



Transport

Introduction

As the economy grows and becomes more globalised, with more goods and services moving ever greater distances, the importance of transport increases. The recent Eddington Study showed that a good transport network is key in sustaining economic success, linking people to jobs, delivering products to markets and supporting domestic and international trade.

7.1 Transport accounts for around a quarter of UK domestic energy use and emissions of carbon. The majority of the UK's transport greenhouse gas emissions are carbon dioxide and road vehicles are responsible for 93% of this. In addition to the climate impacts of transport, the heavy dependence of the sector on oil at a time when the UK will increasingly rely on imported oil, carries potential consequences for the security of our energy supply.

7.2 The latest DTI projections suggest that, without the further measures included in this White Paper, domestic transport emissions may well continue to rise gradually to 2020²⁴⁶. Longer-term projections suggest there is then some potential for emissions to fall, associated with continued improvements in energy efficiency and greater penetration of more fuel efficient and lower carbon vehicles²⁴⁷.

7.3 There are a range of measures we can now take to address transport's carbon emissions in both the short and longer-term. For transport to reduce its climate change impacts we need to enable smarter, more energy efficient use of transport and we need to reduce carbon emissions by bringing about changes in the types of vehicles and fuels we use. In addition to this, these policies to reduce transport's reliance on oil, diversify transport technology and improve fuel efficiency will also deliver improved security of energy supply.

246 This includes road, rail and freight journeys as well as the aviation and shipping journeys that start and end in the UK. The projections include only firm and funded measures. See DTI: *Updated Energy and Carbon Emissions Projections*, May 2007, <http://www.dti.gov.uk/energy/whitepaper>

247 DTI: *The MARKAL Model in the 2007 Energy White Paper*, <http://www.dti.gov.uk/energy/whitepaper>, and PSI: *Final Report on DTI-DEFRA Scenarios and Sensitivities using the UK MARKAL and MARKAL-Macro Energy System Models*, <http://www.ukerc.ac.uk/content/view/142/112>

7.4 This chapter:

- sets out the potential for emissions reductions in transport for both the near and long-term;
- describes measures to be taken within the UK, the EU and internationally to bring about emissions reductions from transport;
- explains the importance of new low carbon transport technologies and measures to support these; and
- sets out policies which will enable individuals to make smarter, lower carbon, travel choices.

7.5 The biggest potential reductions in emissions from transport will be realised as new technology comes through in the medium to long-term. However, it is important we act now. We want to achieve carbon savings from measures that are cost-effective in the short-term, and to establish the frameworks, market signals and information to secure a more fundamental shift towards environmentally friendly transport in the future.

7.6 We must not forget that the challenge is global. Transport services, vehicles and the fuels that power them are internationally traded goods. It is essential we show leadership through our domestic policies so we can have credibility and influence at an international level.

7.7. The inclusion of international aviation and shipping in the UK inventory would alter our emissions projections. As an illustrative example we expect emissions from UK aviation to grow from 10.2 MtC in 2005²⁴⁸ to between 15.7MtC and 29.1MtC by 2050²⁴⁹, assuming that all domestic and only departing international flights are allocated to the UK. Although emissions from international aviation and shipping are currently not counted against our domestic targets, we are working towards agreement in the UN on how to allocate these emissions to individual nations. Our projections underline the importance of international action to address emissions from these sectors.

Potential for emissions reductions in the Transport Sector

7.8 The Stern Review²⁵⁰ emphasised the importance of urgent and cost-effective action on climate change across all sectors of the global economy, but also noted that:

“Transport is one of the more expensive sectors to cut emissions from because the low carbon technologies tend to be expensive and the welfare costs of reducing demand for travel are high. Transport is also expected to be one of the fastest growing sectors in the future. For these two reasons, studies tend to find that transport will be among the last sectors to bring its emissions down below current levels.”

7.9 As Stern has shown, the potential for significant short-term cost-effective abatement in the transport sector is limited but in the long-term

248 Defra: 2006, <http://www.defra.gov.uk/environment/statistics/index.htm>

249 DfT: *Aviation and Global Warming*, 2006,

www.dft.gov.uk/about/strategy/whitepapers/air/docs/aviationandglobalwarmingreport

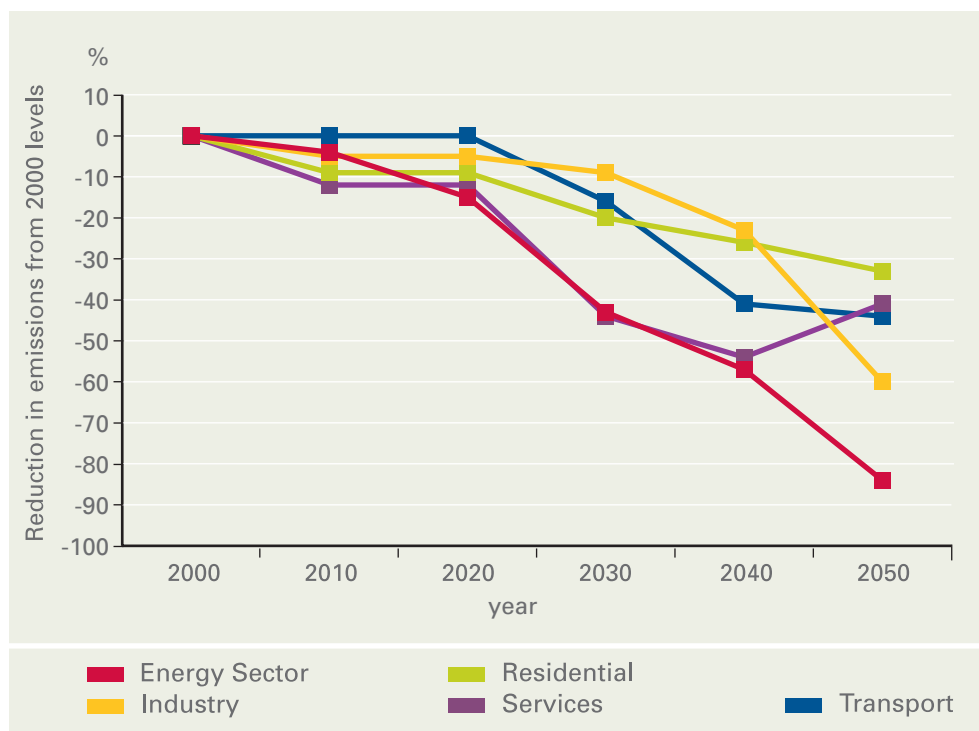
250 See chapter 1 for further details.



