

# Foreword by the Secretary of State



We have to plan for the future and look ahead at the pressures we know we will face over the next 20 to 30 years. People are travelling more and they will want to continue to do so in the future. As we become more prosperous, lifestyles will continue to change and horizons expand. At the same time we all want a higher quality of life which includes a decent environment.

The challenge for all of us is how we balance these competing aspirations. To enable people to travel and to do that in a way that is consistent with our environmental and social objectives.

This paper is published in parallel with the Government's response to studies of some of the most important travel corridors and travel areas in the UK. The studies announced today and in the past year included:

- travel between the North Midlands and Manchester
- travel in and around the M25
- travel on the M1 corridor
- travel between London and the South West and South Wales
- travel in the Tyneside area
- travel in South and West Yorkshire.

The studies examined the current, and projected, transport problems in each area, in particular congestion and accessibility.

The aim was to find sustainable solutions, without prejudging the relative contributions of different modes of travel (car, bus, coach and train), and also to test the scope for alternatives to travel (whether from different patterns of land use, or technology). Nineteen studies had reported by March 2003. By the end of 2002, the Government had made announcements relating to eight of these, and a summary of the Government's decisions on these studies is set out in Annex A. Today's announcement covers the remaining 11. Two further studies will report in the next year.

Each of the studies has found potential gains from improvements to public transport, and from measures which encourage alternatives to travel. This supports the policies underpinning the Government's 10 Year Plan for Transport. A summary of what is being done in these areas is set out in Chapter 2.

The studies also recommended measures to improve the effectiveness of our current road networks. This is an area in which the Government has, in parallel with the studies, also been developing policy and making changes in practice, as set out in Chapter 4.

Road transport can have a significant effect on the environment, and there will continue to be a strong presumption against schemes that would affect significantly environmentally sensitive sites, or important species, habitats or landscapes. But it is clear, as recommended in almost all the studies, that additional road capacity needs to be part of the solution, in reducing both congestion and the environmental consequences of congestion. In making such recommendations, the studies also recommended ways to “lock in” the benefits of additional capacity, rather than let the increase in speeds and improved reliability be eroded by the increase in traffic. These recommendations covered both physical demand management measures, such as limiting access to busy motorways, and measures which charge road users in order to limit demand for otherwise congested roads. These choices are set out in Chapter 6.

This discussion paper is a contribution to the overall review and roll forward of the Government’s 10 Year Plan for Transport, due to be completed next year. While recognising the crucial contribution of public transport, and policies to promote alternative travel arrangements, the document focuses on the strategic issues we face on our roads. It should be read alongside:

- the Progress Report on the 10 Year Plan, published in December 2002, *Delivering Better Transport*
- the Strategic Rail Authority’s Strategic Plan, published in January 2003
- the Government’s consultation on airports capacity
- *Transport 2010 – Meeting the Local Transport Challenge*, issued in March 2001
- the latest progress report, published jointly by HM Treasury, Department for Transport (DfT) and H M Customs and Excise in May of this year, on implementation of the distance-based road user charge for lorries.

Infrastructure improvements and technological change take time. We are looking over a long period. However, we need to plan now for the pressures we know we will face over the next 20 to 30 years.



The Rt. Hon. Alistair Darling MP  
Secretary of State for Transport

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# Executive summary

## Foreword

This paper sets out the challenges we will face over the next 20 to 30 years, in company with other developed nations, in providing opportunities to travel, as the economy grows, while taking account of the impact on the environment. It is clear that we cannot continue to try to build our way out of all the problems we face. Instead, we should seek to make far better use of the capacity available. We must also take advantage of technology as it becomes available. Both infrastructure improvements and technological change take time. We are looking over a long period, but we need to prepare now to ensure that we secure the future benefits we need.

## Travel in the UK – past patterns and projections

Car ownership is increasing and people are now travelling further, both for employment and leisure, often influenced by 1980-90s “out-of-town” land use development policies. The Government is investing heavily in public transport and promoting sustainable communities, mixed use of development and social inclusion. But many of these measures have long lead times, and in the meantime we project traffic growth of 20-25% by 2010. Managing this demand increase effectively will be crucial.

## Planning, public transport and promoting choices

We are already taking action to promote alternatives to travel and to provide alternatives to journeys by car. Firstly, we are planning land use to ensure that the services we need are closest to us. This reduces the need to travel and increases the range of transport options available. Land use policies now in place will make a difference over the longer term but they cannot alone solve today’s problems. Secondly, we are working on a range of other measures to reduce car traffic, offsetting several years of underlying traffic growth: we are promoting workplace and school travel plans, car sharing and teleworking schemes and we are continuing to invest in cycling lanes, pedestrian areas, and bus priority measures. Thirdly, continued investment in public transport will help to ensure people have real choices for the journeys they need to make.

## Tackling congestion

All these measures will help slow the growth in congestion. But, as other countries are finding too, we need to do more. We are already tackling many of the problems road traffic causes – air pollution, noise and safety. This paper sets out further work under three headings: managing roads to get the best out of the

road space we have; taking account of possibilities opened up by new technology; and getting the right balance between additional capacity and measures which ensure benefits are “locked in”, whether through physical measures or pricing.

## Managing the existing network

Proper management of the road network is a key step in tackling congestion. Firstly, roadworks and works by utility companies must be effectively managed. The Highways Agency is limiting lane closures to match them more closely with the extent of active roadworks, and doing more of the work outside peak hours. The Government has led efforts to keep traffic flowing in London and intends to legislate to improve management of streetworks as

soon as possible. Secondly, we must deal promptly with traffic collisions and other incidents which cause delays. The Government is increasing the resources available for managing incidents, and giving the Highways Agency greater responsibility for getting traffic moving again when an incident occurs. Thirdly, we need to be prepared for poor weather and ensure roads are open for safe and efficient travel whenever possible. A uniformed motorway patrol service will operate round the clock with powers to act both following accidents and when bad weather causes disruption. Fourthly, we are introducing new public information sources to provide real time information about public transport and conditions on the road network for drivers.



## New technology opens up new possibilities

Technological developments offer possibilities for tackling congestion, by determining the location of vehicles with increasing accuracy. These developments allow provision of up to the minute “real time” information on travel conditions. They would also facilitate road user charging mechanisms that would distribute traffic more evenly throughout the day, by reflecting better the social, economic and environmental costs of journeys at busy times. New technology would also allow us to manage incidents and collisions better, for example, by alerting emergency services automatically, with an accurate location, in the event of a collision. And it has the potential to promote safety as well as tackling congestion, for example by keeping vehicles at a safe distance from the one in front, keeping drivers in lane, and limiting speeds to the safe speed limit.

Using new technology will also help people make informed decisions – people should feel more like consumers and be able to make active choices about the times and routes of car travel based on information about levels of congestion and price.

## The role of capacity and pricing

There is limited scope for reducing urban congestion through additional capacity, partly because of the layout of our towns and cities. Instead the Government is promoting alternatives to car travel, better network management, and demand management.

On the inter-urban network, additional capacity can make a difference. The recent multi-modal studies have recommended a significant programme of road-building alongside public transport improvements. But continued road building is not the long term answer to inter-urban congestion. And the amount required, if this was the only lever to tackle congestion, would be very expensive, environmentally damaging and in any event, difficult to deliver.

As a result, where studies have recommended new capacity they have also suggested measures to prevent the new capacity filling up too quickly, including measures to control motorway access and pricing measures.

A system of road pricing might allow motorists to make more informed choices about how and when they travel. There are three types of road user charging schemes already being used. Firstly, payment for entering a specific area, for example the existing London scheme. Secondly, payment for using new capacity, for example the M6 Toll, scheduled for opening in January 2004. Thirdly, payment for using existing capacity as will be the case in the German lorry road user charging scheme due to start this year. And lorry road user charging is due to begin in the UK around 2006.

As the technology develops, a more generalised system of road pricing is also a possibility. This could provide significant benefits both to road users and to the wider community. It could promote better choice, both for where we live and work, and for how we travel. Motorists would benefit from more reliable, and faster,

journey times and reduced stress. But no country has yet implemented such a generalised scheme. Nonetheless, it is increasingly realistic to consider the possibility of a road pricing regime in the UK as necessary.

## Fitting it all together – the choices

Even with more construction where it is needed, the best management of the network and the vigorous promotion of alternatives, we can only slow the increase in congestion. To prevent increasing pressure on the roads, we need to find the right balance between pressure on existing capacity, the extent to which we sanction new capacity, the extent to which we price the use of roads, and the method for doing so.

