to develop transport policies" for Integrated Transport Authorities and local transport authorities, highlighting the need for them to " have regard to any guidance issued (…) by the Secretary of State, with respect to mitigation of, or adaptation to, climate change or otherwise with respect to the protection or improvement of the environment".

The Local Government Association (LGA) Climate Change Commission noted in its 2007 report 'A climate of change' that, "some commentators perceive a tension between strong action on climate change and localism. We endorse localism and the innovation it can bring, but individual councils cannot opt out of tackling climate change. Councils face challenging financial conditions with tough decisions about resource allocation. But these pressures cannot be an alibi for inaction. In our view, citizens are entitled to expect council leadership and action on climate change".

The commission also noted that much of the evidence received during the preparation of the report recommended the imposition of a statutory duty on councils to act on climate change. The commission recommended that local authorities be given a two year period to respond to the climate change challenge, with the view that " a statutory duty should be imposed on those councils that, within the next two year, do not respond to climate change".

5.2.3 No 'one size fits all' solution

Some authorities interviewed pointed to the difficulties linked to the nature of the area they covered, either linked to the mix of urban and rural areas or the variation in population and economic indicators within their administrative boundaries.

Both Northumberland and Poole pointed to the need to be able to adopt very different measures to tackle climate change in rural and urban areas and the difficulty in monitoring performance through NI186 when the indicator covers the whole of the local authority area.

Some also noted the need to adopt different approaches in poorer and richer areas where issues linked to transport and transport sector carbon emissions are very different (high level of access to cars in richer areas and need to tackle lack of access to jobs, services and education in poorer areas).

5.2.4 Resource shortages

Most of the authorities interviewed highlighted resource shortages as a barrier to tackling climate change at the local authority level. Two main points were identified:

- the lack of staff available to work on climate change issues, especially as the demand for skills in this area has grown in recent years, although some authorities (for example Norfolk) have been able to secure additional sources of funding to recruit additional staff, many identified the prospect of significant cuts in funding in the coming years as a barrier to expanding internal capacity; and
- most authorities explained that climate change mitigation actions they are proposing to implement in the coming years, including through LTP3, would require additional revenue funding rather than capital investment, this was identified as a significant barrier to the delivery of successful climate change mitigation interventions, especially in the context of local authority budget cuts for the coming years.

Some authorities identified improvements in joint working within the authority as well as with external partners as a possible partial solution to the lack of resources available. Joint delivery examples, where partners pool existing funds to deliver climate change interventions, are however very limited at present.

Norfolk County Council stated that they had considered the use of various carbon tools including the Energy Saving Trust tool, as well as evaluation tools developed by Atkins and SDG. However, the cost of buying/adapting these tools is an issue for the council, especially at a time when transport budgets are being cut.

Poole noted that limited funding was available for CO_2 reduction initiatives, and felt that a balance needs to be found between maintaining network quality and reducing carbon levels. For example if funding is spent on purchasing lower carbon vehicles, less will be available for highway improvements. All departments within the authority have been asked to make savings, with funding increasingly being centralised to education and health services.

5.2.5 Adapting to climate change

Some of the barriers that local authorities are experiencing in taking action to respond to the risk of climate change to transport infrastructure and services are similar to those uncovered in relation to mitigation, and include:

- the prioritisation of limited resources to issues that are seen as a higher priority;
- a lack of understanding of adaptation issues, for example the thresholds that impacts on infrastructure may occur and the difficulty in quantifying and communicating risks involved;
- the cross-cutting nature of the issue – the need to involve officers from across the authority and a wide range of partners; and
- there is a focus on maintaining existing networks ensuring continuity of service rather than focussing on long term issues such as adapting to the risks of climate change;

There are likely to be number of areas where local authorities will require support in future, for example:

- identifying relevant thresholds, for example the temperature conditions at which road deformation is likely to occur;
- ensuring effective utilisation of the latest evidence, such as the new Climate Projections for the UK (UKCP09) assessment of the risks of climate change to transport and subsequent decision making on the appropriate action to address these risks; (the probabilistic nature of the projections will make this process more resource intensive but will provide a more robust basis for decision making); and
- To ensure that all new infrastructure projects and maintenance of existing infrastructure considers the climate over their estimated lifetime to ensure their long-term resilience. Significant upgrades/maintenance projects currently often consider the current or historic climate.

Case Study 25: Towards a carbon-free urban transport system?

Ongoing research funded by the UK's Engineering and Physical Sciences Research Council has looked at developing three visions or future scenarios for 2030.

Creation of the visions

The visions have been developed by a process of review, discussion amongst the members of the research team and extensive discussion with (largely UK) stakeholders and experts through a series of workshops, project Advisory Committee meetings and presentations.

The workshops and other participation events are being used to establish trend breaking views of the future and the key attributes of future conditions which will generate these visions. Impact assessments will be undertaken to consider the likely costs and benefits (including the carbon impacts) of these visions and the potential effects on a persons' lifestyle.

Mode	Current situation (2006)[1]	2030 Vision 1	2030 Vision 2	2030 Vision 3
Walk	28%	32%	37%	40%
Cycle	1%	13%	23%	40%
Public Transport	12%	25%	35%	15%
Car	59%	30%	5%	5%

[1] – Source: National Travel Survey, 2006.

Vision one – European best practice: This vision of the future represents a widespread implementation of current best practice towards more sustainable travel behaviour.

Vision two – A car-free public transport orientated future: In this vision there has been a substantive change in transport behaviour in urban areas, going well beyond the changes experienced in Vision One

The principal car users are those with mobility difficulties who cannot realistically use 'active' modes and have difficulties using public transport. The study team envisage that this vision is only achievable if there have been other major changes in society, leading to it being more cooperative and less individualistic and competitive.

Vision three – A localised energy efficient future: In this vision serious constraints on global energy usage (resulting from a global energy crisis) have rendered the traditional car virtually obsolete and led to a reduction in motorised public transport.

This vision of the future represents a radical shift towards more sustainable travel behaviour. Walking and cycling (Human Powered/Assisted Vehicles (HPVs)) are the predominant modes of urban transit. Buses and trams accounting for only 15% of the modal share are restricted to segregated and direct routes to and from the urban core.

Tools

The work is developing innovative methodologies using visualisation software to help users understand how futures might appear, using modelling techniques which examine narrative and storylines to understand how different futures might be attained.

The project will offer people a range of tools that enable them to construct their own versions of the future, and to weave their own stories in and out of expert visions, thus opening up the possibility of a richer and expanded public engagement with the visioning process.

The value of this project, and the innovative methodologies it adopts, is the way in which it opens up the possibilities of a greater understanding of how walking and cycling could change in the future.

6. Review of tools and methodology

This section sets out the findings of the study in relation to carbon tools and methodologies. The first part presents tools currently in use and discusses the issues associated with their development and application.

The second part examines current weaknesses within these approaches.

Appendix D includes two tables summarising:

a) Which approaches / tools each of the selected local authorities are using.

b) A description of the type and function of these carbon tools (plus other carbon tools known to the team).

6.1 Local authority findings

There are three broad approaches to estimating greenhouse gas emissions within a particular local authority area:

- relying on statistics published by others (e.g. DECC/AEA/Defra);
- monitoring relevant local indicator(s) directly; and
- predicting future emissions (including assessing the impacts of relevant interventions).

6.1.1 Relying on published statistics

All local authorities interviewed for this study rely mainly on local CO_2 emission data provided by Defra to monitor progress towards NI186.

The main issues identified with the use of NI186 monitoring data are as follows:

- delays in data release mean that interventions to reduce emissions would need to take place two years earlier to show up within the data released in any given year;
- rural areas expressed concerns with the methodology used to calculate transport emissions using national averages, which results in very high transport emission per head in rural areas; and
- the data fails to reflect results achieved through local interventions and can sometimes be misleading if the wider context is not fully understood, York gave an example where CO_2 emissions as reported through NI186 monitoring had reduced significantly but this result was due to the closure of important employment sites in the area.

6.1.2 Monitoring

6.1.2.1 Emissions

None of the authorities studied were measuring the emissions of transport related CO_2 directly. Monitoring therefore falls into three categories:

- monitoring person trip-making (e.g. via a household surveys);
- monitoring vehicle kilometres (via household surveys and/or traffic counts); and
- monitoring fuel sales.

In theory, each of these types of ‘carbon calculators’ can be calibrated to current local conditions regarding vehicle speeds, engine types and fuel mix, amongst other variables. Care is needed to ensure the correct inclusion of goods vehicles, buses, diesel trains and taxis and to avoid double

counting of the carbon impacts of electric modes (which may be included separately within NI186 electric generation calculations).

In recognition of the difficulties and limitations attached to the use of NI186 data some local authorities had developed their own procedures in relation to the monitoring of emissions.

Norfolk County Council have developed a CO_2 monitoring tool for LTP2 which is based on NI186 data for transport sector emissions in the area, adapted to take account of the impact of local transport initiatives as well as changes in the composition of the private vehicle fleet.

Hampshire County Council and Government Office South East agreed that monitoring for NI186 would take account of the Defra data as well as two additional proxies[38]:

- a target to reduce CO_2 by 50,000 tonnes in the local authority area through identified projects (with their impact on emissions assessed individually); and
- the development of a vision and strategy by March 2011 to meet the major long term challenges.

For local authority operational emissions (including NI185 monitoring), some authorities rely on environmental management systems already in place and others have set up new protocols to gather data on energy consumption (smarter metering) and fuels sales.

Some authorities are using or planning to use the Energy Saving Trust TrACE tool to record CO_2 saving evidence for National Indicator 186. The tool records progress against the NI186 target and provides a coherent evidence base to the Audit Commission for Comprehensive Area Assessments.

The Energy Saving Trust is also developing systems to combine and aggregate the data so that multi-LA, regional and national comparisons can be made and to help in the identification of good practice and national progress[39].

The need to keep track of the interventions implemented by the local authority and its partners was highlighted by several local authorities during interviews. Although the authorities generally monitor interventions implemented under specific programmes (such as LTP2), it was noted that it is quite difficult to keep track of all interventions which might have an impact on CO_2 emissions (including a negative impact) as they are often implemented by different teams and through different strategies internally as well as by external partners.

Kent noted that under LTP2, monitoring against targets was linked to financial rewards for good performance, but that this has been removed from LTP3 and put into the Comprehensive Area Assessment. This removal of reward funding directly linked to LTP performance may mean that politicians devote less resources to preparing their LTPs. They consider that monitoring of targets in LTP3 and the LAA will therefore be based around the minimum level required for compliance. In the case of many LAA targets this will be restricted to establishing that the 'direction of travel' is positive, rather than quantitative data, and in the case of NI186 is likely to be reliant on the national data set.

Shropshire felt that their approach to LTP2 monitoring has been pragmatic and has looked at opportunities for generating appropriate proxies for monitoring purposes. For LTP3 they stated that it will be important that their monitoring strategy is proportionate and does not create any inappropriate financial / resources burden on the council.

Following a similar theme, Norfolk tried to prioritise proposed measures based on their impact on CO_2, but stated that assessing and monitoring each measure to show its impact on CO_2 would

[38] Source: Hampshire County Council.
[39] Source: Energy Saving Trust (see: www.energysavingtrust.org.uk/business/Business/Local-Authorities/Support-tools/TrACE-Tracking-action-on-carbon-emissions).

be highly intensive and some smaller projects could end-up with significantly higher costs. For example, a £30k scheme could potentially end up with an additional £10k of costs for appraisal and monitoring.

Nottingham's NI186 monitoring currently relies on Defra data. Traffic surveys are undertaken in the area annually but results are currently a bit crude to enable monitoring of emissions (for example some categories of vehicles are grouped together).

6.1.2.2 Progress towards adaptation

Most local authorities reached Level 2 for NI188 in 2010, which means that the authorities have undertaken a comprehensive risk assessment of vulnerabilities to weather and climate and have identified priority risks for their services, incorporating responses to these risks in their strategies, plans and operations.