it is much higher. Analysis has suggested that, with appropriate measures, reductions of 40-60% from domestic transport are possible by 2050, but as figure 7.1 illustrates these would happen later than in other sectors.

7.10 This does not mean that short-term action to address emissions from transport is not necessary or will have no effect. Indeed existing transport policies, as set out in *Climate Change The UK Programme 2006*, will mean that emissions from transport will be 15% lower in 2010 than if we had not put the programme in place. But it does underline the importance of taking early opportunities to cut emissions while also laying the longer-term foundations for low carbon transport technologies.

FIGURE 7.1. UK MARKAL MACRO CARBON EMISSIONS REDUCTION BY SECTOR – SCENARIO SHOWING LEAST COST ROUTE TO 60% REDUCTION BY 2050.



Source: MARKAL-Macro model. Central scenario, 2030+ trajectory.

Note: Energy Sector includes electricity generation and upstream oil and gas production.

7.11 As set out in the Energy Review Report, the Government is working to tackle emissions from transport by: reducing the carbon content of fuel; reducing the carbon emissions of vehicles; encouraging moves towards more environmentally friendly transport and, where appropriate, using emissions trading.

7.12 Our package of measures seeks to balance the demand for transport and the need for mobility against ensuring that the costs of climate change are met. A variety of mechanisms such as emissions trading²⁵¹ can ensure that an overall environmental objective is achieved cost-effectively to sustain productivity and economic growth, and that transport contributes to our international policy goals.

²⁵¹ See chapter 1 for details on international emissions trading schemes and flexible mechanisms such as the Clean Development Mechanism (CDM).

7.13 Since its publication, the Stern Review has moved the international debate on tackling climate change further forward, and its policy framework is a useful way of presenting and understanding the Government's policies on transport emissions:

- **Carbon Pricing** – through tax, trading or regulation e.g. fuel duty, aviation in EU ETS, the Renewable Transport Fuel Obligation;
- **Technology Policy** e.g. the Low Carbon Transport Innovation Strategy (LCTIS), Voluntary Agreements with manufacturers on new car carbon emissions (VAs);
- **Behavioural Change** e.g. through investment in public transport, fiscal incentives, further development of smarter travel choices, supported by information and communication campaigns, and social research.

Transport policies to tackle climate change

Carbon Pricing – through Tax, Trading or Regulation

7.14 The first part of the Stern Review's policy framework is the principle of carbon pricing, whereby the polluter should meet the full external costs of the emissions they produce. The Eddington Study recommended factoring the carbon costs into prices, which in turn provides an incentive to either be more energy efficient or to invest in low carbon alternatives. The Government will look to use carbon pricing mechanisms across all modes of transport in line with the findings of the Eddington and Stern Reviews, through a variety of means: taxation, trading and regulation. This section sets out the Government's policies in this area.

Including Aviation in the EU Emissions Trading Scheme (EU ETS)

7.15 The Government believes that the best way for aviation to contribute to the goal of emissions reduction is through a well-designed emissions trading scheme. This will ensure that the emissions reductions take place in as cost-effective a manner as possible, enabling emissions reductions to take place within the sector or through the aviation sector paying for reductions in other sectors.

7.16 The Energy Review Report set out the substantial progress that had been made during the UK's Presidency of the EU to include the sector in the EU ETS. Since then the European Commission has published legislative proposals to include aviation in the EU ETS (see Box 7.1 for details). The UK welcomed this and will continue to support the debate in Europe on aviation's incorporation into the EU ETS. Our aim is to ensure its inclusion in a robust and environmentally efficient way, as soon as possible.

7.17 We have now begun working with other Member States on the details of the legislation. To help inform our negotiating position, the Government launched a public consultation on 30 March 2007 and we will continue to consult with industry and international partners as the negotiations progress. Once the legislation has been adopted, we will use our influence to ensure it is implemented appropriately and that the necessary monitoring and reporting structures are in place.

7.18 As part of our ongoing consultation we will consider the potential impact for UK carbon emissions. However, for illustrative purposes, our indicative analysis suggests that, considering the contribution of domestic flights only



and depending on the cap on emissions, the UK could reduce its UK domestic carbon emissions by 0.2-0.4MtC per year by 2020²⁵².

BOX 7.1 EUROPEAN COMMISSION LEGISLATIVE PROPOSAL TO INCLUDE AVIATION IN THE EU ETS

In December 2006, the European Commission published a draft legislative proposal on the inclusion of aviation in the existing EU ETS, to include internal EU flights from 2011 and all flights entering or leaving the EU from 2012. The Government supports a proposal that covers at least all flights departing EU airports, not just intra-EU flights.