The Government is introducing a charging scheme for lorries, with implementation due to begin around 2006. A scheme which would cover 26 million vehicles is a very different proposition. Some of the technical challenges to allow road pricing for cars are already being addressed in our work on a road pricing scheme for lorries. But introducing an effective system for all vehicles is a much greater challenge. The Government is therefore establishing a feasibility study, involving key user groups and others, to look in detail at the practical issues that need to be addressed.

# 1. Travel in the UK – past patterns and projections



changed since the publication of the 10 Year Plan Progress Report in December 2002. For road strategy we need to look both at personal travel for leisure and work, and also at freight movements. The key facts are as follows.

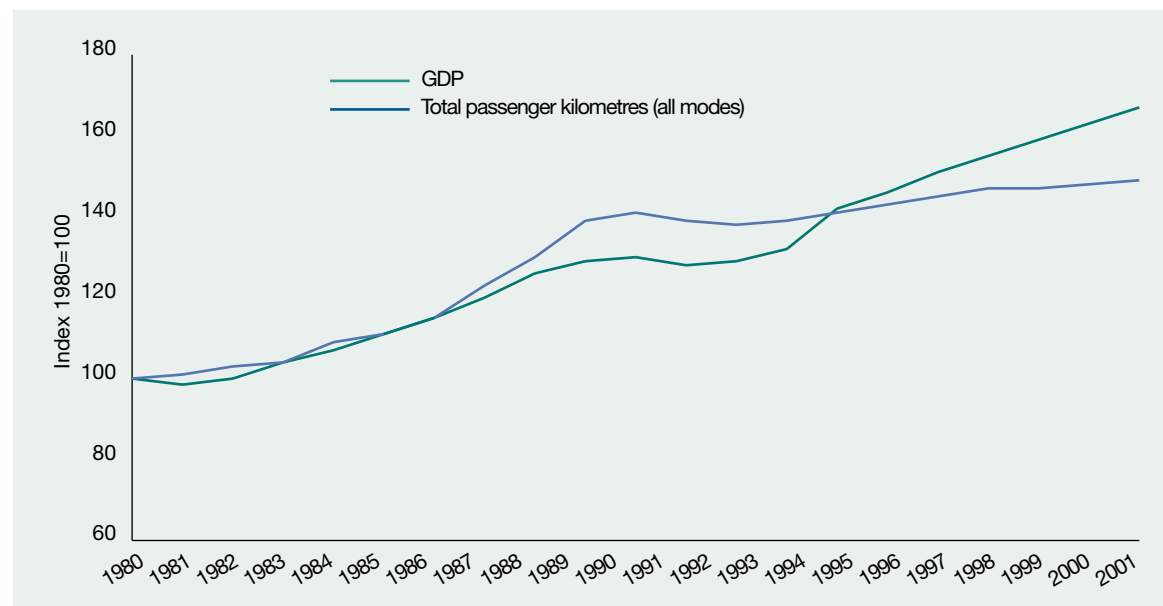
## Our travel inheritance

1. The starting point for any strategy must be an analysis of our inheritance in terms of current travel patterns and past trends. The underlying picture has not

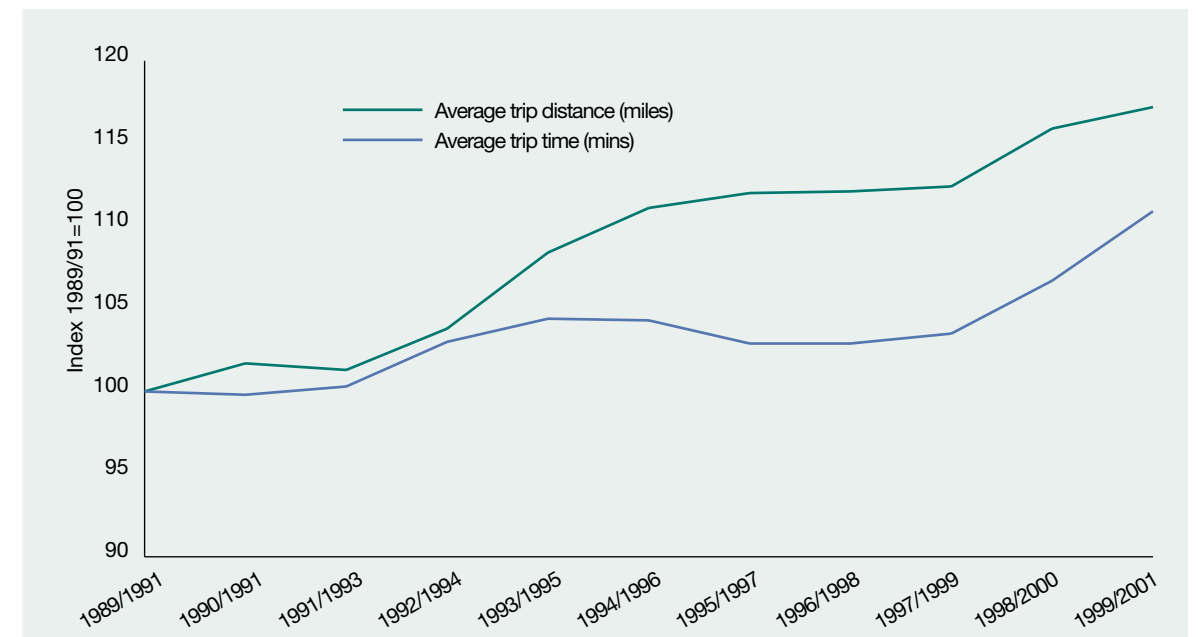
## Personal travel

2. The amount we travel has increased steadily over many decades, broadly in line with our rising wealth though since the early 1990s the increase in people's propensity for personal travel has been lower than the increase in GDP.
3. Some of this increased travel reflects **journeys to work**.

## Passenger kms and GDP



## Commuting trips – average distance and time (NTS)



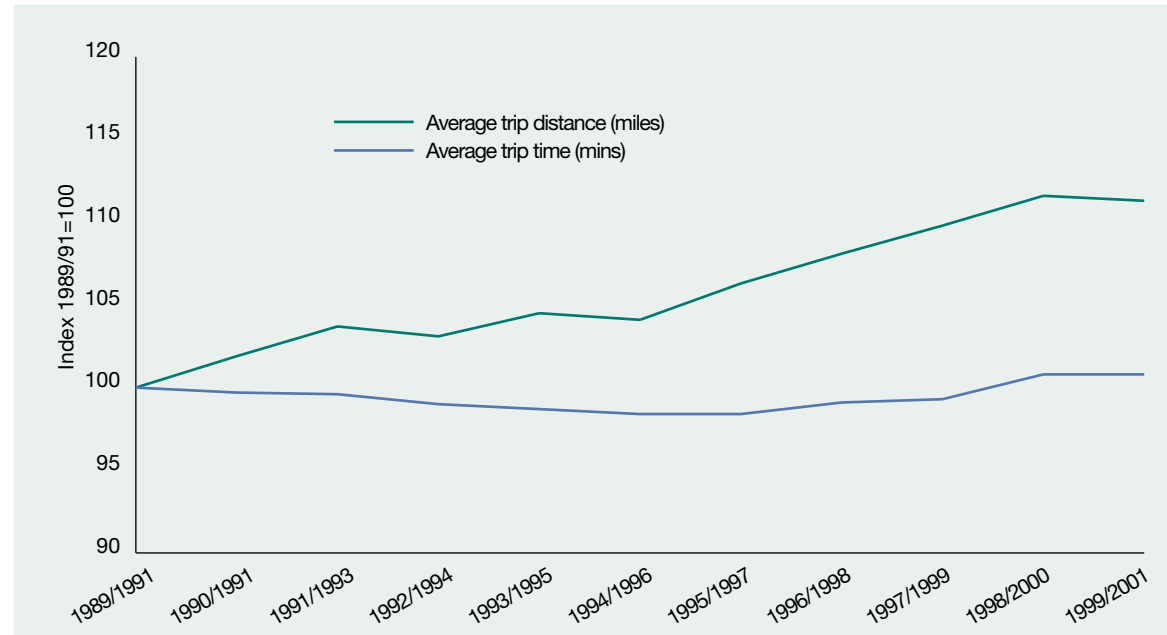
4. Over the last decade, the National Travel Survey has recorded a 6% increase in commuting (as measured by passenger km). The average distance people travel to work has gone up 17% since 1989-91, to an average of 8.5 miles in 1999-2001. The overall number of people in employment has grown by 2% since 1990, with an increasing proportion working part time. However, among both full and part timers, the average number of commuting trips per person per year has declined by around 10%, partly offsetting the impact of increased average distances.
5. These changes:
  - reflect **personal choices** about where we live, where we work, and how we work. There has, for example, been a sharp reduction in the proportion of households that move home because of jobs: between 1984 and 1994 it halved, and there have been further falls subsequently. This may well

reflect choices related to second earners' employment, children's education, and improvements in transport facilitating longer journeys

- help us sustain **higher levels of employment and greater productivity** by widening the labour market, and so facilitating a better match of skills with jobs
- but also reflect the impact of "laissez-faire" **land use policies** in the 1980s, which allowed the location of businesses, shopping centres and other facilities outside the traditional urban centres, often in green field locations. Market driven development often took precedence over sustainable development. Chapter 2 explains how the latest Government planning guidance seeks to reverse that trend.