In preparing for Level 3, local authorities will need to ensure that council or departmental performance management reports record the implementation of adaptive responses for all priority risks identified in the adaptation action plan. It is anticipated that this requirement will lead to the development of monitoring mechanisms, potentially similar to the Energy Saving Trust TrACE tool but focusing on adaptation interventions. Norfolk have developed a monitoring tool to keep track of their progress towards NI185.

In order to manage all the risks and demonstrate improvement surrounding climate change adaptation and mitigation specific to Kent Highway Services, the local authority is developing an Environmental Management System (EMS) which will be certificated to ISO14001.

6.1.3 Predicting future emissions

Local authorities were found to be using a variety of modelling and forecasting approaches to predict the impacts of their various plans, strategies, and interventions on their future transport related GHG emissions. The different tools can be distinguished in their ability to:

- test alternative land-use scenarios;
- predict the effects of future car ownership (some differently to others);
- predict the effects of interventions which affect mode choice (some differently to others);
- predict network speeds and incorporate into the carbon calculation;
- include public transport modes in the calculation; and
- take account of future changes in the distributions of engine types, fuel efficiency and fuel mix.

Local authorities are interested in developing the ability to evaluate the potential impacts of proposed interventions before these are adopted in the authorities' plans or strategies. Most of the authorities interviewed for this study expressed an interest in being able to assess the potential to achieve emission reductions from the transport sector for the preparation of LTP3.

Some pointed to the difficulty in assessing the impact of a wide range of measures on local emissions and identified the need to retain a balanced approach to evaluation to avoid spending too much time and resources in this area, and ensure that funding is allocated in priority to the delivery of interventions.

Taking these considerations into account as well as the lack of in-house resources to develop sophisticated monitoring and evaluation tools, the majority of authorities interviewed are using a qualitative approach to evaluation at the moment. For example, in preparing their LTP3 strategies, authorities are relying on the Strategic Environmental Assessment (SEA) and Sustainability

Appraisal (SA) processes which include a qualitative assessment of the impact of proposed measures on carbon emissions.

Norfolk County Council's emerging LTP3 includes a qualitative assessment of the impact of potential measures on climate change. This has been developed alongside (and to inform) the sustainability appraisal. The assessment was undertaken through a workshop of experts where those participating identified the impact of each measure proposed on their area of expertise. Norfolk stated that the same approach will be used when preparing the LTP implementation plan.

The following section provides examples of the different types of tools currently in use. Appendix D provides a full list of the carbon tools encountered.

Some of the tools discussed within this section (such as Greater Manchester's EMIGMA, and Tees Valley's approach consist of an established baseline, ongoing monitoring and future year appraisal, and thus could fall under several of the presented categories.

6.1.3.1 Cross sector modelling tools

Cross-sector modelling tools take account of emissions across the industrial, domestic and transport sectors.

City of York Council has used the Stockholm Environment Institute REEAP model in the past[40] and the authority, alongside others interviewed, has also considered the use of Carbon Descent's VantagePoint tool. These tools provide modelling capabilities across all sectors and are not specific to the transport sector.

Resource and Energy Analysis Program Model (REEAP)

REEAP was developed by the Stockholm Environment Institute, and includes a regularly updated database of all the carbon footprint data in the UK and a module for policy and scenario analysis, providing the following functions (for all local authorities and regions in the UK):

- footprint data by production sector;
- footprint by household consumption category;
- time series emissions data from 1992-2004 by region;
- a comparison tool across geographies;
- a composite region function to join local authorities or regions;
- update data function where baseline data can be changed; and
- future scenario creation and analysis and evaluation of scenarios and results display.

Vantage Point

Vantage Point is a tool for modelling carbon reduction scenarios over time developed by Carbon Descent. It has been designed specifically for local authorities to develop scenarios to inform climate change or similar strategies[41]. The tool allows the user to:

- set baseline emissions levels for the local authority;
- define carbon reduction targets for a given year;
- set interim reduction targets for any number of key years on a linear or non-linear basis;

[40] The model was also used to support the analysis undertaken by the Yorkshire and Humber region in the "Stepping off the gas" study conducted in 2007/08.
[41] See www.carbondescent.org.uk/pages/vantage-point.html.

- adjust the targets to allow alterations in population growth, rates of demolition, new build and changes in transport emissions;
- analyse a mix of technologies and measures applied to transport, domestic and non-domestic buildings to achieve the targets; and
- group these mixes into reduction scenarios and compare against number of factors such as heat and power produced by technology, CO_2 reductions and projected per capita emissions, net present value, capital costs and total gas and biomass consumption.

EMIGMA

The Greater Manchester Transportation Unit (GMTU) was commissioned, on behalf of the Greater Manchester Local Authorities, to undertake an update of the emissions inventory for the area (EMIGMA) for a base year of 2006. The 2006 EMIGMA database covers an area of 1272 km^2 encompassing the ten administrative districts of Greater Manchester. The inventory contains information on the emissions of pollutants identified in the UK's Air Quality Strategy from all identifiable sources in the area. The emissions sources are grouped into three broad categories:

- stationary point sources - predominantly industrial processes;
- mobile line sources - road, rail and air transportation; and
- area sources - other influential sources, such as domestic emissions. These sources are essentially population based and include, for example, combustion and solvent usage as well as related emissions from domestic buildings.

The database allows the magnitude and spatial distribution of emissions across Greater Manchester to be investigated and enables the relative importance of different sources of air pollution to be examined. The emissions data has a further role in providing the basis for dispersion modelling exercises and air quality management planning. In conjunction with local and strategic transport models, it also provides the basis for forecasting air quality and determining the effects of changes in land use planning and transportation policies.

GMTU stated that approach provides, “a comprehensive suite of transport software following WebTAG guidelines linked to a sophisticated emissions inventory and forecasting tool that allows EMIGMA to be used for monitoring and forecasting under different economic, demographic, land-use and investment assumptions”.

One of the stated weaknesses was that EMIGMA does not consider ‘non- point source’ carbon emissions from transport (such as electric trains). Train emissions are included within EMIGA but dealt with less comprehensively than other forms of transport because they are a small part of total emissions, and because data collection through Network Rail is perceived to be time consuming.

Tees Valley

The North-East England Greenhouse Gas Emissions Baseline and Trajectory Study (undertaken by AEA on behalf of Sustaine) produced four key outputs:

- a comprehensive greenhouse gas emissions inventory for North East England;
- a regional tool to enable the region to monitor its emissions;
- emissions trajectories showing the impact of existing regional plans and strategies; and
- a methodology for the region to use when developing future strategies to show the effect on emissions of future development proposals.

This project has developed two emission inventories: both an 'At Source' and an 'End User', for the six Kyoto greenhouse gases (which includes CO_2) for all source sectors for 1990, 2005, 2020 and 2050.

The 'End User' emission inventory was used as the basis for target setting. The full inventory covers industrial, domestic and agricultural fuel use and waste, as well as the following explicit transport elements:

- road transport by fuel type and separately for major and minor roads (based on fuel consumed in the region and not on vehicle ownership or fuel sold in the region), plus end user element;
- rail, plus end user element;
- shipping (split by international and domestic), plus end user element;
- non-military aviation (split by fuel type and international and domestic), plus end user element; and
- other transport (Off road) not rail, aviation or shipping, plus end user element.

Baseline and future estimates of CO_2 have been aligned with NI186, which is similar to the 'end user' CO_2 calculation, but excludes emissions from motorways, rail, shipping, aviation, sources included in the EU-ETS[42], agriculture and nature.

The project outputs include an Excel-based tool for measuring greenhouse gas emissions and calculating greenhouse gas trajectories, with an associated user guide embedded within the spreadsheet. The data in the spreadsheet tool provides a detailed sector breakdown and results by local authority area.

Future CO_2 emissions from transport have been based on the assumptions shown in Table 6.1.

[42] European Union Emissions Trading Scheme. In the first phase (2005-2007), the EU ETS includes some 12,000 installations, representing approximately 40% of EU CO_2 emissions covering energy activities (combustion installations with a rated thermal input exceeding 20MW, mineral oil refineries, coke ovens), production and processing of ferrous metals, mineral industry (cement clinker, glass and ceramic bricks) and pulp, paper and board activities. The post-2012 ETS is likely to include all greenhouse gases and all sectors, including aviation, maritime transport and forestry.

Table 6.1 - Assumptions within the Tees Valley Baseline and Trajectory Study

Element	Baseline (2005)	Forecast
Road transport	Road transport emissions are based on fuel consumed in the region and not on vehicle ownership or fuel sold. Baseline created using DfT traffic flow data on motorways and 'A' roads, and vehicle kilometre data on local which was again sourced from the DfT. This information was supplemented by NAEI43 Fleet Composition Projections44. For each vehicle type, speed and technology a different emission factor was applied.	TEMPRO assumptions for traffic growth, fleet composition and fuel mix were used.
Rail	Baseline created using Transport Statistics Great Britain (TSGB) 2006 (DfT, 2007b) which includes data on shipping activity at all major UK ports. NAEI spatial emissions were used to calculate the percentage of North East shipping emissions that needed to be allocated to each of the North East Local Authorities. These percentages were then applied to the North East total shipping emissions for 2005 to obtain Local Authority related emissions. Domestic and international shipping emissions were calculated separately, based on the UK split of domestic-international shipping from the UK GHGI.	Rail is a minor emissions source. No growth in emissions assumed 2005-2050.
Aviation	The Civil Aviation Authority compiles an annual database of UK aircraft movements (CAA, 2007), which contains information on the number of aircraft movements for each airport in the UK. From this the NAEI estimates emissions for each aircraft type reported to the Civil Aviation Authority at each airport and also estimates the emissions from other airside emission sources.	DfT passenger projections up to 2030. For 2050 the 2030 and 2050 DfT projections per airport in terms of the expected changes in CO_2 emissions to 2050 (DfT, 2007a) were used. The DfT report reports passenger numbers (pax) for 2030 and 2015, but only CO_2 for 2050.
Shipping	UK marine shipping emission estimates from the UK GHGI used in conjunction with the annual percentage share of total UK freight movement that passes through the major North East ports.	Projected growth at Teesport (obtained from port operator) assumed across the region.

[43] National Atmospheric Emissions Inventory, which is funded by Defra.
[44] NAEI, 2002; http://www.naei.org.uk/emissions/index.php

Merseyside Atmospheric Emissions Inventory (MAEI)

The MAEI is an emission database for the Merseyside region. It provides a structured framework within which emissions information is stored and analysed, allowing comparisons between different emission source types and across the Merseyside local authorities. The 2006 update has involved the revision, assessment, improvement and expansion of the previous emissions inventory.

Prior to collation of the MAEI 2006, new software was purchased which allowed the emissions inventory data to be linked directly to an atmospheric dispersion model. This integrated system is called Airviro. The MAEI can be utilised to:

- assess the magnitude and spatial distribution of emissions;
- examine the relative importance of different sources of air pollution so that specific emission sources can be identified and potentially targeted if a reduction in emissions is required;
- in conjunction with other air quality tools such as air quality monitoring data, meteorological data and air quality targets, to inform judgements about local air quality in relation to review and assessment;
- estimate the contribution made by transport to overall pollutant emissions as required by the Merseyside Local Transport Plan (Merseyside Local Authorities & Merseytravel, 2006);
- provide an input to atmospheric dispersion models, support the evaluation of planning applications and assist in the assessment of ambient air quality; and
- provide general public information.

The emission sources in the MAEI 2006 are grouped into four major emission source categories: point, line, area and grid. The transport related elements of these are shown in Table 6.2.