The draft legislation proposes to allocate allowances through a combination of benchmarking and auctioning, with the overall number of allowances determined at Community level by reference to average emissions from aviation in the years 2004-2006. The proposal does not directly address the non-carbon emissions from aviation, but the Commission has committed to put forward a proposal to tackle the effects of oxides of nitrogen by the end of 2008.

The Commission's impact assessment for the proposal, based on stabilisation of aviation emissions at 2005 levels, suggests annual EU-wide carbon savings of 12-50 MtC a year by 2020, compared to business as usual emissions levels, depending upon the scope of the scheme. Given some access to project credits (e.g. CDM) the impact of including aviation in the EU ETS on allowance prices is likely to be limited.

Working through the UN

7.19 The Government recognises that for an international industry such as aviation, a global solution is ultimately required. Thus the UK continues to play a leading role in the International Civil Aviation Organisation (ICAO) to find ways of minimising the adverse impacts of aircraft emissions.

7.20 We support the development of an international trading regime through the ICAO and are contributing to work on developing guidance for states who wish to include aviation in emissions trading schemes. In terms of the use of other economic instruments, the UK recognises that provisions such as those exempting aviation fuel from tax are anomalous, and we have been working through ICAO to reach agreement on this matter. The UK is also pressing for the modernisation of the Chicago Convention²⁵³, particularly in relation to security and the environment. The ICAO Assembly in 2007 will be the starting point for work to help equip international aviation with a structure and legal framework that builds on ICAO's good work, whilst taking forward an agenda more reflective of today's world.

252 This is an illustrative estimate of the carbon emissions gap accounted for by UK domestic aviation in 2020 assuming a cap set at 2005 emissions in line with the current Commission proposal. This is based on published DfT carbon emissions forecasts for 2020 under different scenarios and Defra 2005 actual data.

253 The 1944 Chicago Convention established the International Civil Aviation Organisation (ICAO) and is the international treaty that governs civil aviation.

7.21 The UK's policy on aviation was set out in the 2003 Aviation White Paper and subsequent progress report (see Box 7.2).

BOX 7.2 AVIATION

The Future of Air Transport White Paper set out a long-term strategy for the sustainable development of air travel to 2030, recognising growing aspirations to travel as well as the needs of our economy and the need to protect our environment.

A report on the progress of policy commitments was published on 14 December 2006. The progress report confirmed the Government's commitment to ensure that aviation meets the full cost of its climate change emissions. This included the introduction of a new emissions cost assessment to inform decisions on major increases in airport capacity and consider whether the aviation sector is meeting its external climate change costs. The Government will consult on the development of this emissions cost assessment over summer 2007.

Surface Transport in the EU Emissions Trading Scheme (ETS)

7.22 The Energy Review Report committed the Government to engaging with key organisations, the European Commission and other EU member states to ensure that the potential for inclusion of emissions from surface transport in the EU ETS is given serious consideration. The EU ETS is currently being reviewed by the Commission, and the Government has been working to encourage the Commission and other Member States to consider the inclusion of surface transport.

7.23 The inclusion of road transport in the EU ETS could be a cost-effective means of delivering significant carbon savings. This could be done in different ways, but one approach would be to require fuel producers to hold carbon allowances to cover the total amount of carbon emissions resulting from the fuel they sell. The benefits in terms of carbon savings would be highly dependent on a number of assumptions, not least the number of allowances allocated to the road transport sector. The tighter the cap on allowances allocated to the transport sector, the greater the carbon savings but also the higher the costs.

7.24 We will be carrying out detailed analysis of this approach, including further consideration of the potential impacts on UK competitiveness and the price of carbon allowances. The carbon savings arising from the inclusion of road transport would depend on the number of allowances allocated to the transport sector. For instance, analysis we have conducted for this White Paper suggests that if the cap was calculated on the basis of a 2-5% under-allocation to the transport sector, this could save in the region of 1-2MtC in 2020.



7.25 Taking this work forward we reaffirm the policy we set out in *Climate Change: The UK Programme 2006* and the *2006 Energy Review Report* that an EU-wide approach is preferred to address emissions from surface transport.

Fiscal Measures

7.26 When deciding which policy is most appropriate in addressing environmental challenges, the Government must use the most effective instrument, for example, regulation, voluntary agreements or fiscal measures. The Government set out details of how environmental policy should be developed in HM Treasury's 2002 publication, *Tax and the environment*.

7.27 The Government has already demonstrated its willingness to use fiscal measures to contribute to achieving its environmental goals in transport:

- fuel duty is a tax on vehicle use, sending a clear environmental signal to motorists that driving less fuel efficient vehicles will be more expensive;
- in 2002, Company Car Tax was reformed to make it carbon-based; and
- Vehicle Excise Duty (VED) was reformed so that from March 2001 it became graduated by carbon emissions. Budget 2006 reduced vehicle excise duty for the lowest emission cars to zero. The UK's VED structure has been recognised by others as a template to follow with recent announcements by both the German and Portuguese governments on their intention to re-structure their equivalent VED taxes to reflect the carbon emissions of vehicles.

7.28 Coupled with these initiatives to encourage the use of more fuel efficient vehicles, there are also duty incentives for motorists to use alternative fuels such as road fuel gases, and biofuels.