6. Some of our increased travel reflects choices about how we spend our **leisure time**.

Leisure and shopping trips – average distance and time



7. Over the last decade, the National Travel Survey has recorded an increase of 5% in leisure travel (as measured by passenger km). As with commuting journeys, the average distance travelled for each trip has increased – by around 11% to an average of 6.8 miles in 1999-2001, offset in part by a decline in the average number of trips of just under 8%. The average time spent on each individual trip has remained broadly constant – people have taken advantage of being able to travel further in the same time.

- increased **car ownership** as more people are able to take advantage of the convenience and flexibility that the car offers to travel to a wider choice of destinations and for routine journeys including shopping and the school run
- **land use planning policy** of the 1980s and early 1990s:
  - in the priority given to greenfield housing, and the limited provision



8. These changes reflect:

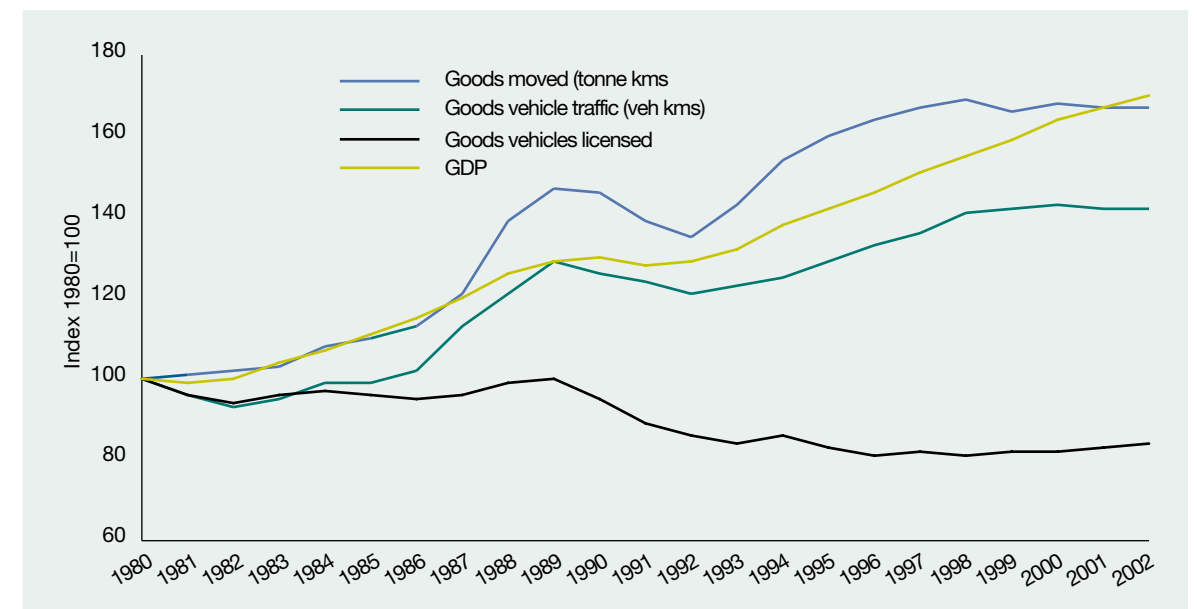
- our **rising incomes**, and **choice** to spend more on travel, or leisure activities further away from home (a phenomenon which is also apparent in the huge increase in international travel). As our incomes and expectations have risen, we travel further to do the things we want to do

of local infrastructure to sustain communities without travel  
 – in out-of-town developments, which offered consumers greater choice at a single location, and lower prices on the back of green field developments, but generated car traffic and tended to discriminate against those without access to a car.

Road freight

9. Similarly our rising wealth is reflected in a growing demand for goods and services, with an associated increase in freight and commercial traffic. Over the last twenty years, the amount of goods moved has grown by around 70%, and despite the number of goods vehicles licensed falling by one fifth, there has been a more than 40% rise in goods vehicle traffic. Although lorries account for less than 2% of vehicles, they represent 13% of traffic on motorways, with vans and light goods vehicles accounting for another 11%.

- Some 81% of freight by weight goes by road, compared with 5% by rail (2001 figures). The Government will continue to encourage the transport of goods by rail or water where this makes sense – and rail freight traffic measured in tonne km in 2001-02 was nearly 28% higher than in 1996-97 – but even with significant modal transfer road will continue to be the dominant mode for transporting goods. The average freight journey is under 100km, and few journeys have a railhead at one end let alone both. Even for longer distance journeys, highly integrated distribution networks have made road very competitive.
- Businesses now source products from further afield. The growth of “just-in-time” supply practices and increasing specialisation make good economic sense, but tend to encourage more and longer journeys.
- At the same time, the increasing efficiency of the logistics sector and a trend towards smaller, higher value





products mean that the volume of freight traffic is now growing much more slowly than the economy.

### Travel projections

13. The connections between land use and transport are evident even in the brief summary above. So are the links to economic growth and individual choices.

14. Projecting future trends in travel is difficult because of this interplay of factors, the different time scales over which they operate and against a background where the Government continues to:

- promote employment opportunities for all that are more accessible in terms of location, travel and distance
- promote more sustainable communities, with planning policies which aim to ensure jobs, shops, leisure and other services are located in city, town, district and local centres within easy reach of people, in places where they can be accessed by a range of transport options

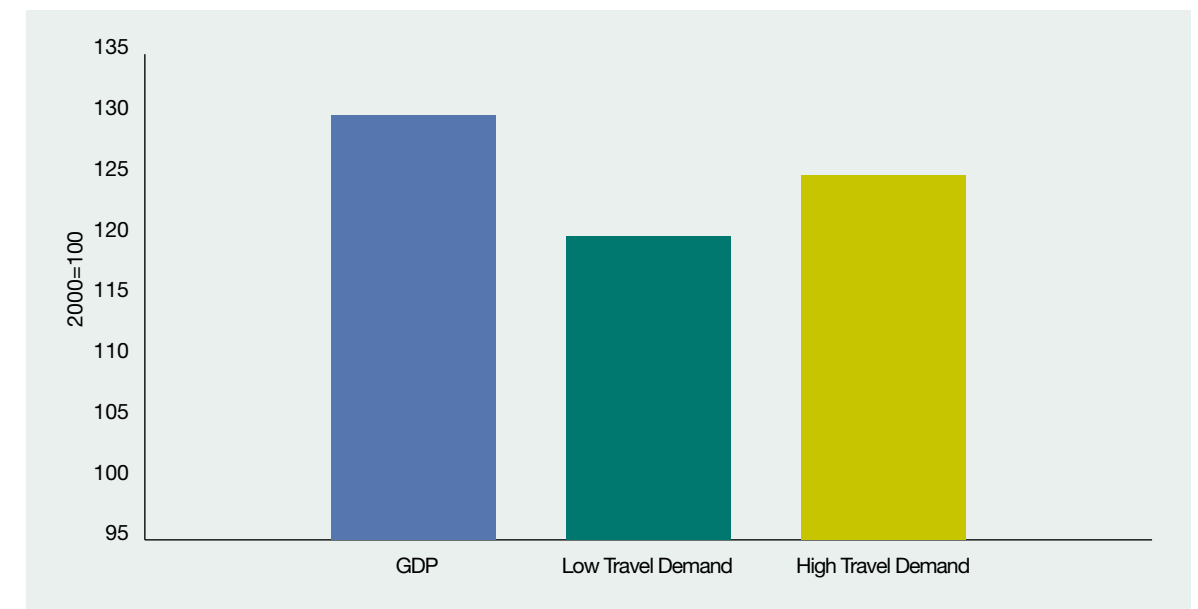
- promote more mixed use development, the growth of business clusters, and more flexible ways of working
- commit long term investment to our transport system, both public and private
- focus on social inclusion, and – for transport – on accessibility.

15. As a result, the Government has illustrated a range of potential growth in travel. The low and high scenarios reflect assumptions concerning:

- the extent to which rising incomes affect propensity to travel and responses to changes in money costs
- whether GDP is 2% higher or lower than HM Treasury’s central forecasts for 2010
- the impact of soft measures (see below) on travel behaviour
- whether rail travel increases relatively quickly or slowly as incomes rise.