Table 6.2 - MAEI transport components

Emission source category	Transport components included
Point	No transport related elements
Line	Road vehicles on all major roads and minor roads where data is available Passenger and freight trains operated on the Merseyside rail network
Area	Large bus stations Ventilation shafts on Mersey Tunnels Petrol station emissions from forecourts (“fugitive emissions”) Aircraft and airport activities from John Lennon airport Large rail stations
Grid	Emissions from roads for which no detailed traffic flow data is available Cold starts, hot soaks and diurnal evaporation Road vehicle emissions at journey start and journey end, plus further evaporative emissions. Emissions from shipping movements and activity in the Liverpool port area

6.1.3.2 Use of transport models

Some authorities are currently using or planning to use their own transport models to assess the impact of proposed measures (including LTP3 measures) on emissions from the transport sector in the local area. This was the case for Bristol and Plymouth amongst authorities interviewed for this study. Derby has a multi-modal model which will be used to try to predict emissions under LTP3 scenarios with the information to be included in the SEA. The area also has automated traffic counters on all main roads and these are used to predict emissions year on year, using NAEI/Defra emission factors.

Nottingham stated that they have the potential to forecast CO_2 within the authority area using the PTOLEMY land use and transport model (local SATURN models) to forecast traffic flows, although they do not do so at present.

A range of transport models is currently being used:

- traffic models (such as Paramics) which are not true multi-modal models, but which can assess CO_2 emissions from traffic. Such models can incorporate land-use assumptions, but do not contain a land-use module;
- spreadsheet models, which combine baseline information (traffic flows, speeds, fleet profile etc) and assumptions about authority initiatives to produce future year forecasts; and
- 'hybrid' models, which include some / all of the following: multi-modal transport models; external spreadsheets; land-use modules; and emission modules.

Examples of each type of approach are provided below.

Traffic models

Plymouth Paramics Model

Plymouth City Council uses S-Paramics traffic flow micro-simulations to simulate a travel-to-work area extending to a radius of around 10-12 miles from the city centre. This is combined with data from a complete cordon of traffic counters around the city centre and elsewhere in the city environs and a network of air quality monitoring stations.

The S-Paramics system could be used by the council to both predict and validate emissions reductions from different measures, subject to further calibrating work being undertaken. Plymouth stated that the system can calculate estimates of fuel use in the different scenarios simulated, which are then converted to emissions estimates. The simulation is regularly recalibrated (every 3 years) against real traffic flow data, increasing its precision.

The Transport Strategy Team would like to see this approach adopted as part of the overall approach to LTP3. The micro-simulation is already used to design and evaluate the congestion and other impacts of transport schemes, but seeing it adopted for the purpose of predicting and validating transport emissions requires further work on calibrating the model.

Spreadsheet models

Transport for London (TfL) CO_2 tool

Metropolitan authorities within London were not considered within the desktop study and interview stages, but in order to review as wide a range of carbon tools as possible, representatives from TfL were invited to the carbon tools workshop.

TfL's carbon tool is an Excel-based model which was originally developed to model the impact of Climate Change Action Plans (CCAP). It has since been updated and used to look at effect of ground-based transport policies on long-term CO_2 emissions.

The tool is used to predict the contribution of CO_2 savings from TfL operations towards the overall Mayor's Transport Strategy and CO_2 goal of reducing London's CO_2 emissions by 30% by 2025.

Inputs into the model include:

- modelled private and public transport vehicle kilometres;
- energy consumption from rail modes;
- ground-based aviation emissions;
- road speeds split by area;
- projected bus fleet composition;
- projected emissions factors (in g/km or g/kwh); and
- projected fleet profile.

The types of initiatives that have been modelled are shown in Table 6.3.

Table 6.3 - TfL CO_2 tool – initiatives modelled

Transport Initiative	Example
Efficiency Improvements: technology	Uptake of electric vehicles
Demand Management	'Smarter Choices'
Fleet Mix Improvements	Introduction of hybrid buses
Efficiency Improvements	Eco driving

The outputs from the model are 'before' and 'after' annual CO_2 totals, which can be broken down by mode and also used to calculate annual CO_2 savings in each policy area. At present the impact of individual initiatives cannot be isolated.

Planned updates to the model include the use of new speed assumptions based upon London drive cycles, and the addition of sub-regional modelling.

Norfolk's LTP2 carbon tool

Norfolk has developed a tool to assess the impact of its LTP2 interventions and is proposing to retain this approach whilst considering how the tool could be further improved for LTP3. The tool is based on NI186 data for transport sector emissions but takes account of the local vehicle fleet mix (and changes to this mix) as well as the impact of interventions implemented locally such as travel planning, public transport improvements or Park and Ride.

Cambridgeshire spreadsheet model

Cambridgeshire's spreadsheet model takes the published Defra figures and TEMPRO growth predictions, and quantifies the impact of Cambridgeshire's LTP2 programme using assumptions about future changes in the vehicle fleet. The model has been used to produce 'do nothing' and LTP2 CO_2 emissions estimates, and was used to set Cambridgeshire's LTP2 target to limit road based CO_2 emissions to 1.74MT by 2010.

Hybrid models

Bristol Highways and Transportation Carbon Model (HTCM)

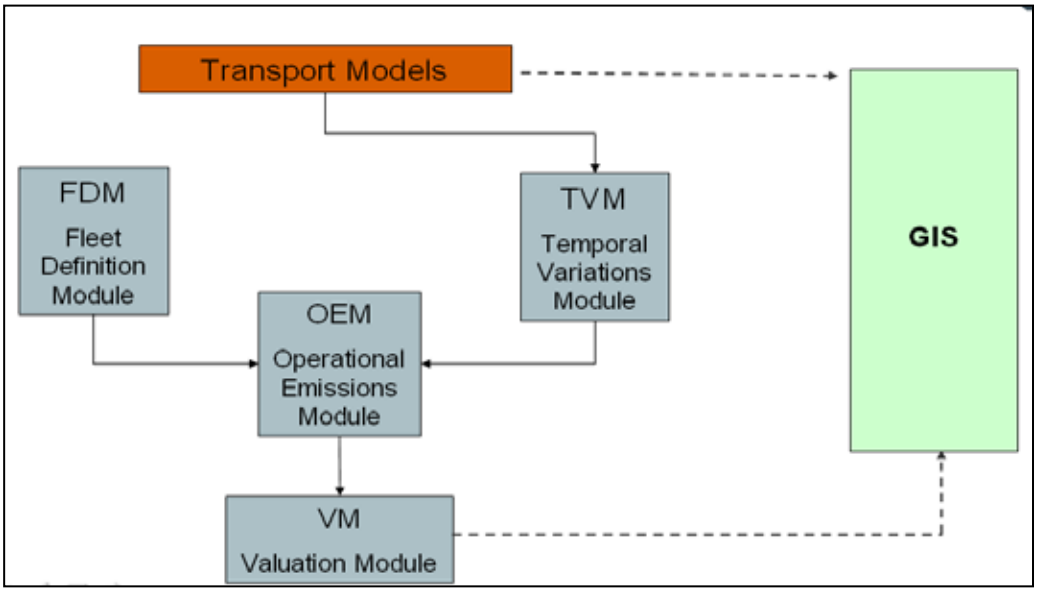
The HTCM is currently being developed with outputs from the Greater Bristol Modelling Framework to support the ongoing West of England DaSTs study.

The proposed HTCM will use transport model outputs (on traffic volume, speed and composition) to estimate the quantity and monetary cost of operational carbon emissions generated by public and private transport land vehicles in a modelled transport scenario by applying best practice in terms of:

- the expansion of traffic information for modelled time periods to represent a full year using demand profiles that vary by day, vehicle and road type (in the Temporal Variations Module - TVM);
- detailed fleet composition through time (in the Fleet Definition Module - FDM);
- estimates of emissions per kilometre (based on vehicle type, year and speed) (in the Operational Emissions Module - OEM); and
- monetary valuation of carbon (in the Valuation Module - VM).

Default values based on national data or guidance will be initially provided throughout, with options provided for users to enter alternative assumptions based on local information or sensitivity tests where required.

Figure 6.1 - HTCM model structure



East of England Regional Model

The East of England region uses outputs from its regional transport model (East of England Regional Model (EERM)) to support analysis undertaken in 2008/09 for the Transport and Carbon Study (TraCS). Outputs from the transport model represent emissions from strategic trips and the influences upon them of measures altering infrastructure and journey charges (such as road user charging). This is supplemented by a spreadsheet model to reflect the influence of short trips, modes and measures not fully incorporated in EERM. Results are combined carefully to avoid double counting and take potential interactions into account.

6.2 Current weaknesses in local authority approaches

The following appraisal presents appraisal discussion of the current perceived weaknesses in local authority approaches to carbon monitoring and appraisal.

The two most-common sources of monitoring data used for estimating transport-related greenhouse gas emissions are the published NAEI/Defra figures (eg as incorporated into NI186) and a variety of local traffic models/databases.

In both cases, the underlying methodology converts a series of traffic counts at specific locations into an estimate of annual vehicle kilometres and applies various assumptions, such as the mix of warm/cold starts, vehicle speeds, driving style and fleet mix to estimate the corresponding annual greenhouse gas emissions.

The set of potential weaknesses of these approaches are as follows:

- the inaccuracy in the **estimation of total annual vehicle kilometres** for the full road network from the sample of traffic count data;
- the tendency to use UK 'default' assumptions regarding **average speeds** (by link type) (unless a well-calibrated local traffic model is available);
- the simplifying assumptions used to estimate **fuel consumption and emissions** based on a single estimate of average speed, with no ability to reflect the variation caused by different amounts of acceleration/deceleration and/or differences in driving styles;
- the tendency to use 'UK average '**fleet mix** proportions, making it difficult to identify benefits of local schemes which encourage greater use of vehicles with a lower $C0_2$/km emissions performance (smaller/more-efficient/hybrid/alternative fuels etc);
- the exclusion of **alternative-powered vehicles** and/or converted vehicle stock from standard emission datasets and from readily available national government fleet models;
- an **inability to distinguish between residents and non-residents** in the observed traffic-based greenhouse gas estimates; and
- an inability in already defined study or model areas to readily reflect the **influence of transfer trips** on apparent changes from a particular intervention (how much is genuinely 'induced' traffic for example).

While the impact of these simplifications may be minor in the context of a local authority's total carbon footprint, the fact that the relevant attributes are effectively 'hard-wired' UK-wide assumptions makes it difficult to use these monitoring tools to reflect the benefits of measures which aim to influence the corresponding local car-purchasing/car-driving behaviour or network conditions over time. Local authorities need clear guidance on the balance between comparability

from the national perspective (for example through WebTAG guidance) and the strong benefits in using more local data to better reflect the bottom-up impacts of local measures.

The weaknesses presented above are discussed in further detail below.

The annualisation process

An issue with traffic-model-based approaches is the inaccuracy associated with the annualisation process needed to get from modelled time periods to annual estimates. These factors will typically vary significantly between urban and rural routes, motorways/A/B/C roads, and commuter radials versus residential streets. These sensitivities tend to be ignored when scaling up modelled time period estimates of carbon to give annual totals.

Use of average speeds

A number of approaches use vehicle km data (by road type) but with no correction to reflect observed local speeds. The distinct U-shaped nature of the carbon emissions per kilometre by speed curve means than the assumption of an average speed often significantly underestimates carbon emissions – for example, the emissions from a combination of a 1km drive at 30kph on a congested road followed by 1km in free-flowing 90kph traffic conditions will typically be 20% higher than the estimate based on the corresponding 45kph 'average' speed for the 2km. We would therefore warn of the potential dangers of simplistic approaches which do not endeavour to estimate and use locally-observed speed information. Note this is especially true of any approach (such as TUBA) which uses end-to-end origin-destination distances and times to calculate average journey speeds, rather than individual link speeds.

Toolkits are already being developed which enable users to vary speeds and develop alternative emission and fuel consumption factors. For example the Highways Agency is updating the Defra Emission Factor Toolkit which will be linked with DMRB. Alternatively, users can go back to the original DfT/TRL speed-emission functions themselves and use their own speeds to calculate alternative factors.