7.29 Budget 2007 announced further measures in support of the Government's objective to address the environmental impacts of transport. The announcements included:

- raising fuel duty by 2 pence per litre from October 2007, to be followed by a 2 pence per litre increase in 2008, and a 1.84 pence per litre increase in 2009;
- increasing vehicle excise duty for the most polluting cars (graduated VED band G) to £300 this year, rising to £400 next;
- cutting vehicle excise duty for graduated VED band B cars to £35 per year; and
- extending the 20 pence per litre duty differential for biofuels to 2009-10, which, alongside the Renewable Transport Fuel Obligation, will mean a 35 pence per litre incentive in that year.

7.30 Based on the principles of policy already established, we will continue to examine how fiscal and other policy instruments can achieve our aims.

Biofuels and the Renewable Transport Fuel Obligation (RTFO)

7.31 The use of biomass to produce biofuels for road transport has significant scope to deliver carbon savings as well as other environmental, social and economic benefits. For this reason, the Government announced in November 2005 that it would introduce a Renewable Transport Fuel Obligation (RTFO) to require transport fuel suppliers to ensure 5% of total fuel sales are from renewable sources by 2010/11. This represents around 2.5 billion litres of fuel per annum and is expected to come almost entirely from biofuels. We estimate that at this level, the RTFO will save an estimated 1 million tonnes of carbon each year, the equivalent of removing around 1 million cars from our roads²⁵⁴.

7.32 As confirmed by Budget 2007, the RTFO will be the UK's primary mechanism to develop a healthy market for transport biofuels, as well as delivering the objectives of the EU Biofuels Directive²⁵⁵. Alongside the RTFO the Government offers a 20 pence per litre duty incentive on biofuels, which will be maintained until at least 2009-2010.

7.33 The Government made clear in the Energy Review Report that it intends to increase the level of the RTFO beyond 5% after 2010/11, provided certain conditions are met:

- confidence that the biofuels will be produced in a sustainable way, so that they deliver the maximum practicable carbon savings with the minimum practicable adverse environmental impact;
- certainty that the use of blends of biofuel higher than 5% will not lead to mechanical problems, particularly for owners of older cars which were not designed to run on such mixtures²⁵⁶; and
- confidence that the costs to consumers will be acceptable, both in terms of fuel prices at the pump, and in terms of wider economic impacts, including for example the impacts on food prices and other industries which make use of similar feedstocks.

7.34 The Government published a further consultation on the details of the RTFO on 22 February 2007²⁵⁷. This consultation seeks views on both the detailed implementation of the 5% obligation in 2010, as well as issues relating to the future evolution of the RTFO including appropriate levels of future targets.

7.35 Before increasing the level of the RTFO beyond 5%, the Government will want to be satisfied that this would represent an effective use of our biomass resources. We estimate that, should the Obligation be raised to 10% by 2015 subject to the conditions above being met, then the UK could save

254 This estimate takes into account emissions from the production and processing of biofuels that are produced overseas but used in the UK. However, these emissions will also be counted in other countries' emissions inventories. Consequently the reduction to be made against the UK's national inventory as reported to the UNFCCC is 1.6MtC.

255 More information on the EU Directive can be found at: http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_123/l_12320030517en00420046.pdf

256 The European Committee for Standardisation is the group responsible for technical specifications of fuels to be used in cars and lorries across Europe. They are currently looking into the technical difficulties of introducing biofuel blends above the current 5% limit to the existing and ageing vehicle fleet.

257 Details of the consultation can be found at www.dft.gov.uk/consultations/open/drafttrfo/



up to a further million tonnes of carbon a year by 2020²⁵⁸. However, alternative uses of biomass include substitution for fossil-fuels in the generation of electricity and heat, as well as applications in the oleo-chemical industry²⁵⁹. These can often deliver greater carbon savings at lower cost than using biomass to produce high quality transport fuel.

7.36 The role of transport biofuels is considered further in the Government's Biomass Strategy²⁶⁰, which is published alongside this White Paper. In addition, the Government is also exploring ways to broaden the use of biofuels, and has facilitated pilots to explore other uses such as in trains.

7.37 Biofuels also form a part of the EU's climate change and energy policy. In March 2007, the European Council agreed, amongst other things, a binding target of a 20% share of renewable energies in overall EU consumption by 2020. This applies to electricity and heat as well as biofuels. The agreement also commits the EU to a binding target of reducing greenhouse gas emissions by 20% by 2020 and by 30% in the context of international action. The Commission has been asked to bring forward detailed proposals for each Member State's contribution to the overall EU targets. After a decision has been reached, and each Member State has agreed its contribution, we will bring forward appropriate policies to deliver the UK's share.

7.38 The European Council agreement recognised the need to satisfy the conditions referred to in paragraph 750. The agreement includes the cost-effective introduction of a 10% by energy content biofuels target by 2020, subject to production being sustainable, second-generation biofuels becoming commercially available and the Fuel Quality Directive being amended accordingly to allow for adequate levels of blending. The UK will continue to work closely with European partners in developing these initiatives further. In particular, we shall need to respond to the Commission's proposals for revising the Biofuels Directive and for implementing the EU biofuel targets.

Technology Policy, Research and Development

7.39 The Stern Review notes that a carbon price alone might not be enough to overcome the market failures in research and development (R&D) and that therefore technology policy will have a role to ensure there is sufficient low carbon innovation, including in the transport sector.

258 Illustrative analysis that does not prejudge later UK decisions on the appropriate level. Estimate represents a 10% Obligation by 2015 under central oil price assumptions, and is additional to carbon savings from a 5% Obligation by 2010. This estimate takes into account emissions from the production and processing of biofuels.