16. In total this gives a range of growth (2000-2010) of +20% to +25%, as shown opposite.

GDP and total traffic 2010



17. Chapter 2 summarises the action the Government is taking, and planning, against this background, to promote alternatives to travel, and alternatives to journeys by car. All these measures will help address problems of congestion and accessibility.

18. Chapters 3-7 look in more detail at the strategic issues for our road network.

## 2. Planning, public transport and promoting choices

### Spatial planning

- 19. Our transport policies aim to ensure that where people need or wish to travel, they can do so easily and efficiently. This is as true for business and freight movements as it is for private journeys.
- 20. But faced with congestion and other environmental considerations, we must also ensure that longer term planning and land use policies provide choices which allow people to reduce their need to travel, and the distances they travel.

21. This was not a priority in the past. Planning policies in place before the early 1990s took a very permissive attitude to out of town developments, whether business parks or shopping centres, and their effects continued into the late 1990s. The emphasis was on new development, and associated employment opportunities, rather than sustainability and accessibility. Together with the increase in car ownership, this contributed to the increasing number and length of journeys by car.

- 22. The Government's planning policies seek to reverse that trend. The aim is to promote developments where the things we need are closer to us. This reduces the need to travel, and increases our choice of travel, particularly where journeys become short enough for walking or cycling.
- 23. So Government planning guidance to local authorities aims to:
  - manage urban growth to make the fullest use of public transport
  - focus major generators of travel demand such as shops, leisure and entertainment, and offices in city, town and district centres and near to major public transport interchanges
  - locate day to day facilities in local centres
  - accommodate housing principally within existing urban areas
  - ensure that development comprising jobs, shopping, leisure and services offers a realistic choice of access by public transport, walking and cycling

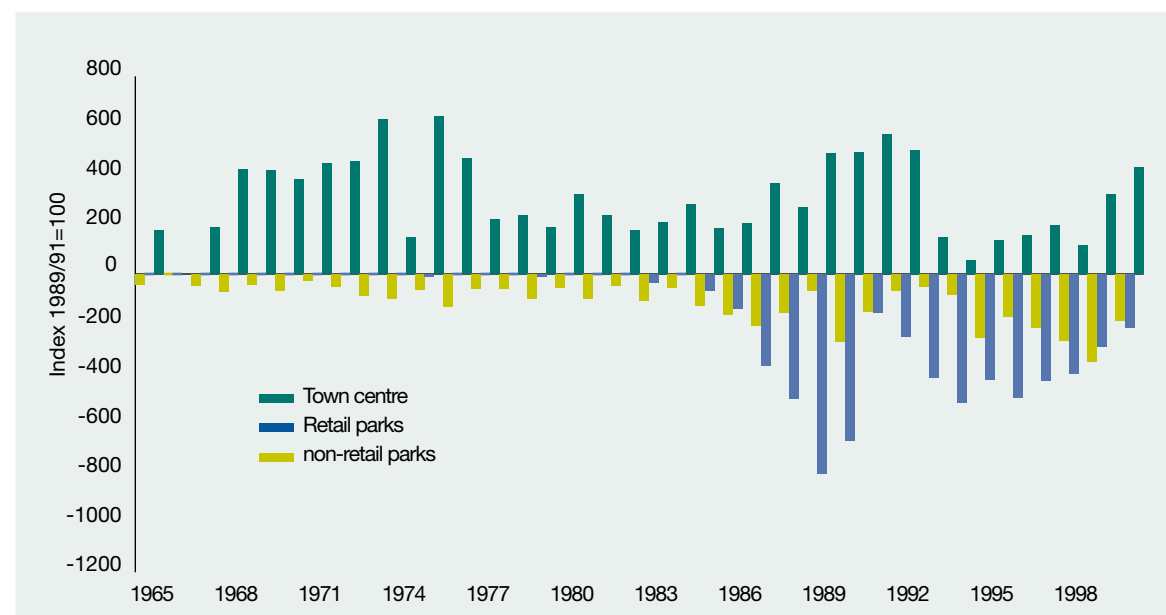
- in rural areas, locate most development for housing, jobs, shopping, leisure and services in local service centres
- use parking policies to promote sustainable transport choices and reduce reliance on the car for work and other journeys.

24. The impacts of planning guidelines take a long time to work through. The problems we face today have their genesis in the developments made possible from the 1960s as a result of growing car ownership. The policies in place now will similarly have an increasing effect, but over the longer term, and cannot alone solve today's problems.

### Measures reducing the need for travel, and offering choice

25. In addition to planning our space better, we need to make use of other measures and opportunities to reduce the need for travel. The Government is working to promote:

New retail floorspace in town centres and out of town: 1965-2000



- **workplace travel plans** – 69% of all journeys to work are by car. Over 1200 organisations have implemented travel plans, promoting car sharing, and establishing other ways to journey to work. Such plans have been shown to make a marked difference in traffic, especially around large sites. Given this potential, which across the country would reduce traffic by around 1%, the Government is investing in promoting travel plans, and sharing best practice
- **school travel plans** – almost 1 in 5 cars on the road at 8:50am on weekdays are doing a school run. As with employers, the Government has been promoting school travel plans. Around 2000 are now in place, and some have achieved significant modal shift. DfT and DFES have agreed to boost the number and effectiveness of school travel plans, and are developing a broader package of proposals to reduce car dependency on the school run
- **bus quality partnerships** – with better vehicles and more frequent and reliable journeys, can increase ridership by 20%, with a third of those switching from cars
- **cycling** – local authorities plan to spend approaching £40m per year between 2003/04 and 2004/05 to improve facilities for cyclists. The National Cycling Strategy Board is currently auditing the quality of local provision. The Government has also provided dedicated funding of some £5m for very small scale projects. The box illustrates what is possible
- **walking** – the Government is consulting on a strategy document over the summer of 2003
- the Government is also funding a pilot project to demonstrate the potential cumulative benefits from an integrated package of sustainable travel initiatives, including investment in cycling lanes, higher quality pedestrian areas, and bus priority measures
- **teleworking** – the numbers of teleworkers have increased by 13% each year since 1997. Studies estimate teleworking could reduce car commuting by 6% by 2015. Government has published a booklet *Working Anywhere* which aims to help those interested in teleworking.

## Cycling Projects Fund

DfT launched its Cycling Projects Fund to support local projects aiming to deliver an increase in cycling across England in April 2002.

DfT supported 138 projects in the first round of the fund in September 2002. The following case studies provide examples of successful schemes from the first round and details of the immediate increases in cycling that they have delivered.

Eastleigh Borough Council – Has installed new cycle parking facilities, CCTV, and lighting through the Cycling Projects Fund. The old cycle parking was located at the rear of the Civic Office car park. The facilities were inadequate and situated some distance away from the entrance to the Civic Offices.

The Council's Mayor, Chief Executive and Leader agreed to give up their priority car parking spaces close to the entrance of the Civic Offices so that the new cycle parking compound could be located there. Cycle use has almost doubled.

The Channel School, Folkestone – This partnership project between the Channel School and Shepway District Council has provided secure cycle storage for 50 bikes. The immediate impact of the cycle storage was an increase in pupils cycling to school from an average of 30 per day to between 45 and 50.

Hillside Travel Group – Among the elements of this scheme were the provision of three “trailer bikes”, one cycle trailer and one child seat, for loan to parents who wish to cycle to school with their children. Since their purchase they have contributed to a reduction of 200 car trips to the school.

The scheme also provided lockers at one end of the cycle shed for helmets and other cycling equipment and maintenance workshops, and cycle training for over 80 children. The initial results have seen:

- a 12% drop in pupils coming to school by car
- a 25% drop in cars coming to the front of the school.

On 19 June DfT announced that a further 155 projects will receive a share of £2.28m funding in 2003/04.

26. Various studies have shown that these measures can reduce car traffic. The precise future impact is difficult to predict, but these measures certainly have the potential to offset several years underlying growth in traffic, and this is reflected in the forecasts in paragraph 16. The Government is undertaking research to assess the potential impacts better.