Use of UK average fleet proportions

Many of the approaches use default (UK-wide) assumptions regarding current and future fleet mix – this will tend to underestimate the benefits of any local campaigns or initiatives (such as investment in local electric car infrastructure, initiatives such as Low Emission Zones, congestion charging etc) which might affect local car-buying behaviour.

Toolkits which allow users to vary the fleet mix are in existence, and AEA are currently understood to be exploring the potential use of regional-specific fleet data at a district authority level.

Fuel sales data

There appears to be little or no use of local fuel sales data to monitor current GHG emissions. Fuel sales could, in principle, provide a direct indicator of the relevant GHG emissions. This approach could automatically incorporate local variation in fleet and fuel mix (petrol/diesel/biofuel etc) and might overcome the difficulties associated with using simplifying assumptions regarding speeds and fleet-mix etc when predicting fuel consumption from traffic forecasts.

Inability to distinguish residents from 'non-residents'

None of the approaches identified appear to have a clear method of distinguishing between the travel behaviour of residents and non-residents (travelling to, from or through) the relevant local authority area. While this approach will provide a full disaggregation of the overall UK total (without any double-counting), it does mean that the resulting predictions will be estimates of the traffic on the authority's roads, rather than a true measure of the carbon generation of the authority's residents, which makes the per capita version of such measures a little misleading. Care is also needed to ensure that any measures which affect traffic levels beyond the authority's

boundaries are properly included in any forecasting-based appraisal – this is particularly true of developments which generate or attract large amounts of (long-distance) goods traffic.

Other perceived weaknesses in the current approach are discussed further below.

Local behavioural survey data

There appears to be little or no use of local behavioural survey data (eg household survey data) to estimate trip rates, length, mode, vehicle occupancy etc – such data would allow the emissions predictions to be based on the behaviour of residents of a given authority, rather than having to include trips to, from and through the region by 'non-residents'.

Nottingham mentioned that they use the results of the twice yearly 'Big Wheel survey' (which includes residents and businesses) as part of LTP2 monitoring.

Traffic-only models

Some of the approaches appear to use outputs from traffic models, rather than full multi-modal models. For these, it is not clear how the impacts of measures which might affect mode choice (including car sharing) will be picked up by the relevant forecasting. This is particularly important if the CO_2 appraisal tools will be used to predict the impacts of initiatives such as more-sustainable developments, public transport investment or initiatives to affect travel behaviour.

Destination choice and trip length

It is not clear from the descriptions how many of the modelling-based approaches include changes in car trip lengths over time. This should be included automatically in approaches based on monitoring vehicle kilometre (or fuel-sales), but may be missing from all but the most-sophisticated model forecasting-based approaches.

Inconsistency between CO_2 estimates and forecasts

The variety of different approaches highlighted so far suggests that there is likely to be a growing problem of inconsistency between the various methodologies and their estimates of transport-related CO_2 emissions. We would recommend that local and regional authorities are strongly encouraged to identify and understand any discrepancies between the base-year CO_2 estimates produced by their local tool and the corresponding Defra (or equivalent) 'benchmark' estimate and to state clearly any assumptions or predictions regarding how this discrepancy will change over time.

6.3 What are local authorities looking for?

The availability of robust carbon tools will be of great assistance to local authorities in developing strategies and interventions, setting targets and monitoring and appraisal.

This section examines what local authorities would ideally require in terms of future guidance and carbon tools. It does not constitute the recommendations from the study, which are set out in Section 7.2, although many of the points discussed below are carried forward.

The key points to emerge in relation to carbon tools are set out below.

- From an operator's perspective authorities are looking for a tool which is:
  - clear and easy to use (ability to be operated in-house);
  - provides unambiguous outputs which are easily interpreted and which provide an answer to the kinds of questions likely to be generated by those responsible the climate policy in the region; and
  - the effort and cost in developing and applying the tool is proportionate to the importance attached to carbon reduction through local interventions.

- Local authorities felt that the key function of a future carbon tool should be that it allows them to evaluate the potential impact of proposed measures which they are considering for inclusion in local strategies and plans. Authorities would welcome any additional advice on how to sift / rank options, whether through reference to previous studies or as further guidance on a mechanism for prioritisation[45].
- Related to this, access to disaggregated national forecasts by region would allow authorities to understand the impact of strategies such as the Carbon Reduction Strategy in their area. This would allow authorities to separate the impact of national, regional and local interventions.
- Any carbon tool should provide a consistent style and quality of output across different areas and regions. This would allow comparison across areas, and allow results to be benchmarked.
- A suggested methodology to monitor the impact of specific interventions (such as travel planning) would be useful so that each authority uses the same methodology and assumptions, which would allow results to be benchmarked.
- Authorities would prefer a methodology which incorporates basic transport data (such as national / local traffic flows, fleet /fuel mix and speed data) that is available to all. This would result in lower costs and would not require a bespoke transport/traffic model. Such models can be costly to build and maintain, and expertise to do so often lies outside the authority.
- Authorities identified the need for a set of consistent assumptions and a consistent approach to forecasting. Guidance on wider assumptions, such as the future energy mix and vehicle mix would also be useful, although it was noted that there some assumptions available in WebTAG. The ability to take account of future changes in land-use was seen as important to any possible tool.
- As well as a set of standard inputs, authorities would welcome the ability to suitably modify model inputs to reflect local variables. Similarly, if a local transport model is available, the ability to incorporate this model would be beneficial.
- Several authorities stressed the important of being able to demonstrate how the measures implemented would help the area to save money through efficiencies and other benefits. This would preferably cover the whole life-cycle of schemes where possible, although it was acknowledged that the resources required might make this very difficult. This was important for the purposes of building the business case for schemes to reduce carbon, and allow them to be better compared with more traditional transport interventions.
- On the above point, GMPTE referenced their current Investment Appraisal Guidance which forecasts and values the reduction in car travel resulting from improvements to public transport. An allowance for carbon emissions is made, and results are used in GMPTE internal business cases to demonstrate value for money. However, GMPTE noted that they deem current monetary values for carbon so low that even large reductions as a result of a scheme would make little difference to the benefits.
- The workshop discussions touched upon the idea that a cap scheme, or carbon trading between local authorities (on a wider scale than the Carbon Reduction Commitment) could help to focus the minds. A similar exercise was recently undertaken by the LGA, which instigated a carbon trading game that involved 34 local authorities across the UK.

The following text box discusses the benefits of a method to help local authorities prioritise transport schemes and strategies in terms of their carbon reduction potential. As identified above, this ability is seen by local authorities as a key aspect of any future carbon tool.

[45] See, 'The need for evidence for prioritisation' on p86.

Case Study 26: The need for evidence for prioritisation

As local authorities develop strategies to mitigate transport carbon emissions they will need a basis for prioritising the measures they implement. The comparison of the relative merits of potential measures could be based on the consideration of a number of issues, either alone or in combination, including the following:

- scale of abatement potential;
- cost;
- cost effectiveness of abatement achieved (combining points 1 and 2);
- deliverability (including issues such as public acceptability);
- timescale within which abatement would be delivered; and
- impact of the measure on other policy objectives (national, regional and/or local).

A set of evidence on the relative performance of each potential measure against the issues under consideration in relevant conditions (e.g. taking account of density of population in the area) would therefore be a valuable tool to inform each authority's decision making process.

The availability of an evidence base specifically focussed on carbon impacts would be particularly valuable because existing views of the relative merits of different transport measures are often based on their performance in addressing more familiar transport-related problems such as congestion, noise and local air quality. These views would often form a misleading basis for prioritising measures in terms of carbon abatement potential as the scope of measures to reduce carbon emissions often varies significantly from their performance in tackling the more geographically focussed issues such as congestion.

These focussed issues are often the result of the concentration of relatively few trips on the most used sections of the network at the busiest times. Measures targeted at the critical trips can therefore alleviate the problem and generate benefits for a much large number of trip-makers or residents.

In contrast, all motorised trips contribute to carbon emissions with only speed (and vehicle type) differentiating between the impact of vehicle kilometres travelled over night on rural roads and those at peak times in a city centre. Targeted measures that influence relatively few trips will therefore have a relatively limited impact on carbon and would not tend to be prioritised on carbon abatement grounds, although they may have the potential to provide significant benefits against congestion, air quality and other objectives.

7. Summary and recommendations

7.1 Summary

7.1.1 Goals, commitments and targets

All the authorities surveyed have goals, commitments or targets relating to climate change mitigation or adaptation. These commitments are usually being driven by elected members and officers (including management teams) within the authorities as well as initiatives led by local communities or local authority partners.

Two main types of climate change commitment or targets were identified:

- area wide cross-sector commitments (including LAA targets, Climate Change Action Plan targets, the Nottingham Declaration); and
- transport specific targets.

Some goals and targets are the direct consequence of a local authority signing up to a commitment such as the 10:10 Campaign, the Covenant of Mayors or the Friends of the Earth 2020 Climate Change target (42% reduction in CO_2 emissions by 2020).

However targets are more frequently set by the local authority itself, through the development of its LAA, LTP or climate change strategies.

Most local authorities have set ambitious carbon reduction targets for their area through NI186; however separate targets are not usually set for the transport sector. A large number of authorities are aiming to reach Level 3 of NI188 with a comprehensive action plan adopted for their area by 2011.

The majority of targets set in LTP2 relate to the “shared priorities” of congestion, accessibility, road safety, air quality and quality of life listed in the DfT guidance in 2006, when LTP2 were developed.

At the stage the review was undertaken, most local authorities were undertaking consultation on LTP3, with limited information available in the public domain. More emphasis on carbon and climate change was evident in the available LTP3 objectives compared to LTP2 objectives, reflecting the change of emphasis in the guidance issued by DfT.

Findings show that target setting for CO_2 emission reduction, especially for transport sector emissions, is often more problematic than for interventions that have become established components of LTPs (such as bus patronage for example) which have more established monitoring and reporting procedures.

7.1.2 Who is in charge of climate change issues?

Responsibility for transport and climate change within local authorities residing mainly in the following areas of expertise:

- sustainability, climate change and carbon emission reduction;
  - for the area, with roles such as Sustainability Officer, Climate Change Officer, Environment Officer, Strategy and Policy Manager,
  - or for the council’s own operations and buildings, with roles such as Carbon Reduction Manager, Property Services Manager;

- transportation, with roles including Transport/Transportation Manager, Local Transport Plan Manager, Head of Transport Strategy, Travel Plan Co-ordinator; and
- air quality, including roles such as Air Quality/Environmental Protection Manager.

These teams are required to work together to produce various cross-cutting strategies and documents (such as Climate Change Strategies, Carbon Reduction Strategies and Local Development Frameworks). Work at the local authority level has an important role to play, with actions usually being driven by LAA targets.

On the whole current arrangements were deemed to be satisfactory, regardless of whether teams sat within the same directorates or departments.

Some areas are already working across local authority boundaries as well as at the regional or city regional level. This is especially true of larger urban areas (Metropolitan areas), where joint LTP arrangements often provide the basis for working jointly on emission reduction and adaptation across the conurbation or even the city region.

This partnership work is seen as important as it generates buy-in but it is also noted that arrangements can sometimes be cumbersome and do not often translate in joint delivery. The main reason for this seems to be pressure on funding within each organization.

Reflecting the importance of climate change adaptation and mitigation for at the local level, some authorities have set up dedicated governance structures for elected members to discuss climate change policies and decide on priorities for the area.

In some areas, community initiatives are being set up by residents, sometimes with the help and support of the local authority but also fully independently in some cases.

7.1.3 Acting on climate change

Actions can be split into two main areas:

- transport specific; and
- cross-sector initiatives (including land-use planning).