259 Oleo-chemicals are chemicals derived from biological oils or fats.

260 The Biomass Strategy will be published alongside the White Paper and can be found at <http://www.defra.gov.uk/environment/climatechange/index.htm>

Successor to EU Voluntary Agreements on new car fuel efficiency

7.40 The Government recognises the need to provide clear market signals that incentivise industry to innovate and develop more environmentally friendly transport technology. Given the international nature of the automotive industry, our focus is to drive change through the EU. To this end we will continue to work with the European Commission and other interested parties on developing successor arrangements to the current Voluntary Agreements on new car fuel efficiency, which expire in 2008/9.

7.41 In September 2006 the Department for Transport (DfT) published a discussion paper on policy options to replace the Voluntary Agreements²⁶¹. Whilst the responses broadly recognised the progress made so far under the Voluntary Agreements, concern was raised about the slowing rate of progress and the likelihood of the targets not being met. There was therefore considerable support for moving to a mandatory system to replace the Voluntary Agreements. It also pointed to further issues that needed resolving before a final decision could be agreed, for example potential costs, possible benefits of trading and the way fuel efficiency targets are structured.

7.42 On 7 February 2007, the Commission published a Communication on the review of the Community strategy to reduce carbon emissions from passenger cars and light commercial vehicles. The Communication confirmed that the Commission intends to bring forward a legislative proposal to reach an average new car fuel efficiency target of 130 grammes of carbon dioxide per kilometre (gCO₂/km) by 2012, representing an improvement of around 30% over 1995 levels. Further carbon savings are to be delivered by a range of other measures, such as the use of gear shift indicators and tyre pressure monitoring systems, leading to an overall target of 120gCO₂/km by 2012. The Government welcomes the Commission's intention to bring forward a legislative framework and supports a move to demanding mandatory fuel efficiency targets. Subject to understanding how the targets will be implemented and subsequent impact assessment, the Government is supportive of the Commission's proposals. However, it is our view that the proposals should also set out a longer-term strategy for improving vehicle fuel efficiency. The Government announced in Budget 2007 that its longer-term objective is that average new car emissions be reduced to 100gCO₂/km.

7.43 There is a lot of further work to be done before any final decisions are taken, including on the appropriate level of the fuel efficiency target and how that target should be implemented. Final decisions will be subject to full and open consultation with interested parties.

7.44 The Government believes it is essential that the legislative framework enshrines certain key principles:

- **Clarity and accountability** so all parties are clear what is required to ensure effective delivery and monitoring;

²⁶¹ The summary of the responses can be found on the DfT website at: <http://www.dft.gov.uk/consultations/closed/reducingnewcarco2emissions/>



- **Cost effectiveness** of different regulatory approaches on fuel efficiency will have different costs and benefits. Greater flexibility will often ensure greater cost-effectiveness;
- **Environmental effectiveness** to ensure achievement of the stated environmental objectives;
- **Comprehensive scope** by applying the framework to all new vehicles sold in the EU regardless of place of manufacture, and also seeking to ensure further progress in fuel efficiency across all market segments; and
- **Proportionality** via thorough impact assessment, with particular attention given to setting appropriate targets and timescales.

7.45 We will continue to work with the Commission, other Member States and all interested parties with the objective of securing a Europe-wide regulatory regime that is compatible with these principles. We are optimistic that a satisfactory framework will be delivered. Our analysis suggests that in the UK we could save 1.8-4.1MtC per year by 2020, depending on the extent of fuel efficiency improvements we achieve²⁶².

7.46 This has the potential to be one of the Government's biggest interventions to tackle transport emissions. We will therefore push for an ambitious and realistic long-term target that recognises the importance of tackling climate change and of giving industry a clear signal to develop and implement new technologies.

7.47 To achieve the kind of fuel efficiency improvement outlined above will require considerable innovation. The private sector will need to sustain and enhance its investment in vehicle technologies to improve their environmental performance, the Government needs to provide the frameworks that support and stimulate this investment, as well as encouraging a successful entry to market of low carbon technologies.

Low Carbon Transport Innovation Strategy

7.48 The Government announced in the Energy Review Report last year that it would develop a Low Carbon Transport Innovation Strategy (LCTIS). Development of the strategy reflects the important role that new technology will play in delivering carbon reductions in the transport sector over the long-term. The strategy, published alongside this White Paper²⁶³, assesses where Government intervention is most usefully focussed and sets out a wide range of actions Government is taking to encourage innovation and technology development in lower carbon transport technologies.

7.49 Industry already spends a great deal on research and development (R&D). For example the big automotive manufacturers spend several billion dollars per year. However only a small proportion of this goes on riskier, less developed low carbon R&D. A key role for Government is therefore to stimulate investment in a broader range of R&D activities, including nearer and further from market options. Essential to this will be the use of regulatory

²⁶² Illustrative estimate reflecting annual improvements in new car fuel efficiency of 1.5%–3.6% p.a. Actual efficiency improvements will depend on the level of target set at EU level and application in the UK.
²⁶³ DfT: *Low Carbon Transport Innovation Strategy*, <http://www.dft.gov.uk/pgr/scienceresearch/technology/>

frameworks such as carbon pricing and fuel efficiency standards, but also Government funding aimed at accelerating the development and market penetration of new lower carbon technologies.

7.50 Accordingly:

- DfT will contribute an additional £5 million per annum to the low carbon transport theme of the Energy Technologies Institute²⁶⁴ – ensuring transport is at the heart of the Government's strategy to accelerate the development of secure, reliable and cost-effective low carbon energy technologies;
- in conjunction with the Technology Strategy Board (TSB), DfT and EPSRC will help finance and develop a new Low Carbon Vehicle Innovation Platform²⁶⁵ providing critical coordination and up to £30 million of support from 2008/09 for UK technology research aimed at accelerating the development of relevant technology. Assuming the Innovation Platform develops successfully we would envisage extending the programme to run over a number of years;
- with initial funding of £20 million, DfT will develop a new programme of public sector procurement to promote and support low carbon vehicle development, including small fleet demonstrations to provide early markets for new innovative lower carbon vehicle technologies; and,
- to ensure that Government leads by example we have set a fleet average car procurement target of 130gCO₂/km by 2010/11 for new cars purchased by Government and used for administrative operations. We will keep the target under review and look to extend the scope of this target following further analysis.