### Investing in public transport

27. In the meantime, we need to ensure that people have real choices for the journeys they need to make. The Government is continuing to invest heavily in public transport, as well as measures to make cycling and walking safer and easier. The details were last set out in the first Progress Report on the 10 Year Plan, and include:

- a trebling of spending on the railways, which is already helping to fund:
  - **the replacement of 40% of all rolling stock within five years**, with over 1200 new vehicles already introduced and nearly twice as many on order
  - **over a thousand more scheduled train services every weekday than in 1997**
  - **the construction of the high speed Channel tunnel rail link** – the first major new rail line in this country for a hundred years
  - **the upgrading of the West Coast Main Line** to cut journey times and increase capacity by 80%
  - **a huge track replacement programme to rectify many years of under-investment**



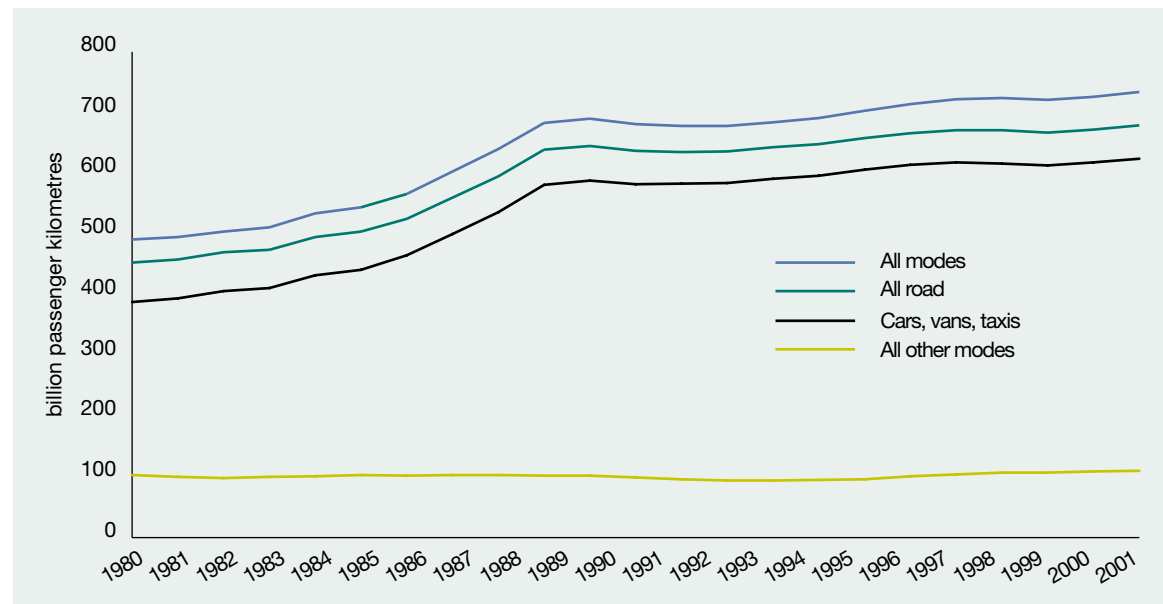
- the installation of a new safety system across the entire network
- the modernisation and refurbishment of hundreds of stations
- a doubling of local transport capital investment, which in the first five years of the 10 Year Plan alone will help deliver:
  - over 3000 miles of bus route improvements to improve the speed and reliability of bus journeys
  - over 3000 miles of new cycle lanes and tracks
  - over 150 new park and ride schemes
  - new light rail lines in Sunderland, London and Nottingham
- a Public Private Partnership to modernise the London Underground, unlocking £16bn over fifteen years, which has now been signed. This will deliver new trains, renewed tracks, new signalling, refurbished stations, producing extra capacity, fewer delays and a better service.

28. This new investment is already helping to provide the increased capacity and better quality of service needed to attract people to use public transport. Rail use has gone up by a nearly a quarter since 1997, and more people are using the railways than at any time in the last 50 years. The London Underground is also seeing record levels of passengers. Light rail use went up by a third in the last two years. And bus use is now growing again after 40 years of decline and stagnation.

29. But delivering step changes in public transport, after years in which the sector has been starved of resources, is in itself a demanding management challenge. It will take many years of sustained extra investment, to which the Government is fully committed. The multi-modal studies have each recommended public transport measures as part of their packages of investment. But it is clear from their analysis that public transport by itself cannot solve the current and projected problems of congestion.

### 3. The importance of road transport

Passenger travel by mode



30. Both road freight and car travel have risen over time, and will continue to do so. Within the overall picture, car journeys have dominated road travel.

31. This reflects:

- convenience – door to door travel, in an environment (inside the car) we can control and which offers increasing choice
- cost – both the cost of ownership and the cost per mile have fallen relative to incomes, particularly with improvements to fuel efficiency, which also has the effect of reducing cars’ climate change CO<sub>2</sub> emissions per mile travelled. Fuel efficiency thus has important benefits for both vehicle users and the environment, and

Annex B describes the Government’s *Powering Future Vehicles* strategy for pushing forward the UK’s shift to clean, low-carbon transport

- the absence in most areas of attractive alternatives, although the investment provided in the 10 Year Plan will start to address this.

32. In turn, road is the dominant means of freight transport. The reasons for this dominance are similar to those for car dominance. In addition to lower cost, convenience (door-to-door delivery) is a major benefit.

33. The Government recognises that road transport will remain the preferred means of travel for most journeys,

both personal and for freight transport. But it is determined to address the problems that this causes. In particular it will tackle:

- **air pollution** by reducing even further polluting emissions from vehicles – both to improve local air quality in line with our Air Quality Strategy and to find ways of limiting emissions of damaging greenhouse gases which contribute to climate change
- **noise** by specifying low noise surfaces as the norm for all trunk roads and in particular for all concrete roads. The Government announced in April 2003 the timetable for resurfacing all stretches of concrete roads, and that within the next four years the 26 stretches affecting the largest number of people would be resurfaced, with the remaining stretches resurfaced between 2007 and 2011. The early work would benefit some 11,500 properties and cost in the order of £77 million
- **safety** by taking the necessary measures to meet our targets to reduce road deaths and serious injuries by 2010 (see Annex C)
- **accessibility** for those without access to a car, by taking forward the recommendations of the Government’s Social Exclusion Unit report *Making the Connections*, (February 2003), and other measures as set out in the December 2002 Progress Report on the 10 Year Plan
- **congestion** – see paragraphs 34-37.

34. We can see a sustainable way forward on many of these issues, but congestion is an increasing problem across the world, and increasingly so in countries with more successful economies. It is, of course, an irritating phenomenon for all those caught in queues. But it also has a substantial economic cost: times spent in jams is not available for other activities; and unpredictable and unnecessarily long, journeys add costs to business, both through time lost to business travellers and through inefficiencies in their supply chain. In addition, congested



conditions are far more damaging to the local environment, especially local air quality, than free flowing traffic.

35. In the UK there are three broad categories of congestion, for which different combinations of measures are needed:
- urban congestion which, while often a peak hour phenomenon, is also seen in many areas throughout the day
  - inter-urban congestion which appears largely at peak hours (for example on the M1 north of Sheffield and the M11 north of Bishop's Stortford)
  - inter-urban congestion which is sustained throughout the day (for example on the M6 north of Birmingham, and many parts of the M25).
36. Proposals for tackling congestion have been put forward by Governments in the past, as far back as 1964's *Road pricing – the economic and technical possibilities – report by a panel set up by the Ministry of Transport*. The 10 Year Plan and December 2002's Progress Report set out a strategy for tackling congestion within a broad transport programme. We now need to develop the debate further for the future, looking at the measures in Chapter 2, and the following three areas:

- the way we manage the existing road network for the benefit of road users – getting the best out of what we have
  - technological development: taking account of the possibilities being opened up by new technology
  - and considering to what extent to provide additional road capacity **together** with measures to ensure that any benefits can be “locked in”, whether through physical measures or the possible use of pricing.
37. Each of these is considered in turn in the following three sections. The Government is keen to learn also from international experience. Annex D outlines the work undertaken in other countries.

## 4. Managing the road network for road users

38. Active and coordinated management of the road network is a key step in tackling congestion.
39. We are all too aware of the problems we often encounter in using our network:
- the repairs to the road where no one seems to be working, or which are uncoordinated in their timing
  - the seemingly endless interruptions to traffic flow from utility companies digging up the road to renew their distribution systems or connect up new customers
  - the delays resulting from accidents and other incidents which are exacerbated because no one is planning ahead to get the traffic moving as soon as it is safe to do so
  - the days when the weather seems to defeat us.

40. This chapter explains the actions the Government has already taken, and its plans for the future, on each of these problems.

### Better management of roadworks

41. The UK road network is a physical asset of immense value. The strategic road network, itself only a small proportion of the total network, is the Government's single largest asset, valued at over £62bn. Strategic roads, and those managed by local authorities, must be kept in good condition to:
- contribute to the safety, efficiency and comfort of our journeys
  - reduce vehicle wear and tear
  - minimise whole life costs to the taxpayer.