Most authorities highlighted improvements to public transport, walking and cycling infrastructure and services through their LTP2 as examples of schemes to reduce CO_2. The development of similar schemes is expected to continue through LTP3. Other key initiatives, identified through the desktop review and the interview process include:

- sustainable travel towns and cycling towns / cities;
- cycling demonstration towns / cities;
- smarter travel and active travel programmes; and
- community car clubs.

Many authorities are aiming to encourage the take up of low carbon vehicles and fuels by providing electric vehicle charging facilities, purchasing or leasing low carbon vehicles for the council's fleet and encouraging operators to use low carbon buses.

Many of the local authorities considered are seeking to establish links between transport and land use planning frameworks to ensure that the need to travel is minimised where possible.

Local authorities are committed to reducing their own carbon footprint, driven by initiatives such as the Carbon Reduction Commitment. This allows them to set a positive example within the community, but also to reap the financial benefits of more energy efficient practices. Initiatives

include ‘greening’ local authority vehicle fleets, installing energy efficient lighting and signage and implementing sustainable procurement practices.

Some regions (through regional climate change partnerships) and local authorities have undertaken climate change adaptation studies and assessments in their area.

7.1.4 Challenges, drivers and barriers

Key drivers uncovered during the study included:

- strong political leadership and senior management support providing high-level impetus;
- working towards high level commitments or transport specific targets;
- commitment from council officers was seen as being particularly important - within local authorities the presence of motivated individuals was often key in driving initiatives forward;
- community support - as evidenced in developing initiatives and environmental groups;
- the financial savings which could be achieved from reductions in energy use (and carbon emissions) from authority operations; and
- to mitigate against (and plan for) the impact of climate change within the local area.

Many authorities noted strong political and senior management support for climate change strategies. Some also pointed to difficulties linked to climate change scepticism amongst the local community, elected members or local authority officers. Some authorities identified the harsh winter (2009/10) and the recent University of East Anglia climate change email incident as additional factors contributing to this scepticism.

Authorities identified that climate change, economic development and growth, social and other environmental priorities can sometimes conflict. Several authorities identified the current economic climate and the prospect of very significant cuts in local authority budgets as a threat to climate change interventions, especially where these do not result in short term cost savings.

Some authorities interviewed pointed to the difficulties linked to the nature of the area they covered, either linked to the mix of urban and rural areas or the variation in population and economic indicators within their administrative boundaries.

7.1.5 Review of tools and methodology

There are three broad approaches to estimating greenhouse gas emissions within a particular local authority area:

- relying on statistics published by others (e.g. DECC/AEA/Defra);
- monitoring relevant local indicator(s) directly, for example by monitoring person trips, monitoring vehicle kilometres or monitoring fuel sales; and
- predicting future emissions (including assessing the impacts of relevant interventions).

The two most-common sources of monitoring data used for estimating transport-related greenhouse gas emissions are the published NAEI/Defra figures (e.g. as incorporated into NI186) and a variety of local traffic models/databases.

In both cases, the underlying methodology converts a series of traffic counts at specific locations into an estimate of annual vehicle kilometres and applies various assumptions, such as the mix of warm/cold starts, vehicle speeds, driving style and fleet mix to estimate the corresponding annual greenhouse gas emissions.

Analysis of local authority approaches found that:

- there was little consistency of approach between the various local authorities contacted;
- most local authorities are using measures based on vehicle kilometres, rather than on fuel-sales-based information, which is a potential alternative;
- few of the approaches appear to include any attempt to distinguish between resident's trips and through traffic, being based on the traffic using the authorities' roads, rather than the behaviour of the authorities' residents; and
- models generally use national data for speeds, the fleet mix and the current / future fuel mix.

Local authorities pointed to the following main areas where they would require additional support from central government:

- monitoring local carbon emissions (including for the transport sector) and target setting - improvements required to NI186 data and the ability to monitor local interventions and appraise their impact on emissions;
- advice on the best way to prioritise interventions and investment for LTP3; and
- guidance on the type of interventions to be promoted in emerging sectors such as low carbon vehicles.

The availability of robust carbon tools will be of great assistance to local authorities in developing strategies and interventions, setting targets and monitoring and appraisal. Local authorities would like to see the following from a carbon tool:

- from an operator's perspective authorities are looking for a tool which is:
  - clear and easy to use (ability to be operated in-house); and
  - provides unambiguous outputs which are easily interpreted;
- the ability to evaluate the potential impact of proposed measures which they are considering for inclusion in local strategies and plans. Most authorities are using a qualitative evaluation process at the moment although some have used modelling tools either on a cross sector area wide basis or through their transport modelling capabilities;
- consideration of a standard methodology to monitor the impact of specific interventions (such as travel planning) so that each authority uses the same methodology and assumptions, allowing results to be benchmarked;
- the ability to differentiate between the impact of national, regional and local interventions;
- a set of standard inputs (basic transport data available to all) and variables, and the ability to suitably modify model inputs to reflect local variables, this includes the addition of local transport model data if available;
- the need for a set of consistent assumptions and a consistent approach to forecasting (including land-use forecasts); and
- the ability to demonstrate the value for money of carbon reduction schemes.

7.2 Recommendations

The following recommendations have emerged from the study. They fall into three categories, which together form a 'stepped' process for the DfT to consider:

1. Making best use of existing information;
2. Improving data sources; and
3. The creation of a DfT carbon tool.

These recommendations focus on issues related to land based transport sector emissions and do not consider emissions from the shipping and aviation sectors. These sectors are considered to require interventions implemented at the national or even international level and were therefore not considered in detail within this study. It is important to note however that the monitoring and appraisal processes required for these sectors are different and the recommendations set out below would therefore not apply to these sectors.

7.2.1 Making best use of existing information

Local authorities contacted for the study were aware of different sources of information relating to monitoring data and methodologies for the evaluation of possible transport interventions. The large number of potential sources and methodologies was however highlighted as an issue as this is leading to a lack of consistency and coordination in the approaches being adopted for CO_2 monitoring or appraisal. There is a need for local authorities to have full knowledge of the data and guidance that exists, be able to access it easily, and also to be aware how to use it appropriately.

Guidance from the DfT

To help develop more consistent and coordinated approaches, the DfT could provide guidance on the data and methodologies to be used when monitoring transport sector emissions and evaluating the potential impact of transport interventions. This guidance could include:

- clear information on the monitoring of transport sector emissions within NI186 data produced by Defra, setting out the strengths and weaknesses of this approach, describing planned improvements to the dataset and guidance on how this data can be supplemented by monitoring activities undertaken at the local level;
- a list of data sources which can be used by local authorities to support their monitoring and appraisal work, including advice on how the data can be best used depending on the type of monitoring/appraisal undertaken and the type of intervention/area considered;
- clear references to relevant WebTAG Units and when methodologies and guidance related to CO_2 emissions set out in WebTAG should be used;
- examples of best practice from current local authority or regional approaches to transport sector emissions monitoring or appraisal, also including examples of how interventions can be prioritised against CO_2 reduction objectives and targets;
- information on how national measures, such as the Carbon Reduction Strategy might impact emissions within each local authority area. This data is available from National Transport Model forecasts[46] (which include the predicted impact of the Carbon Reduction Strategy), and is broken down to the regional level. Data includes percentage changes in average speeds, vehicle delays and CO_2 emissions between 2003, 2015, 2025 and 2035;
- a section discussing the impact of proposed interventions on carbon emissions, especially those measures designed to reduce congestion through modal shift which might not necessarily also be effective in reducing CO_2. Depending upon how they are implemented, measures such as Park and Ride schemes, school travel planning, congestion charging and bus priority measures have the potential for rebound effects, emission displacement and unintended consequences; and
- guidance on the type of interventions to be promoted in erging sectors such as low carbon vehicles – guidance on which technologies and fuels are most promising and should be supported.

[46] http://www.dft.gov.uk/pgr/economics/ntm/forecasts2009/.

A forum for best practice

Local authorities would also benefit from a forum to exchange information and best practice and discuss on-going work in this area. This could be done through groups which are already established, for example through the Local Authorities Coordinators of Regulatory Services (LACORS), the Local Government Association or the Local Transport Plan (LTP) network. Such a committee could consist of representatives from local and regional authorities, the DfT and be supplemented by academics and other outside specialists as required.

Prioritisation of schemes

One of the recommendations from this study is that local authorities are provided with guidance on how they can prioritise schemes and strategies in terms of their carbon abatement potential. Existing evidence from previous studies is discussed in more detail below.

Case Study 27: Prioritisation of schemes.....part 1

Existing information

Successful prioritisation of measures for carbon abatement will depend on access to relevant, consistent information on the impacts of a range of measures on carbon emissions. Only part of the relevant information is currently readily available, although there is a growing body of reports and research on the impacts of different types of transport measure including:

- the DfT's Carbon Reduction Strategy (CRS) and preceding Carbon Pathways Analysis;
- reports published by the Committee on Climate Change (CCC);
- the recent report for the DfT assessing the impacts of the Sustainable Travel Towns programme;
- the Interactive Manual of Policies to Abate Carbon from Transport (IMPACT) by the UK Energy Research Centre, providing evidence from a literature review on the carbon impacts of different transport scheme types;
- databases providing information and case studies on the impacts of different types of transport schemes such as KonSULT and VTPI;
- UK and other government publications (including the Energy White Paper and associated Energy Measures report and Cenex/Arup report on the scope for electric vehicles); as well as
- research documents such as the Commission for Integrated Transport (CfIT) report on Transport and Climate Change and the Low Carbon Transport Policy for the UK report from MRTU.

Within these sources, information on local measures is typically either in case study form, not in consistent format and/or provides limited quantified evidence on the impacts on carbon abatement, particularly in terms of the likely range of impacts under different scales or circumstances of implementation. This means that converting the evidence available into a form that helps an authority identify the likely local impacts of a given measure on a consistent basis with evidence for other measures implies considerable interpretation and effort.

Where evidence on impacts is available on a more consistent basis across a range of measures (notably in the CRS and CCC reports), it tends to be focussed on larger scale/national measures (such as fleet improvements) rather than the type of measure available to authorities to implement.

Some evidence is however available on the impacts of measures at the regional/sub national scale from recent work including studies for the Scottish Government and East of England Development Agency. These reports include some evidence on the relative impacts of different types of measure that authorities could potentially implement, although again there is little information on the impact of different scales of implementation or implementation in different circumstances.

Prioritisation of schemes.....part 2

Findings from existing information

A number of general messages can be drawn from available information that are relevant at all scales and would therefore apply for prioritisation at the local scale, as set out below:

- measures need to influence a large number of trips across all time periods and distance bands to achieve a significant change in carbon emissions;
- measures to achieve extensive change in travel choices (away from car based, long distance travel) have the potential to provide significant reductions in carbon if they target medium to long distance trips as well as more local travel and are implemented in a comprehensive manner, potentially as packages of reinforcing measures;
- measures to change driving behaviour (eco-driving training and speed limit enforcement) can have a sizeable impact if applied and enforced extensively;
- capital intensive measures to improve public transport provision are unlikely to perform well in terms of cost effectiveness of carbon abatement due to the relatively low number and short average length of trips affects;
- planning measures have a relatively limited effect over the short to medium term due to the relatively slow rate of development turnover. However, for the same reason, implementation needs to start early to allow a larger scale impact to be realised over the longer term;
- measures to improve fleet fuel efficiency are particularly cost effective when considered at the national scale as they also bring cost savings to users. However, this position is less clear when considering the impact of local measures to support uptake of newer fleet as it is more difficult to identify directly the scale of impact of the measure;
- goods vehicles have high emissions rates and therefore contribute disproportionately to emissions totals. Measures to reduce freight emissions therefore have the potential to have significant effect;
- carbon emissions per kilometre vary with speed, following a form of 'U' curve with the lowest emission typically occurring at speeds of between 30 and 50 mph. Any variation in speed in either direction increases emissions. Consequently measures which free up traffic flow or attempt to deter road trips by slowing traffic can potentially increase emission depending on the speeds involved; and
- some carbon abatement measures can potentially have significant negative impacts on other policy objectives. For instance:
    - charge based measures to reduce travel demand such as parking charge increases can increase the cost of travel (with associated implications for public acceptability and deliverability); and
    - unless measures are implemented to prevent the rebound effect (whereby people are encouraged to drive further if the cost of car travel reduces), measures to improve fleet efficiency can increase traffic levels and therefore potentially congestion, poor journey time reliability, accidents and (depending on the nature of the vehicles and their other emissions) local air pollution.