Low carbon innovation in the road sector

7.51 The road sector is the largest source of carbon emissions from transport in the UK. In developing the LCTIS the Government asked consultants E4tech to examine how the innovation system was functioning for some of the key technologies²⁶⁶.

7.52 E4tech's work highlights a range of technologies that have, in combination, the potential to make a significant contribution to carbon reduction. These technologies include more advanced versions of hybrids, including "plug-in" hybrids, fully electric vehicles, second generation biofuels, and hydrogen fuelled vehicles, whether powered by an internal combustion engine or a fuel cell. The steps outlined above will help more of these options become commercially and technologically viable. However, the success of hydrogen or electricity based technologies in delivering low carbon transport will rely heavily on the UK's future electricity generation mix, discussed in Chapter 5.

264 See chapter 6 for more information on the Energy Technologies Institute (ETI).

265 Innovation Platforms are schemes designed to bring Government and funders together with the business and research community in order to address a major market driven and societal challenge. Existing Innovation Platforms include work on intelligent transport systems and services, in the context of road congestion. More information can be found at:

http://www.dti.gov.uk/innovation/technologystrategy/innovation_platforms/index.html

266 E4tech: *A Review of the UK Innovation System for Low Carbon Road Transport Technologies*, March 2007, is being published alongside the LCTIS and is available in full at <http://www.dft.gov.uk/pgr/scienceresearch/technology>



7.53 Finally, Budget 2007 announced a review, to be led by Professor Julia King and Sir Nicholas Stern, to examine the vehicle and fuel technologies which over the next 25 years could help decarbonise road transport. This will identify options for moving towards the Government's longer-term objective to reduce average new car emissions to 100gCO₂/km. The review will report its initial findings at the time of the 2007 Pre-Budget Report.

Low carbon innovation in other sectors

7.54 While the road sector currently accounts for the bulk of emissions from the transport sector, rail, shipping and aviation also contribute significantly.

7.55 For aviation the Government is already providing around £45 million per year, match-funded by industry, for the National Aerospace Technology Strategy (NATS) to help develop the technologies to maintain UK competitiveness in aerospace. This is in addition to the £5 million that is being provided for the OMEGA project (Opportunities for Meeting the Environmental Challenges of Growth in Aviation) looking at radical options to mitigate the climate impacts of aviation. The EU Framework Programme 7, commencing this year, will also provide significant aerospace backing, including a major new Clean Sky Joint Technology Initiative combining EU and aerospace industry funding.

7.56 In the rail sector the Government is working in a number of ways to improve environmental performance. Examples include implementing regenerative braking, optimising the rail network for energy efficiency, trialling hybrid trains, and considering the longer-term role that hydrogen fuel cells could play. In addition the Government is setting challenging targets for train mass reduction and energy efficiency improvement for new trains and is requiring flexibility to be built in, so that the cost of installing future new technologies such as fuel cells will be minimised. The Government is reviewing the case for further electrification of the network taking account of environmental, economic and affordability issues. It will set out its conclusions on this and rail's broader environmental performance in the long-term rail strategy to be published in summer 2007.

7.57 Though an efficient way to move bulk freight, shipping represents a growing source of carbon emissions. The Government commissioned AEA Energy & Environment and Newcastle University to advise on technology options available to improve the environmental performance of shipping²⁶⁷. Technologies identified include biofuels and sky sails, as well as technologies to improve the fuel economy of commercial shipping. Over time, carbon pricing approaches should be extended to the shipping sector as well as other modes of international transport. To further this aim, the UK is contributing to an International Maritime Organization work plan to identify and develop the mechanisms needed to achieve the limitation or reduction of carbon emissions from international shipping. At the same time, the UK will consider the potential scope for regional emissions trading schemes and other economic instruments that may prove effective.

267 AEA Energy and Environment: *Low Carbon Commercial Shipping*, February 2007, <http://www.dft.gov.uk/pgr/scienceresearch/technology>

Encouraging Behavioural Change

7.58 The Stern Review noted that a third important dimension to the policy framework required to reduce emissions is to enable people to adopt low carbon behaviours. The policies presented below are aimed at achieving this through raising awareness of the issues and identifying and removing barriers to behavioural change.

Promoting the use of Public Transport

7.59 As highlighted in the Energy Review Report the Government recognises the important role public transport has to play in reducing emissions. This is why we are putting record amounts of investment into public transport to give people a real alternative to using their cars. As a result, the UK now has the fastest growing railway in Europe²⁶⁸ and more journeys are now being made on the network than at any other time in the last 60 years.

7.60 As part of this commitment to providing real alternatives to the car, local and central Government are now spending around two and a half billion pounds a year to provide bus services. The Government is also extending the scope of Concessionary Bus Travel across England, guaranteeing everyone aged 60 and over and disabled people, free off-peak travel on all local buses anywhere in England from April 2008.

7.61 Availability of bus travel is increasingly important for giving people choice and encouraging greater use of lower-carbon transport. In December 2006 the Government published proposals for a modernised national framework for bus services, in *Putting Passengers First*²⁶⁹. These proposals, along with other measures to help tackle congestion and improve public transport, will be included in a draft bill which is due to be published shortly.