42. The strategic network is in good condition, although it requires a continuing cycle of planned maintenance. From 2003/04 the Highways Agency is planning maintenance work on a “whole life cost” basis, to strike the right balance between the need to carry out work, the cost and the disruption to road users. On the local road network there is a backlog of maintenance, following a decline in condition in the mid-to-late 1990s. The Government aims to reverse this trend by providing substantial funds to remove this backlog by 2011.

43. While road maintenance is important, it is also critical to ensure it is delivered in a way which minimises its impact on traffic.

44. To ensure this on the strategic road network, the Government has increased the Highways Agency’s target for lane availability, requiring in 2003-04 that 98.5% of lanes are available during peak hours. This would improve the Agency’s already good record in lane availability over recent years, from 98.1% in 1999/00.

45. To achieve this, the Agency will be:

- using latest traffic management techniques such as lane closures which more accurately match the work in hand, and so maximise lane availability
- carrying out more roadworks outside peak hours through contracts that provide incentives to encourage efficient working and minimise disruption to road users.

46. On the local road network, the Government has required all Local Authorities – as part of the Local Transport Plans – to take account of road users in their five year maintenance strategies and in work programmes for principal road maintenance and bridges.

47. In addition, many of the measures to improve the management of street works by utility companies (see below) will also drive up performance on roadworks, to the benefit of road users.

### Better management of works by utility companies (“street works”)

48. The privatisation, and deregulation, of many utility operations has brought substantial benefits to utility consumers. These have in turn been reflected in exacting standards by the relevant regulators, both for the prompt connection of new consumers and – in some cases in association with the Health and Safety Executive – for the renewal of mains supply infrastructure. The latter is particularly important for Transco’s gas distribution, with works scheduled in relation to risk.

49. Most of these utilities make substantial use of the road, or rather the ground under the road, for their distribution networks. As a result, customer connections and network renewals also have an impact on road users. This impact can become very significant when different companies digging up neighbouring stretches of roads at the same time, or the same stretch in quick succession. There are

also wider scheduling issues between utilities’ work and the relevant authority’s work on road maintenance.

50. In some areas (such as Kirklees and the City of London) there are strong coordination mechanisms, which enable all the relevant parties to agree plans which meet their requirements and the needs of the road user. But this is, unfortunately, the exception rather than the rule. Too often there is no one taking an overview, on behalf of road users.

51. As a result, the Government has:

- led efforts to coordinate action within London. In the run up to the introduction of the congestion charge, the temporary increase in roadworks, coupled with the very high volume of street works, brought many parts of the capital virtually to a standstill. Bringing Transport for London (TfL) together with the London Boroughs, the Police, and through work with the major utility companies, significant improvements have been made. In January, a new Traffic Control Centre was opened and took on responsibility for operating the network in real time and managing incidents. In May, TfL appointed its first Traffic Director, with responsibility for ensuring that traffic flows smoothly
- established a programme to provide better computer based mechanisms for collecting information on all proposed works on, and under, roads. This is a critical step in enabling authorities and utilities to plan their

works in a way which minimises the impact on road users

- trialled new arrangements which give authorities the ability to charge utilities for access to the roads, as well as implementing powers to charge them when works overrun the agreed timetable
- announced its intention to bring forward legislation to:
  - support the introduction of traffic managers in local authorities (or group of authorities), with reserve power for the Secretary of State to appoint such a person if an authority is clearly failing to deliver for road users
  - provide for a permit system to control all road openings
  - strengthen both the powers for authorities to be able to manage the impact of utility works, and the corresponding duties on utilities, so as to minimise the disruption from street works
  - extend authorities’ ability to control other activities taking place on the road
- begun work on a new best value performance indicator, which would reflect disruption on all, rather than only sensitive, roads, and measure average periods for which roads were disrupted.

### Better incident management

52. Our roads are among the safest in Europe. But with the volume of traffic every day, it is inevitable that there will be incidents such as collisions and spillages. The overwhelming priority in

such cases is safety: getting medical care quickly to the injured, managing hazards in affected vehicles, and ensuring that the traffic behind doesn't become part of the incident in front.

53. The second priority, in cases of criminal offences, is to ensure that the Police can collect appropriate evidence. To facilitate this, the Government is trialling, with the Police, new technologies to speed up accident investigation.
54. But too often, it takes far too long before someone addresses the needs of the road users caught up in the jam behind an incident.
55. On the strategic network, the Government has decided to put more resource into the management of incidents. Over the next three years, the Highways Agency will:
- establish a network of regional traffic control centres, operated jointly by the Agency and the Police, to monitor the motorway network and coordinate action when an incident occurs. These are currently being developed and the first, covering the West Midlands motorways, is expected to come on-stream in Spring 2004. This new network will streamline and simplify current arrangements where each of 39 Police forces has its own control centre, with varying degrees of joint working with the Highways Agency and local authorities

- recruit, train and deploy a uniformed motorway patrol service, operating round the clock, with powers to take action and a focus on taking whatever steps are necessary – as soon as possible – to get traffic flowing. The Agency's patrols will work in close cooperation with the police, roadside assistance and recovery organisations, the Agency's maintenance contractors and other organisations to ensure that:
    - equipment to carry out essential repairs and remove damaged vehicles is summoned at the outset, not waiting until after Police and emergency services have completed their priority tasks
    - that local diversion routes are opened up quickly and that timely and accurate information is relayed to motorists about the situation
  - this expanded role for the Agency, bringing more resources to bear on keeping traffic flowing, has been developed in close cooperation with the Association of Chief Police Officers, who welcome and support the initiative.
56. The Agency estimates that it will be able in the first two years to reduce the delays caused by incidents on motorways by 5%.

## Preparing for adverse weather conditions

57. Poor weather is a fact of life at certain times of the year, and in many countries roads are often blocked by snow. But highways authorities must ensure that roads are open for safe and efficient travel whenever possible.
58. The Highways Agency's record on managing adverse weather has generally been good. But in January 2003 a key section of the trunk road network was not operating effectively. Severe delays resulted, with drivers unable to move for many hours.
59. As a result of this, the Agency has:
- reviewed operating procedures which will be implemented before next winter
  - reviewed and strengthened emergency contact procedures, which will be kept under constant review
  - put in hand a strengthening of contingency planning procedures including better liaison with Police forces and local authorities, and the identification of robust diversion routes and turnaround sites
  - committed to test these in exercises this summer.
60. The Government is also legislating to give local authorities a clear duty to clear snow and ice from the roads.

## Better information for road users and road managers

61. Drivers need better information before and during their journeys, about:
- the current state of the network
  - where congestion is
  - weather conditions
  - incidents/collisions.
62. This will enable road users to plan their journeys more effectively, and to make more informed choices. Road users are service users and need to be treated accordingly.
63. The media already performs a key role in relaying to road users information from a variety of sources about driving conditions, incidents, abnormal loads and adverse weather conditions. Several companies also offer real time information targeted to the car's location.
64. The Government is establishing two further sources of information:
- Transport Direct, which will give internet access to a range of information about all modes of transport. It will in time contain real time information about traffic conditions across the road network, as well as historic information about journey times at different times of day. And it will have a wide range of public transport information. The overall objective is to help people make better choices not only about car journeys but also between different modes of transport



- the Highways Agency's Traffic Control Centre comes on line in early 2004. By providing real time information about traffic conditions on the network, travellers will be able to plan their journeys more effectively both before they set off by using information available on the web site, and during their journey by using information supplied on variable message signs. The real time information will also be available to the media.

## 5. Technology

65. Technological advances, including the development of Intelligent Transport Systems, offer a further set of possibilities for tackling congestion **over a longer timescale.**
66. The Government is exploring the potential benefits of several developments as part of its future roads strategy. Some applications are already being developed, including:
  - **keeping a safe distance** (“autonomous cruise control (ACC)”) – some cars can already follow the car in front at a fixed distance, by automatically varying their speed. Current ACC applications do not yet control emergency braking: drivers still have to take action themselves to slow their vehicle more rapidly than by just so called “check” braking. As manufacturers gain more experience of ACC, it will become possible to introduce systems which automatically maintain a car's position relative to other vehicles, at all speeds, making full use of the car's acceleration and braking potential
  - **keeping a safe speed** (“intelligent speed adaptation (ISA)”) – when an on board electronic map with speed limit information is combined with a vehicle positioning system it is possible to limit a car to the legal speed limit by automatically controlling the throttle

and “check” braking. Such systems are undergoing trials in the UK and other parts of Europe and have the potential to reduce injury and accidents by up to 20%. On motorways, ISA could smooth traffic flows and increase road capacity

- **keeping in a lane** – this technology is currently in development, initially based on systems which detect lane markings on motorway-type roads or magnetic markers buried in the road surface. Whether as a warning system (to improve safety) or ultimately in conjunction with intelligent speed adaptation, such systems progressively remove the scope for human error, and offer the potential for greater road capacity in the long term by increasing lane numbers on existing roads
- **real time navigation** – the combination of positioning systems, on board congestion monitors and telecommunications has enabled several companies to offer drivers real time information about conditions ahead of them, and options for alternative routes. Some systems can also provide automatic notification of a collision to the emergency services, with an accurate location. Knowledge of the accurate position of vehicles, and their speeds, also allows fleet and

logistic operators to improve the efficiency of their operations.