Findings such as those outlined above can provide an indication of suitable direction and types of transport measure for inclusion in a local carbon abatement strategy. However, more detailed evidence on the impacts of different types of local schemes in different contexts would provide a better basis for helping authorities decide between the detailed options available to them.

7.2.2 Improving data sources

Although many data sources exist, some sources are not currently easily accessible and others might not provide the data local authorities actually require for their monitoring or appraisal activities. There is therefore a need to improve the data made available to local authorities, with standard sets of data provided at the local level for authorities to use.

Local fuel sales data

We believe that the DfT should explore ways to obtain and use information about fuel sales by local authority as an alternative starting point for estimating greenhouse gases. If the relevant data can be collated or estimated by local authority (i.e. based on the location of the point of sale of the relevant fuel), then the benefits would be as follows:

- fuel sales could potentially provide a much-more-direct measure of the actual CO_2 emitted by road traffic than the rather-indirect combination of annualised traffic counts, assumed speeds, driving style assumptions and vehicle fleet (age and proportion of hybrid/electric etc); and
- it is likely (in our opinion) that a local authority's fuel sales will be a better representation of its residents' driving behaviour, even when fuel purchase by people who are not local residents are included, than an observed level of vehicle kilometres, especially if the latter is predicted from a limited number of traffic count sites.

There are issues that would need to be resolved with an approach to monitoring based on fuel sales. The main issue is whether the local authority takes responsibility for the carbon from fuel **sold** or **consumed** in its area. Some of the fuel sold will be consumed outside of the authority area, e.g. in an adjacent area or on the main highway network connecting towns and cities.

Further research is recommended in this area to establish the potential benefits / limitations of this approach.

Greater use of the NTS

We believe that **National Travel Survey** data should be used to monitor and predict the amount of car vehicle kilometres driven per annum in different areas.

We believe that a further disaggregation of regional NTS data would be helpful: three urban/rural classifications (the largest two plus an 'Other' grouping for each region) and three levels of household car ownership, to predict 'local' estimates of car vehicle kilometres per household per annum. These could then be used to provide an improved indicator of the levels of current car use by the residents of each local authority.

Local surveys

In addition we believe that local authorities could/should be encouraged to use local household surveys (containing NTS-consistent questions regarding travel behaviour, particularly car-driving) to boost the availability of information to monitor changes in car use by their local residents over time. Combined with other information, this would allow a link between travel behaviour, the use of vehicles and their emission ratings to be established.

Again, this approach is valid where the carbon emissions are meant to represent traffic involving just the local population. Alternatively if authorities are required to take account of all traffic in the local area (i.e. that passing through on strategic trips) then another method based on traffic census data would probably be required.

Further investigation and discussion on this point would be beneficial.

Local network speed data

We are aware of increasingly-robust/comprehensive observed network-wide traffic speed data (eg ITIS or TeleAtlas data) which could/should be used to inform greenhouse gas emissions

monitoring tools which require estimates of traffic speeds on different areas of the road network and/or at different times throughout the day. The use of these network-wide speed datasets should be considered further as a potential improvement to the current suite of monitoring tools which rely on speed estimates, but which do not have access to the outputs from a well-calibrated traffic model.

It is understood that toolkits are already being developed which enable users to vary speeds and develop alternative emission and fuel consumption factors. For example the Highways Agency is currently updating the Defra Emission Factor Toolkit which will be linked with Design Manual for Roads and Bridges (DMRB). Alternatively, users can go back to the original DfT/TRL speed-emission functions themselves and use their own speeds to calculate alternative factors.

Another pragmatic way forward may be to collate a wider range of locally observed traffic speed data, together with nationally available datasets (longer time series), to allow generation of a wider series of speed-emission curves than used in generic tools such as WebTAG or the NAEI data, to allow better understanding of the relationship between local speeds and emissions.

Improved data on the local fleet mix

We believe that the DfT should facilitate the preparation and distribution of regional or local authority fleet-mix data, covering the characteristics which are most-relevant for forecasting current greenhouse gas emissions. This would ideally include *inter alia* information regarding the fleet profile by vehicle age, engine size and fuel type (including hybrids and electric).

It is our understanding that these data could be provided for each local authority (relatively easily and cheaply) by the DVLA, although we note that this is based on registration location rather than location of use.

Provision of this data as a standard across the country would help eliminate a number of key weaknesses of the current monitoring approaches by a) using the true local fleet mix, b) picking up any local changes in this fleet-mix over time and c) improving the standardisation of the CO_2 estimation and monitoring processes.

It might be useful to examine variations in fleet composition on a regional basis, rather than the local level, as vehicles are not necessarily used in the locality that they are registered. This is particularly true for company cars which may be licensed in the town where the company is registered, but not where the driver lives.

This is going to be a relevant and important point that will need consideration if local measures are to be introduced (e.g. to encourage lower carbon vehicles), and this is an issue that AEA are currently examining on a national scale with the DfT.

Improved representation of behavioural responses

The use of micro-simulation models for complex operational traffic management regimes allows a better reflection of behavioural response than more strategic modelling, and this becomes more important when looking to change the way people use, rather than whether they use, a particular travel option.

Instantaneous emissions modelling has been the subject of much work since initiatives such as the ARTEMIS[47] programme, and allows sub-second, metre by metre determination of emissions, with an obvious increase when accelerating, decelerating and (to an extent) idling, which are particularly associated with excess emissions. Such approaches are for very specific interventions, but would benefit markedly from more localised datasets.

The drawback of these more sophisticated approaches are more resource intensive and require expertise to use and a research-based approach to collect and analyse the required input data.

[47] The 'Assessment and Reliability of Transport Emission Models and Inventory Systems' programme.

More research is required to better understand the potential benefits and requirements of such techniques.

Quality of local data

Use of more local data comes with a price, including the possible wider variability in its quality and associated uncertainties. Meta data refers to the survey techniques ***behind*** the data that is being collected, for example:

- data capture rates / survey sample;
- the data collection protocols followed;
- Quality Assurance / Quality Control evidence; and
- ratification evidence.

The availability of meta-data associated with more local data is critical to the assessor to understand the reliability that can be attributed to its use, and the confidence range that should be associated with decisions made as a result. The collection of local data across a number of local authorities would therefore require a consistent approach to data gathering.

7.2.3 The creation of a DfT carbon tool

To further support the adoption of a consistent approach to carbon appraisal across local authorities, the DfT could consider the development of a basic carbon tool which would provide a consistent means for local authorities to appraise the potential impact of transport interventions on emissions.

The tool could for example be used by all local authorities and Independent Transport Authorities (ITAs) developing an LTP3, and the DfT could provide suggestions as to how the tool could be further refined with the addition of local data, should this be required.

From an operator's perspective authorities are looking for a tool which is:

- clear and easy to use (ability to be operated in-house);
- provides unambiguous outputs which are easily interpreted and which provide an answer to the kinds of questions likely to be generated by those responsible the climate policy in the region; and
- the effort and cost in developing and applying the tool is proportionate to the importance attached to carbon reduction through local interventions.

The tool would probably need to be developed as an interactive database (spreadsheet or web-based). The tool would need to:

- provide clarity on emissions and impacts to be considered (scope definition), ensuring that interventions which might result in additional emissions are recorded and assessed alongside carbon reduction interventions to provide an overall assessment of the impact of a strategy or plan (such as LTP3). This would also potentially allow for displaced emissions to be recorded, for example considering additional emissions attributable to the power sector but due to the take up of electric vehicles or additional rail electrification;
- include a consistent set of assumptions on the impact of proposed interventions on emissions, built on available evidence and updated regularly. Such an approach would help local authorities compare and prioritise competing options. The assumptions would also need to be able to reflect some local characteristics such as the degree of rurality (potentially reflecting TEMPRO area types) as well as potential timescales for implementation and the intensity of implementation;

- be flexible enough to allow local data inputs such as local monitoring and baseline data (for example on fleet composition or speeds), outputs from local models and modified assumptions on the impact of some interventions in specific circumstances where this could be justified;
- be able to work in areas without a local transport model but also be able to include information from local models where available and relevant; and
- include national measures identified by central government and allow for regional and local interventions to be assessed, with their impact identified separately from the impact of national measures to show how local level interventions can make a difference.

7.2.4 Other areas for consideration

National support for local initiatives

Many authorities point to the need for more national support on climate change mitigation for local interventions to deliver savings. This is the case with regard to low carbon vehicles and fuels for example, where central government, and to some degree the regional level, is seen as the main driver for research and development and early commercialisation of low carbon vehicles. This is also true of supporting policies such as regulatory (emission standards) and fiscal (fuel tax) policies.

Many local interventions are identified as requiring the support of national and even European regulation and policies to be able to deliver significant savings in emissions.

Turning engagement into partnership delivery

The need to secure funding to deliver behaviour change interventions led some authorities to argue for improved partnership working across agencies at the regional and local level. As described earlier, some authorities noted that partnership arrangements are currently working well at the strategy development stage but that there were still too few examples of partnership delivery, where agencies agree to pool funding to deliver interventions in support of common objectives.

The implementation of the Local Carbon Framework pilots was seen as a potential step in the right direction with regards to joint delivery. These are at early stages of development, and the role that transport will play is unclear at present.

Some authorities also noted that parts of the local community are organizing themselves and bidding for various pots of funding to deliver their own carbon saving interventions. This was seen as a positive step and local authorities were supporting these initiatives where needed. This could potentially result in the development of a different type of partnership working between the local authority and community groups.

Appendix A - Study methodology

A.1 Desktop review

Purpose

The purpose of the desktop review was to establish the following from each local authority:

- **Goals and public commitments** – what has the authority pledged to do in relation to tackling climate change and reducing CO_2 emissions, especially those relating to transport emissions?
- **Policies and initiatives** – how is the authority planning to meet its goals and commitments?
- **What indicators or targets have been set in relation to transport and carbon reduction and climate change, and how are these being monitored?** Targets could be directly or indirectly related to carbon reduction (e.g. modal shift targets). Other targets might include cross-sector targets, for which the transport sector is seen as a contributor.
- **Carbon tools** – how is the authority monitoring carbon emissions throughout the authority area? How is the authority assessing the impact of proposed transport interventions on emission levels?
- **Examples of good practice** in relation to **reducing CO_2 emissions in transport.**
- **Drivers and barriers** – what drivers and barriers has the authority encountered in addressing climate change and transport? This information may be particularly useful to the DfT in deciding how best to support local authorities.
- **Key contacts and role** – which individuals are identified as being responsible for developing policy and setting targets or the delivery and monitoring of transport interventions? Individuals identified during this phase will be potentially useful contacts for the study team to take forward the second part of the research.

The results from the desktop review were used to inform the choice of local authorities interviewed in the second stage of the research (Task 2.6 in the Figure 1.1). Results from the desktop review and the interviews are presented in Sections 2 to 6.

Approach

Selection of local authorities

At the inception meeting (1st February 2010), the DfT emphasised that the study was to focus on local authorities and it was agreed that 20 authorities would be targeted during the desktop exercise to ensure a comprehensive and detailed assessment of the key issues.

It was decided that activities within metropolitan areas would be considered as a whole, by selecting one area and reviewing relevant documentation available from the constituent Metropolitan Districts as well as the Integrated Transport Authority (ITA) and Passenger Transport Executive (PTE) as a common LTP3 would be prepared for each metropolitan area.