7.62 *Putting Passengers First* also highlighted the potential case for refocusing bus subsidy to provide a more direct linkage with the Government's priorities of tackling congestion, improving the environment and accessibility. The DfT is considering these issues further with interested parties, including the scope for refocusing the current subsidy based on fuel consumption into one which is more directly linked to performance and environmental outcomes.

7.63 In addition to the investment outlined above, the Government has also earmarked up to £200 million per year from the Transport Innovation Fund to support packages of measures that combine demand management such as road pricing, with modal shift, smarter travel choices and better bus services²⁷⁰. Already ten areas have been awarded more than £14 million of pump-priming funding to support the development of proposals. The first bids are expected to be submitted in July 2007. These proposals are expected to reduce carbon and other emissions by improving services and reducing road congestion.

268 DfT: *Ten-year European Rail Growth Trends: A study by the Association of Train Operating Companies*, [http://www.atoc-comms.org/admin/userfiles/](http://www.atoc-comms.org/admin/userfiles/Ten%20Year%20European%20Rail%20Growth%20Trends%20July%202006.pdf)

Ten%20Year%20European%20Rail%20Growth%20Trends%20July%202006.pdf

269 DfT: *Putting Passengers First*, <http://www.dft.gov.uk/pgr/regional/buses/secputtingpassengersfirst>

270 DfT: *Transport Innovation Fund*, <http://www.dft.gov.uk/pgr/regional/tif/>



Smarter Travel Choices

7.64 The Government has put in place a substantial programme to promote changes towards more sustainable patterns of travel behaviour using a range of measures collectively known as Smarter Choices. These include workplace, school and personalised travel planning, travel awareness campaigns and marketing and offer great potential to reduce congestion and carbon emissions.

7.65 Local authorities are the key delivery agents for using Smarter Choices, primarily through the land-use planning system and as part of their 5 year Local Transport Plans (LTPs). The Government is also supporting the work of the new National Business Travel Network to encourage more businesses to develop voluntary travel plans which can reduce car use to the workplace.

7.66 By 2008, the Government will have provided over £100 million of support for its *Travelling to School* Initiative. The initiative's objective is to ensure every school in England has an active travel plan in place by 2010. The funding includes £7.5 million each year to fund a network of 250 local authority based travel advisers to work with schools and help them develop and implement school travel plans. By summer 2007 over 50% of schools in England are expected to have an approved school travel plan and more than £70 million in small capital grants will have been allocated.

7.67 In March 2007 the DfT announced the results of its new scheme to encourage more primary school children to walk to school through "walking buses" or alternative walking initiatives. There was an extremely good response with more than 3,200 primary schools in England (more than 1 in 6) being awarded a grant. As a result, we expect to see the number of walking buses across England triple, with significant health, environmental and congestion benefits. The Government has also published *Walking and cycling: Links to Schools*, which promotes to local authorities the success and achievements of linking residential areas to schools via the National Cycle Network, helping to demonstrate the possibilities and potential of active travel.

7.68 As set out in the *Energy Review Report* the Government has a continuing commitment to promoting active travel, encouraging people to view cycling and walking as viable alternatives to the car. The Government doubled Cycling England's budget in June 2006. And we have now begun the national roll-out of *Bikeability*, the new standard for cycle training, taking cycling proficiency into the 21st Century. The on-road element to this training will provide greater reassurance about safety to parents and children, and so further increase cycling.

7.69 We will continue to assess the potential of Smarter Choices measures with ongoing programmes such as the Sustainable Travel Towns initiative²⁷¹, to provide further evidence of the benefits, and guidance to others on how to implement such measures. Although not complete, initial results are promising, and show that in the target population area, public transport use

271 DfT: *Sustainable travel demonstration towns*,
<http://www.dft.gov.uk/pg/sustainable/sustainabletraveldemonstrati5772>

has increased by over 10%, with car use among the targeted population decreasing by a commensurate amount.

Raising Awareness – Communications Campaign

7.70 Building on our strategy to improve the overall environmental performance of transport we are also keen to raise awareness amongst motorists of what they can do to help reduce emissions. The scope for reductions from individual motorists taking action is considerable. For example, if everyone purchasing a brand new car chose the most fuel efficient car within its class and price range, carbon emissions from new cars could be reduced by 24%²⁷². If all drivers in the UK adopted smarter driving techniques carbon emissions from the fleet could be reduced by around 8%²⁷³.

7.71 To promote these benefits, a consumer-facing communications campaign has been developed to cover smarter driving and new car purchasing. The Smarter Driving strand was launched in March as the first part of the Government's *Act on CO₂* brand. The campaign will be rolled-out over the coming months and will include advertising on Television and radio, in national and motoring press, as well as on-line activity targeted at drivers and new car purchasers.

7.72 The Smarter Driving strand of the campaign focuses on existing car drivers and complements the work of the Driving Standards Agency (DSA) to include eco-safe driving in the L-test for all new drivers from 2008²⁷⁴. Advice and training on eco-driving for van and HGV drivers is already provided through DfT's SAFED (Safe and Efficient Driving) programme.

7.73 The car purchasing element of the campaign will build on the introduction in 2005 of the colour-coded fuel economy label for new cars, linked directly to Vehicle Excise Duty (VED) carbon emissions bands now found in the majority of new car showrooms.

7.74 We are also making information available to consumers about the carbon impacts of their journeys through our award-winning journey planner Transport Direct²⁷⁵. Currently, information is available on the carbon impact of car journeys. By Summer 2007 we will launch a service that compares the relative carbon impacts of different travel modes.