67. All these technologies are likely to be attractive to both consumers and manufacturers. They each offer potential benefits also to the management of the road network and as such complement other applications of technology used by local highway authorities to manage traffic on their roads. An example of the latter, where again the Government is working on new developments, in partnership with local authorities and industries, is in the “Urban Traffic Management and Control” programme. This will provide a framework where authorities will be able to install systems that will work together to control traffic lights, give priority to buses, direct cars to parking spaces, will link to air quality and travel information systems and will allow data to be exchanged between different control centres. This is being demonstrated in projects in four towns – Preston, Reading, Stratford upon Avon and York.
68. Intelligent speed adaptation and lane following can improve safety, but also have the potential to tackle congestion by:
- reducing collisions
  - keeping traffic flowing smoothly
  - avoiding unnecessary braking as drivers keep a safe distance
  - potentially enabling so called “car trains” where individuals cars effectively travel in a controlled

convoy at uniform speeds and distance. This technology has already been demonstrated in Europe (under the PROMETHEUS research) and trials with trucks are beginning in the Netherlands.

69. This approach has significant potential for increasing the effective capacity of our road network. Early benefits will arise as individual cars are progressively fitted with measures, and these measures begin to help reduce traffic incidents. Widespread use of this technology is a prerequisite for developments along the lines of “car trains”. As such they are further off, and will probably not be available for widespread use before 2030.
70. Accurate positioning, and real time communication, also provides the basis for different structure for motoring insurance and motoring taxation:
- Norwich Union is already testing technology which records a driver’s car use, in order that insurance premia can more accurately reflect risks
  - most of the multi modal studies have also recommended the introduction of road pricing which varies by location and time of day. The current approach to motoring taxation reflects fuel consumption (through fuel duty) and vehicle ownership (vehicle excise duty). The road user pays the same for all journeys involving the use of a litre of petrol, whether the journey is on an uncongested rural road, or on a congested major national motorway. As with the insurance example,

pricing roads by location and time of day would redistribute costs, so journeys which have little impact on others cost less, journeys which do affect others (both through congestion and the associated environment effects) are priced accordingly. Details of proposals for a distance-based charge for lorries are at Annex E.

71. Sorting out the technology issues for both of these is, of course, a necessary part of establishing a workable proposition. The box overleaf summarises the key issues and the technology studies already underway in Leeds. The key decisions in respect of an operational pricing regime obviously depend on many other factors, as discussed in the next section.
72. Technology offers further opportunities in terms of measuring the real extent of congestion, and testing our current conceptions. No roads are congested all of the time. Many roads are congested only at morning and evening peaks and following incidents, as shown by recent analysis of the A14. This level of detail could help to target responses to tackling congestion more effectively.

73. It is clear, though, even from this brief summary that a number of technological developments offer – over the medium term – material gains in both safety, congestion, information and comfort for road users. The Government recognises that there is a potential gain to be made through technology, and is conducting its own research to examine how central Government can best promote the development of such systems, and harness the capability of modern technologies to provide new solutions to some long standing problems.

The Government is studying the feasibility of electronic systems for charging drivers to use busy roads in a research project called DIRECTS (Demonstration of Interoperable Road-user End to end Charging and Telematics Systems). Temporary equipment is being set up on a small network of road in south Leeds with the help of Leeds City Council. Volunteers will help test the equipment, for around a year starting in October 2003, using a small electronic charging unit in their vehicles. No one will be charged.

Electronic systems can charge automatically without any interruption to the driver's journey. So there would be no need to buy a ticket before each trip, or to stop and queue at a toll booth. But these systems have not been tested on the range of everyday conditions found on British roads – for example, a foggy morning rush hour on a dual carriageway or a sunny Sunday afternoon on residential streets. DIRECTS will also check that all parts of the system – from the electronic unit fitted inside vehicles to the billing and administration centre – can work together.

DIRECTS will show how two different electronic charging systems can work together.

The first is a **Dedicated Short-Range Communications (DSRC) system**. It uses equipment at the roadside to transmit signals to and from electronic units, about the size of an audiocassette tape, fitted on the inside of the windscreen or on the dashboard of vehicles. The data from the roadside equipment are then processed by a central administration office, and converted into bills.

The second is a **position fixing system**. Vehicles are fitted with a receiver, about the size of a videocassette, which determines location using the Global Positioning System (GPS) satellite network. GPS is already used for navigation in the road haulage, shipping and aircraft industries and in car navigation systems. The unit in the vehicle works like a car radio – it “listens” to broadcasts from GPS satellites but it does not send signals back to them. The communication is one way and private.

The receiver matches its position with an electronic map of charged areas and a table of charge rates, both stored inside it. Then, as with the DSRC system, the data are sent to a processing office for billing.

## 6. The role of capacity and pricing



74. The final two issues to examine are road capacity and road pricing.
- forecast that, as a result, **congestion** on our roads would be some 20% lower by 2010 than it would have been without the plan (equivalent to returning congestion in 2010 back to the levels in 2000).
75. The 10 Year Plan for Transport, published in 2000, set objectives and a planned investment up to 2010. In parallel with a major increase in investment in public transport, the plan also:
- provided for significant **new road capacity**, including an estimated 360 miles for road widening and funding to recover from the backlog of maintenance work on local roads
  - assumed as the basis for analysis that eight local authorities would use their powers under the Transport Act 2000 to introduce **congestion charging**, with a further 12 introducing workplace parking levies
76. The Progress Report published in December 2002 set out the achievements since April 2001, updated our forecasts and acknowledged the need to consider further action in the forthcoming review of the Plan.
77. As we now carry out this review, and prepare to roll the Plan forward, these three related elements – and the balance between them – will be revisited. The issues to be considered are summarised in turn in the sections below.



### Additional capacity

78. Although there are exceptions (such as the Bingley Relief Road), there is only limited scope for tackling urban congestion by increasing road capacity. The key issue in urban areas is the scope for improving the management of the network, alternative travel arrangements, and the acceptability of disincentives to car travel, for example parking controls and charges to enter busy central areas.
79. On the inter-urban road network additional capacity can make a contribution to tackling congestion. The 10 Year Plan's original provision for strategic roads included £7.1 billion of public investment for additional capacity improvements including 80 junction schemes and 30 bypasses in addition to the estimated 360 miles of widening.
80. Some extra traffic is generated when road capacity is enhanced. However, the traffic generated is usually less, and often much less, than the increase

in capacity. It is the ongoing demand for road travel, which happens whether or not capacity is increased, which is responsible for the majority of the extra traffic.

81. Decisions on the precise nature and location of additional capacity are being considered following the remaining multi-modal studies of key transport corridors, and today's announcement provides further detail. As already noted, the studies were explicitly charged with testing multi-modal options for tackling the various problems, not simply assessing the case for road investment.
82. With today's announcement on 11 studies adding to the eight dealt with in previous announcements, we have now completed the bulk of the multi-modal study programme. There are several general themes among the analysis and recommendations:
- that alternatives to car journeys (along the lines covered in Chapter 2) and better management of the network (Chapter 4) will help tackle congestion
  - but in almost all the studies, additional road capacity would be necessary as well
  - that on some corridors (the M6, M1, M25) the volume of traffic is already, or will soon be, above the road's design capacity almost all day long: in these locations there is little alternative to widening or new roads. Indeed, studies consistently noted that – in the absence of other measures – rising demand would justify widening by more than one

lane each way (for example, getting to five lanes each way on parts of the M6 and M25)

- that the congestion on other parts of the strategic road network was largely a peak hour phenomenon. Conventional widening is a possible solution, and featured in study recommendations. But there are alternatives, reflecting the nature of the problem, such as active traffic management, including temporary hard shoulder running where it can be introduced safely. This has been trialled successfully in Holland (see box). It would, of course, require investment in adequate emergency refuge areas off the hard shoulder, and quick response mechanisms for dealing with incidents. But it could also be put in place faster than conventional widening, and so produce earlier benefits for users

- that, wherever additional capacity is provided, the studies recommend measures in parallel to prevent the new capacity filling up too quickly, and thus losing the benefits. Such measures fall into three categories:
  - physical measures such as limiting access to motorways (e.g. through traffic lights on slip roads) where additional cars would trigger congested conditions. The Government is already trialling some of these measures on the M27 at Southampton, and will be testing other possibilities as part of trials on the M42 beginning in 2004, as illustrated in the box below.
  - pricing measures, which are covered in the next section
  - all the other measures to promote alternative travel choices, as in Chapter 2.