It was also agreed that London authorities would be excluded from the scope of this study, on the basis that they face different challenges and operate in a different legislative environment from the majority of local authorities across England.

The next step was to identify these 20 authorities, considering:

- the need for regional coverage;
- a range of geographies (urban / rural); and
- historic performance in the climate change / carbon emission reduction fields.

Each of the regional Government Offices was contacted, and asked to suggest suitable local authorities in their area. Responses were received from the majority of Government Offices, and combined with local knowledge held within the team to develop the agreed list shown in Table A1.

Table A.1 - Local authorities covered by the desktop review

Number	Local Authority	Type	Region
1	Bristol	Unitary Authority	South West
2	Cambridgeshire	Shire County	East
3	Darlington	Unitary Authority	North East
4	Hampshire	Shire County	South East
5	Herefordshire	Unitary Authority	West Midlands
6	Hertfordshire	Shire County	South East
7	Kent	Shire County	South East
8	Kingston upon Hull	Unitary Authority	Yorkshire and Humber
9	Lancashire	Shire County	North West
10	Leicester	Unitary Authority	East Midlands
11	Norfolk	Shire County	East
12	Northumberland	Unitary Authority	North East
13	Nottingham	Unitary Authority	East Midlands
14	Oxfordshire	Shire County	South East
15	Plymouth	Unitary Authority	South West
16	Poole	Unitary Authority	South West
17	Shropshire	Unitary Authority	West Midlands
18	Warrington	Unitary Authority	North West
19	Worcestershire	Shire County	West Midlands
20	York	Unitary Authority	Yorkshire and Humber

Table A1 shows that at least two local authorities were selected from each of the Government Offices, and that eight Shire Counties and twelve Unitary Authorities were targeted. The desktop review focused upon authorities who were perceived to be progressing well in the fields of climate change adaptation and carbon emissions reduction, and also included those that were seen as potentially under-performing in these areas.

The metropolitan area selected for the study was Greater Manchester. Investigations at the desktop stage focused on the actions of Greater Manchester Passenger Transport Executive (GMPTE) and the Metropolitan Districts as well as initiatives at the regional level (led by 4 North West[48] and the Regional Development Agency).

[48] 4 North West (4NW) is the Regional Leaders Board for the North West of England

Scope of review

Pro-forma

One of the key aspects of the desktop review was to record information in a structured manner. To this end a proforma was created and agreed with the client before the desktop review commenced. A full set of results from the desktop review is included in Appendix B.

Documents reviewed

The desktop review was limited to existing documents and published material. The team reviewed:

- LTP2 documents (including Delivery Reports, Strategic Environmental Assessments);
- Local Area Agreements (and progress reports);
- any LTP3 documents which were publicly available (e.g. Evidence Base, consultation documents or information on the authority website);
- Climate Change Adaptation Plans;
- Climate Change Strategies; and
- any other relevant documents uncovered by the research.

Table A2 shows the documents which were consulted as part of the desktop review.

Table A.2 - Documents reviewed for each authority

Number	Local Authority	LAA (including progress reports)	LTP3 information	LTP2 (including progress reports)	Adaptation Plan (or similar)	Climate Change Strategy	Climate Change Action Plan or evidence base	Other relevant documents
1	Bristol	*	*	*		*		
2	Cambridgeshire	*	*	*		*	*	*
3	Darlington	*	*	*		*	*	
4	Hampshire	*	*	*	*			
5	Herefordshire	*	*	*	*	*		*
6	Hertfordshire	*	*	*		*	*	
7	Kent	*		*	*	*		*
8	Kingston upon Hull	*		*	*	*		
9	Lancashire	*		*		*		
10	Leicester	*	*[49]	*	*	*		*
11	Norfolk	*	*	*		*	*	*

[49] Limited information on LTP3 available in LTP2 Progress Report.

Number	Local Authority	LAA (including progress reports)	LTP3 information	LTP2 (including progress reports)	Adaptation Plan (or similar)	Climate Change Strategy	Climate Change Action Plan or evidence base	Other relevant documents
12	Northumberland	*	*	*	*	*		*
13	Nottingham	*	*[50]	*		*		*
14	Oxfordshire	*	*	*				
15	Plymouth	*		*		*	*	
16	Poole	*	*	*	*			*
17	Shropshire	*		*	*	*		
18	Warrington	*		*		*		
19	Worcestershire	*		*	*	*		
20	York	*	[51]	*	*	*		
21	4NW	*[52]				*	*	*
	GMPTE	n/a		*			*	*
TOTAL		**21**	**12**	**21**	**10**	**18**	**7**	**10**

Both the Local Area Agreement and LTP2 were reviewed for each local authority. Of the twenty authorities, over 50% (thirteen authorities) had some LTP3 information publicly available. Exactly half (ten authorities) had Adaptation Plans (or Local Climate Impact Report, a pre-cursor to a full Adaptation Plan). The majority (seventeen authorities) already had Climate Change Strategies in place, some of which included related Climate Change Action Plans.

A.2 Interviews

Purpose

The aim of the desktop review was to produce a broad evidence base of climate change activity, commitments and monitoring for each local authority covered. The next stage of the study involved interviewing selected authorities to explore in more detail the themes and issues which would emerge from the desktop review.

[50] Not yet at consultation stage, summary information available on authority website.
[51] Consultation online, but needs login to access.
[52] LAA for Manchester City Council has been reviewed.

Approach

Authorities to contact

The following table presents those authorities which were contacted at the interview stage of the study.

Table A.3 - Local authorities to be interviewed

Number	Local Authority	Type	Government Office Region
1	Bristol	Unitary Authority	South West
2	Kent	Shire County	South East
3	Lancashire	Shire County	North West
4	Norfolk	Shire County	East
5	Northumberland	Unitary Authority	North East
6	Plymouth	Unitary Authority	South West
7	Poole	Unitary Authority	South West
8	Shropshire	Unitary Authority	West Midlands
9	Staffordshire	Unitary Authority	West Midlands
10	Worcestershire	Shire County	West Midlands
11	York	Unitary Authority	Yorkshire and Humber

Authorities were selected using the information obtained from the desktop review, bearing in mind the need for a geographical spread and the requirement for a mix of progress towards carbon reduction.

The Director of Transportation at each of the authorities was contacted by the DfT, and asked to nominate individuals to interview. It was believed likely that no one person within each authority will be in a position to answer all of the questions posed by the interviewer, and that a series of interviews or a teleconference would be required to obtain all relevant information.

This invitational email provided a concise summary of the study's aims, and also the areas which the interview would cover (along with an idea of the depth and range of knowledge that would be required). This was to ensure that the most appropriate individuals within each authority were put forward for interview.

Table A.4. shows the interviews that were undertaken:

Table A.4 - Local authority interviewees and interviews undertaken

Local Authority	Interviewees	Interview date
Bristol	David Bishop – Strategic Director Alistair Cox – City Transport Manager	19/03
Kent	Rob Smith, Senior Transport Planner	08/04
Lancashire	Andrew Hewitson – Policy Officer Andrew Coombe – Principal Environment Officer	19/03
Norfolk	Ann Carruthers – Strategy and Policy Manager Louise Cornell – Senior Transport Planner	17/03
Northumberland	Margaret Robinson – Local Transport Plan Coordinator Sarah Brierley – Travel Plan Coordinator Hugh Clear-Hill – Principal Climate Change and Sustainability Officer	24/03
Plymouth	Philip Heseltine – Head of Transport Strategy	18/03
Poole	Ken Pearce – Local Transport Plan Manager Chris Francombe – Transport Policy Manager	16/03
Shropshire	Rachel Strivens – Sustainability Manager Martin Withington – Head of Transportation	18/03
Staffordshire	Clare Horton – Transport Policy Officer	31/03
Worcestershire	Steven Harrison – Transport Policy and Strategy Team Leader Cat Ainsworth – Principal Sustainability Officer	19/04
York	Noel Collings – Sustainability Officer Ian Stokes – Principal Transport Planner (Strategy) Mike Southcombe - Environmental Protection Manager	12/03

Structure of interviews

Interviews were conducted by telephone wherever possible, as the most efficient method of canvassing a large number of contacts. Interviewers were guided by a semi-structured proforma (included in Appendix C), which was agreed with DfT before the interview process commenced.

A semi-structured form was developed as it was felt that the interview process should be relatively fluid in order to create a more natural conversational tone. Questions were grouped by theme. Within each theme there were certain key questions which the interviewer needed to ask, along with other prompts for information should they be required.

Interviews were summarised, and a transcript returned to the interviewee for checking before approved for use in the study.

Where required, follow up calls were undertaken to clarify points raised in the interviews. Extra information was also sent through by authorities where it was identified that this would benefit the study.

A.3 Carbon tools workshop

Purpose

The purpose of the workshop was to build upon the findings of the desktop review and interviews.

The workshop aimed to:

- explore the knowledge and opinions of those present regarding the strengths, weaknesses, relevance and fitness for purpose of the tools they are using or know;
- explore the type of tools that local authorities need for bringing forward low carbon transport interventions, such as for LTP3; and
- discuss the scope for more robust and/or standardised approaches to transport related GHG impact assessment and monitoring.

The emphasis of the workshop was on the practical application of carbon tools, and the existing barriers that are faced by local authorities in their development and use.

One of the aims was to provide a forum for individuals from across local, regional and national authorities to discuss the current issues surrounding the use of carbon tools, and to share information on the latest developments in the field.

The workshop provided a chance for attendees to suggest what further support might be needed from the DfT in the future, to assist carbon reduction at the local level.

Approach

The workshop was held on 15th April 2010 in the DfT's offices at Great Marsham Road, London. Table A5 sets out the agenda.

Table A.5 - Carbon tools workshop agenda

Time	Item
14:30-14:45	Arrivals and introductions
14:45-15:00	**Introduction to the study and emerging findings** Andy Southern - Atkins
15:00-16:00	**Group session 1 - Current approaches** - The need for carbon tools within local authorities - Strengths and weaknesses of existing approaches
16:00-16:15	Break
16:15-17:00	**Group session 2 - Future requirements** - Areas for further research - Barriers to development - Support required
17:00-17:15	Groups report back
17:15-17:30	**Summary and Next Steps**

Attendees were split into two groups, with sessions facilitated by Steven Fraser and Helene Vergereau from the project team (Atkins). Dr David Connolly (MVA Consultancy) and Dr Miles Tight (ITS Leeds), also project team members, participated in the group discussions.

Appendix B - Results of desktop review (see attached spreadsheet)

Appendix C - Interview proforma

This document presents a draft structure for interviews to be conducted by phone with local authority representatives across England for the DfT Local and Regional Climate Change Research Project. Interviews will be conducted in a semi-structured format, with the questions listed here used as a basis for discussions.

Discussions will explore the commitments, actions and monitoring/evaluation process adopted by selected local authorities to reduce carbon emissions in their area. Interviews will focus on the transport sector although information on commitment and initiatives implemented in other sectors can also be noted.

C.1.1 About the person we interview

What is their **name**?

What is their **position**?

How long have they been in this position? Is this a new post?

Which authority/organization do they work for?

Which department/directorate are they based in?

Who do they report to/what is their level of seniority in the organization?

Is **anyone else** in the organization in charge of climate change issues (including adaptation)?

C.1.2 About the organization's commitments to addressing climate change

Is the organization committed to **specific targets** in terms of:

- carbon emission reductions across all sectors for the area?
- carbon emission reductions for the transport sector?
- climate change adaptation?

Ask about LAA (NI185/186/188), LTP2 and 3, Adaptation Strategy, Climate Change Strategy, other relevant strategies

How were the targets set (linked to monitoring and evaluation section of questionnaire)?

C.1.3 About drivers and barriers

What are the **reasons for** the organization to have made these **commitments**?