Other measures

7.75 In freight, the Government's Sustainable Distribution Fund successfully encourages efficient operating practices in the logistics and haulage industry, in addition to the Government freight grant scheme to encourage the use of rail and water freight instead of roads. Together these deliver the Government's strategy to reduce the environmental impact of freight by minimising the number of vehicles in use and the impact of the remaining vehicles.

272 This is based on 2005 registration data and WhatCar? classifications.

273 This is based on trials undertaken by the Driving Standards Agency (DSA). The fuel cost saving is calculated using fuel prices taken on 5/1/2007. The carbon emissions were calculated using 2005 car and taxi fuel sales figures from *Transport Statistics Great Britain 2006*.

274 Smarter or Eco-Safe Driving is a style of driving that helps the environment by reducing fuel consumption and emissions whilst contributing to road safety.

275 DfT: *Transport Direct*, <http://www.transportdirect.info>



7.76 Effective planning policies can help shape the places in which we live and work to promote sustainable patterns of development and economic growth. Influencing the location and design of new development can reduce the need to travel, particularly by car, minimising transport energy demand and impacts on the environment and climate change. The Government recently sought views on a supplement to *Planning Policy Statement 1 (PPS1): Delivering Sustainable Development*. The consultation document *Planning and Climate Change* sets out how spatial planning should contribute to reducing emissions, including consideration of the transport impacts. Further details are available in chapter 8.

7.77 Aviation carbon offsetting, whilst not a substitute for the Government's wider policy on aviation, is a valuable complementary measure to raise awareness and enable the public to mitigate the impacts of their travel. The Government has taken the lead, introducing an offsetting scheme for all ministerial and official air travel. The scheme is expected to offset up to 100,000 tonnes of carbon dioxide annually. The Government has also recently consulted on a Code of Best Practice for offsetting to ensure that schemes offer a robust and verifiable service for consumers.

7.78 To ensure that the policies outlined above take account of public attitudes and are targeted in the most appropriate way, we are also conducting research to improve our understanding of the key issues affecting public attitudes and travel choices. The DfT has embarked on a long-term programme of social research that will provide an in depth understanding of public engagement with climate change issues and transport.

Conclusion

The combination of these policies means transport can contribute to a substantial reduction in carbon emissions

7.79 This package of savings is consistent with Stern's recommendations, and includes policies to reduce emissions from transport in the short-term, affect behaviour change into the medium-term and bring on the required technologies in the longer-term for transport to make a significant and meaningful contribution to the UK's climate change goals.

7.80 Our objective to secure a regulatory regime to improve the fuel efficiency of new cars will further reduce carbon emissions in the Transport sector by 1.8-4.1MtC per year by 2020. If the above conditions were met then the Road Transport Fuel Obligation would be raised beyond 5% by 2010. If, for example, it were to rise to 10% by 2015, the UK could reduce carbon emissions by up to a further 1MtC a year by 2020. Further reductions can also be expected from the aviation sector. For example, if aviation were included in the EU Emissions Trading Scheme on similar terms to those indicated in the Commission's proposal, then we could expect to see reductions from UK domestic aviation in the region of 0.2-0.4 MtC a year in 2020²⁷⁶. These policies

²⁷⁶ This figure does not include any savings resulting from including international aviation in the EU ETS, the impact of which on the UK inventory will only be quantifiable when agreement is reached on how to allocate responsibility for such emissions. It is also worth noting that in 2005 domestic aviation accounted for only 0.4% of the UK's total carbon dioxide emissions.

could therefore have a total impact on UK carbon emissions of 2.0-5.5 MtC a year by 2020, and so ensure that the growth in domestic transport emissions is counteracted.

7.81 In addition to these we would expect further savings from our policies to encourage behaviour change and promote technology development. For example, although more difficult to quantify, improvements to public transport, encouraging people to make more sustainable travel choices and fleet programmes to demonstrate the potential of new technologies will help reduce carbon emissions. Finally, we have set out that we will continue to investigate the costs and benefits of including surface transport in the EU ETS. Much depends on the detail of how such a scheme was designed, but our initial analysis suggests that it could reduce UK carbon emissions by around 1-2MtC per year by 2020.

7.82 The scale of the challenge facing transport is considerable, and success will rely on all parts of society playing their part: individuals, businesses, Governments and international organisations such as the EU and the UN. If we are to succeed we need to secure modern, efficient and clean transport systems that allow businesses to operate effectively, goods to be transported efficiently and people to access services and make the most of their leisure time, all of which needs to be achieved whilst meeting our environmental objectives.

TRANSPORT: SUMMARY OF MEASURES

We will:

- **continue to support the European Commission's recent proposal to include aviation in the EU Emissions Trading Scheme (EU ETS);**
- **support a move to demanding mandatory fuel efficiency targets for new vehicles and lead efforts to ensure that the inclusion of surface transport in the EU Emissions Trading Scheme is given serious consideration;**
- **deliver around 1 million tonnes of yearly carbon savings through the Renewable Transport Fuel Obligation and consider the future evolution of the obligation in the light of consultation responses and the EU biofuels targets;**
- **invest in low carbon technologies through the Energy Technologies Institute, help support new vehicle technologies through a new initiative with the Technology Strategy Board, and use public sector procurement to assist in fleet demonstrations of new technology; and**
- **encourage changes in behaviour to reduce emissions from transport, through fiscal incentives, further development of smarter travel choices and consumer communications campaigns.**

The combination of these measures could produce yearly domestic carbon savings of 2.0-5.5 MtC in 2020.