- linked to national policies and targets (Carbon Budgets, Carbon Reduction Strategy for Transport etc)
- local population and stakeholders through the LSP?
- local members' political commitment?
- any other reasons?

What are the **barriers** to:

- the organization being committed to addressing climate change?
- the organization delivering cuts in emissions?
- the organization adapting to the impacts of a changing climate?

C.1.4 About the organization's actions to address climate change

What has the organization done to reduce carbon emissions from the area so far (across all sectors)?

- any specific actions in the transport sector?
- any actions undertaken in other sectors (such as land use planning) to reduce emissions from the transport sector?

What has the organization done so far to adapt to a changing climate?

Does the organization work in **partnership** on these issues?

- which other organizations are involved?
- what is the role of the city region (where applicable) or Region?

Are any actions considered to be best practice which should be shared with other authorities?

What is the organization **planning to do** to reduce carbon emissions/adapt to a changing climate in the coming years (**LTP3** period)?

C.1.5 About the organization's approach to monitoring and evaluation

How does the authority **monitor its carbon emissions** and check if it is "on target" at present?

- overall?
- for the transport sector?

Reference to Defra data anticipated in majority of cases here but some authorities might refer to local data on person trips, vehicle kilometres, fuel sales.

If the authority has a method separate from the Defra data, additional questions:

- what area does the monitoring cover?
- how is the baseline established?
- where does the data come from?
- what is in scope/measured (emissions from those who live in the area or CO_2 emitted in the area / cars, freight, public transport, aviation, shipping)?
- what assumptions are made?

How does the authority **assess the impact of proposed schemes and policies** on carbon emissions from the transport sector at present?

- qualitative assessment (+/- in a table)
- quantitative assessment (spreadsheet calculations/modelling)

If the authority has a method to undertake quantitative assessments, additional questions:

- what area does the tool cover?
- how is the baseline established?
- where does the data come from?
- what is in scope/measured (emissions from those who live in the area or CO_2 emitted in the area / cars, freight, public transport, aviation, shipping)?

- what interventions can be assessed and what assumptions are made on the impact/contribution of interventions?
- how is counterfactual information taken into account?

How does the authority **plan to monitor emissions** (especially from the transport sector) in the future?

How does the authority **plan to assess the impact** of transport and non-transport interventions on transport emissions in the future (e.g. for LTP3)?

What help or support does the authority require to develop its evaluation and monitoring tools?

Appendix D - Carbon tools summary

Table D.1 - Carbon tools in use

Organization	Tool / approach used	Comments
Bristol	Multi-modal Transport Model + scenario testing database	Outputs from a SATURN traffic model which feed into an emissions scenario-testing database.
Bristol (JLTP Area)	Multi-modal Transport Model + emissions spreadsheet	Outputs from the multi-modal BATS model are used to populate an emissions forecasting spreadsheet.
Cambridgeshire	Trend-based Adjustments	This approach takes the published Defra figures and TEMPRO growth predictions and attempts to quantify the impact of Cambridgeshire's LTP2 programme using assumptions about future changes in the vehicle fleet. This was used to produce 'Do Nothing' and LTP2 CO_2 emissions estimates.
Dorset	Multi-modal Transport Model + emissions spreadsheet/database	Dorset are developing a 'carbon calculator' as part of the South East Dorset Multi-modal Study which uses speed profiles by time period, a freight demand model and emissions profiles used to predict emissions from the multi-modal transport model outputs.
East of England Development Agency (EEDA)	Multi-modal Transport Model + emissions-forecasting database	Outputs from the East of England Regional Transport Model are fed into an emissions-predicting database and uplifted to match published GHG stats
Manchester City Council	EMIGMA	Greater Manchester Transportation Unit (GMTU) maintain an emissions inventory (EMIGMA) covering the ten administrative districts of Greater Manchester. The inventory contains information on the emissions of pollutants identified in the UK's Air Quality Strategy from all identifiable sources in the area.
Merseyside	Merseyside Atmospheric Emissions Inventory (MAEI)	The MAEI is an emission database for the Merseyside region. It provides a structured framework within which emissions information is stored and analysed, allowing comparisons between different emission source types and across the Merseyside local authorities.

Norfolk	Published/ Forecasting Hybrid	This is a bolt-on to the Defra statistics which aims to quantify carbon savings from Park and Ride, changes in vehicle fleet composition, carbon sequestration (through tree planting), car sharing and school travel plans.
Nottingham	Traffic –based monitoring	CO_2 emissions are calculated by monitoring the total volume of traffic on the Greater Nottingham road network and using data from the DfT on trunk roads and motorway traffic, broken down into four vehicle types. These figures are then multiplied by the DfT's average emission factor for each vehicle type to give an overall volume of CO_2 emitted.
Plymouth	PARAMICS	Model covering a 10-12 mile radius from Plymouth City Centre provides both monitoring (via regular updates to model) and forecasting, though it is unclear how changes in mode choice over time are included.
Poole		It is expected that the methodology for monitoring the CO2 emissions from transport in the area will be built into the multi modal transport model that has been developed by Atkins. The multi modal transport model developed by Atkins is expected to be the basis of the future approach to monitoring CO2 emissions from transport in the area under LTP3. This will enable the council to monitor the impacts of future policies and plans.
Shropshire	EST's TRACE used to set targets - approach to monitoring/forecasting	
Somerset County Council	Traffic Model (SATURN) and/or observed traffic	'Work in progress' referred to in WSP's SW Climate Change Assessment Framework report - observed veh kms (from Defra) deemed a more-robust basis than the SATURN model - unclear as to how (if at all) local speed info and future travel demand changes will be incorporated.
Tees valley	Multi-modal emissions database	Baseline and future estimates of CO2 have been aligned with NI186, which is similar to the 'end user' CO2 calculation, but excludes emissions from motorways, rail, shipping, aviation, sources included in the EU-ETS, agriculture and nature. The project outputs include an Excel-based tool for measuring greenhouse gas emissions and calculating greenhouse gas trajectories, with an associated user guide embedded within the spreadsheet. The data in the spreadsheet tool provides a detailed sector breakdown and results by local authority area.

TfL	Multi-modal appraisal spreadsheet	TfL's carbon tool is an Excel-based model which was originally developed to model the impact of Climate Change Action Plans (CCAP). It has since been updated and used to look at effect of ground-based transport policies on long-term CO2 emissions. The tool is used to predict the contribution of CO2 savings from TfL operations towards the overall Mayor's Transport Strategy and CO2 goal of reducing London's CO2 emissions by 30% by 2025.
West Sussex	ESTEEM	Referred to on Barlett School of Planning (UCL)'s ESTEEM website.
York, City of	Defra data, but planning to use TRACE - have used REAP and considered the use of Vantage Point	
Scottish Government	Multi-modal Transport Model + emissions-forecasting database	National Transport Estimates - National Multi-modal model (TMfS) with uplift for missing traffic and ability to change emissions-related assumptions.
Scottish Government	Multi-modal Transport Model + ENEVAL	MVA/SG - Carbon Account for Transport - National Multi-modal model (LATIS) with uplift for missing traffic and ability to change emissions-related assumptions.
Scottish Enterprise	GRIP	Sebastian Carney (Manchester University) is applying a GRIP-based approach to all 32 Scottish LA's.

South West Regional Assembly (Highways)	Traffic Model Forecasts (Strategic Network only) +WebTAG-based emissions factors	Work carried out by Faber Maunsell/Aecomm on behalf of SWRA - referred to in WSP's SW Climate Change Assessment Framework report.
West London Partnership/West London Air Quality Group	TEEM	A grouping of West London Authorities (Brent, Ealing, Hammersmith & Fulham, Harlow, Houndslow, Hillingdon & Richmond Upon Thames) have been making extensive use of TRL's vehicle emissions model (which includes pollutants and GHG) - inputs are currently based on London Air Quality Inventory estimates of traffic flows, but may ultimately use outputs from AECOM's West London Traffic Model.

Table D.2 - Types of carbon tools

Tool identifier	Type	Who / What	How	Comment
Carbon Baseline Tool for Local Authority Estates	Measuring/predicting hybrid			Environment Tools website (with Aether and AQC logos) - 'establishes the amount of CO_2 emissions that a UK Local Authority is responsible for' - website provides link to Carbon Trust - details of the tool are unclear
DECC Local and Regional C02 Emission/ NAEI	Published statistics	All veh kms by vehicle type	Applies emissions per km factors by six classes of vehicle & two fuel types and assumed fleet mix - assumes average speeds	Assumes homogenous fleet/ fuel mix across the UK/Simple average speed assumptions/ matches estimates of fuel sales
EMIGMA	Measuring/predicting hybrid	All traffic using the modelled road network	Outputs from a SATURN model of the area	Reported as an Inventory but can also be used to forecast http://www.gmtu.gov.uk/reports/emigma/GMTUReport1530.pdf

Tool identifier	Type	Who / What	How	Comment
ENEVAL	Predicting Future Emissions	All traffic using the modelled road network	Uses link-based outputs from traffic models to predict C02 using DMRB methodology	Can be used to test alternative fleet assumptions - reliant on the quality of the traffic model
ESTEEM	Predicting Future Emissions	Traffic associated with new developments	Predicts emissions from new developments - more details required	A tool developed by the Barlett School of Planning at UCL for measuring emissions by different transport methods - 'designed to assist Local Authorities in planning new developments in parallel with travel demand reduction strategies
GRIP (Greenhouse Gas Inventory Protocol)	Monitoring/Predicting	Either fuel sales or vehs km	Inventory/published stats, then 'What if' tools	grip.org.uk plus additional info provided by Sebastian Carney at Manchester University
Multi-modal Transport Model	Transport Model	All traffic in the model	Calibrated to current traffic levels and speeds, then predicts changes over time	Variety of add-ons for emissions scenario-testing and uplifting for missing traffic
PARAMICS	Traffic Model	All traffic in the model	Detailed estimates of traffic flows and speeds in modelled time periods	Monitoring and forecasting - unclear how mode-choice etc would be incorporated
REAP - Resources & Energy Analysis Programme (developed by the Stockholm Environment Institute)	Published/predicting hybrid	User can alter over 200 variables, including average distance travelled by residents, and explore their effect on the environmental indicators.	Contains baseline data on the greenhouse gases, air pollutants and ecological footprints for every local authority area. Use scenario editor to explore environmental impact of changes.	JMP used REAP at Yorkshire and Humber Regional Assembly. It's provided to 20 local authority partners, and through the Sustainable Consumption and Production Network (SCP-NET7), to all Regional Assemblies, Regional Observatories, Government Offices and Regional Development Agencies in England.
REEIO - Regional Economy Environment Input Output (maintained	Published/predicting hybrid	Complimentary to REAP, but measures impact of economic	Similar to REAP	

Tool identifier	Type	Who / What	How	Comment
by Cambridge Econometrics)		production rather than regional consumption		
TRACE (Tracking Action on Carbon Emissions)	Published/predicting hybrid	All GHG sectors - transport based on published stats, so vehs kms	Applying predicted savings to published emissions rates, based on the list of actions/initiatives	Created by Aether and the Centre for Sustainable Energy for EST 'to help LAs meet the challenge of NI186') - appears to predict changes in emissions based on recorded actions - more details required
Traffic-based monitoring	Measuring or monitoring relevant local indicator	All traffic using road network	Monitoring local traffic levels and applying relevant emissions factors	
Trend-based Adjustments	Published/ Forecasting Hybrid	Estimates of future veh kms	Applies adjustments to published stats & trends to take account of policy interventions	
Vantage Point	Predicting Future Emissions	All GHG sectors - unclear how transport emissions are predicted	Unclear from web-site how transport-0related emissions are predicted	VantagePoint is a tool developed by Carbon Descent for modelling carbon reduction scenarios over time. It has been designed specifically for local authorities to develop scenarios to inform climate change or similar strategies. (http://www.carbondescent.org.uk/pages/vantage-point.html)