### Active traffic management trials, M42

A trial of Active Traffic Management (ATM) is due to begin in 2004 on a 16 km section of the M42 at Birmingham.

ATM techniques will include access control, variable speed limits, extensive CCTV monitoring and comprehensive lane signalling, and controlled use of the hard shoulder.

The hard shoulder will be used as a running lane in controlled circumstances to deal with congestion and incidents – during the uncongested parts of the day it will not generally be in use.

The M42 will be lit throughout the ATM section for safety reasons, and signal gantries will be sited every 500m along M42 to provide information to drivers about use of the motorway.

Speed limits will be controlled in a similar way to the M25 Controlled Motorways project for safety reasons.

## Experience in the Netherlands

The Netherlands has several pilot schemes investigating the use of hard shoulders to increase the capacity of the road. The hard shoulder is used as a running lane in periods of peak congestion or increased demand (and known as Peak Hour Lanes). The hard shoulder is opened through overhead gantry signals and closed through the display of a red cross above the lane. In the Netherlands examples of hard shoulder running schemes exist at the A27 and A28 at Utrecht and the A50 at Arnhem. These locations do not involve the use of the hard shoulder through a junction: they are mainline sections.

During implementation of the Peak Hour Lane the carriageway speed limit is reduced to 90kmph from the national speed limit of 120kmph. During normal operation an incident detection system alerts operators of stationary vehicles on any lane and allows operators to set a red cross above the lane and close it. It is estimated that the time taken between an incident occurring and closing the lane is two minutes maximum. When an incident has occurred during operation of the Peak Hour Lane the lane is closed to allow emergency services to access the incident.

**Emergency Refuge Areas (ERAs) are provided for use by drivers when a breakdown occurs. Emergency telephones are situated in the ERAs but operators are alerted immediately when a driver enters the area and can call recovery vehicles (which are situated at slip roads in order to reduce response time to a few minutes). Vehicles are escorted out of the ERA during which time the Peak Hour Lane in the vicinity of the ERA is closed.**

## Road pricing

83. There are three broad categories of road pricing schemes already being used, either in the UK or abroad:

- payment for entering or being in an urban area within a defined boundary. London has the first major scheme in the UK, with a £5 a day charge for travelling in the central area. Initial results are encouraging. Since its introduction in February, traffic in the

central area has fallen some 15%, trips around the zone boundary are generally flowing freely, and additional buses have been able to carry passengers now choosing to use public transport. Indeed there has been a significant improvement in bus reliability across London as a consequence of lower congestion in the centre

- payment for using new capacity on inter-urban roads:
  - one option is to pay for use of a completely new road, like the M6 Toll, scheduled for opening in January 2004 to the north of Birmingham. This is a new motorway with three lanes in each direction, offering an alternative to the busy M6. Initial daytime charges will be £2 per trip for cars, and £11 per trip for lorries
  - an alternative is to pay for the use of new lanes on an existing road after widening. It is technically more difficult to implement than tolling an entire road, necessitating either physical separation of lanes or effective enforcement. Schemes involving charging for new capacity are in operation in San Diego and Orange County, California, USA. Both schemes involved new lanes in the median of an existing road
- payment for using existing capacity on inter-urban roads. This carries the potential to encourage diversion on to other roads less able to carry the traffic safely.

84. Building on recent technological developments, a more generalised system of road pricing is now also a possibility, with the potential to restructure motoring taxation so that the costs of driving reflect the user's choice of when and where to drive. This has a number of potential advantages over the pricing regimes above:
- it would reinforce the promotion of alternatives. Personal choices are not at present influenced by the knock on

effects of congestion on other people. Effective road pricing would make clear to road users the real costs of their journeys

- it would reduce the relative cost of journeys in uncongested conditions: for any given level of motoring taxation, a system which charged more for driving on busy routes at peak hours would effectively charge less for driving in uncongested conditions
- it reduces the potential problems of diversion in charging for existing roads, since charges could be set on an area basis, ensuring that the costs imposed on others as a result of diversion away from the busiest routes are fully reflected in the charges drivers face.

85. These theoretical benefits have been apparent for decades. The attractiveness of road pricing was established right back in the 1964 report, *Road Pricing – the economic and technical possibilities – report of a panel set up by the Ministry of Transport*. The early 1990s saw publication of the Green Paper *Paying for Better Motorways: Issues for Discussion* (HMSO, 1993). And the net benefits to motorists – private and commercial – could be substantial, as could the net benefits to society:

- more reliable, and faster, journey times
- greater efficiency, both in the use of our personal time, and for business travel and transport of goods
- reduced stress

- increased safety
- lower emissions and noise
- landscape protection (through reduced need for additional capacity).

86. Although these benefits are very substantial and offer the prospect of a substantial boost to UK productivity, we should ensure that the scheme provides net benefits across the economy. As a result any scheme of nationwide road user charging should:

- deliver higher economic growth and productivity for all regions of the UK
- be fair, respect privacy, and promote social inclusion and accessibility
- deliver environmental benefits
- deliver a more efficient approach to the structure of transport pricing.

87. It would be necessary to ensure that the overall effect of any package introduced – including nationwide charging itself, as well as potential offsetting tax cuts or spending measures – fulfilled our transport, environment and other objectives, and in particular the four principles set out above.

88. But no country has yet implemented such a scheme. In part, this is because the positioning and communications technology is only now becoming sufficiently sophisticated and affordable. However, given the many other consumer benefits of this technology (see Chapter 5), this is very likely to be the subject of a great deal of study and development in the future. It is therefore now increasingly realistic to consider the possibility of a future road pricing regime. As a nation we should begin to debate the implications this issue would have for the UK economy, and begin sensible planning and research work.

## 7. Fitting it all together – the choices

89. The Government is committed to tackling congestion and improving accessibility.

90. The Government is continuing to invest increasing sums in public transport, and actively promoting joint planning and transport solutions through its programme to develop sustainable communities.

91. It is also clear that there are gains for everyone in pursuing better management of the road network we have.

92. Beyond these priorities, there is a real choice for our nation, and others around the globe. Even with the best management of the network and vigorous promotion of alternatives, we will need to find the right balance between:

- the pressures on our roads
- the provision of further capacity, including road widening, and new roads
- the extent to which we might price the use of roads, and the methods for doing so.

93. The RAC Foundation, in its Report *Motoring Towards 2050*, summarised this choice as follows: “It is for the Government to decide how to strike

the balance between investment in roads, allowing congestion to increase, and restraining traffic growth by charges or taxes.”

94. As it reviews the 10 Year Plan, the Government sees the choices as follows:

- in urban areas, it remains likely – as assumed in the 10 Year Plan – that where congestion is (or will soon become) a problem, investment in public transport will need to be reinforced by effective incentives, including parking controls and pricing. The initial results from London are encouraging, and given that experience it may be timely for local authorities in urban areas to review their position on anti-congestion measures, including charging schemes. The Government plans to publish guidance on the development of such schemes later this year
- on the inter-urban network, some additional capacity is clearly required. The road widening recommendations from the multi-modal studies have been considered carefully by Government:
  - some have been rejected, either because the potential benefits are insufficient, or the environmental costs too great

- where additional capacity is provided, demand must be controlled. Several studies recommended strongly that additional capacity in the absence of such control would be short-sighted, and result only in requests for further widening in a few years' time. As a result, the decisions to increase capacity on the strategic network are taken with a parallel commitment to consider what is necessary to ensure that effective measures are in place to lock in the benefits
- there are, as successive Governments have recognised, benefits to road users, and to the wider community, from reflecting through prices the costs of choices to drive on busy roads at busy times. The extent to which such a regime is necessary depends critically on the effectiveness of parallel strategies (management and investment in public transport), and ultimately on its public acceptance as a better alternative to yet further capacity or yet higher congestion
- the Government has accepted the case for road pricing for lorries. But for cars that choice cannot be made sensibly without knowing in more detail how a pricing regime might be designed. So, in light of the recommendations from the multi-modal studies, the Government has decided to undertake a detailed feasibility study of road pricing. Decisions on whether to implement such a regime are for the future, and the regime could not – in any case – be in place this decade. The box

opposite sets out the how the study will operate

- in the meantime, the congestion problems faced by many urban areas are likely to worsen. To facilitate the establishment of urban congestion and workplace charging schemes, the Government reaffirms the commitment in the Transport Act 2000 that any local authority which introduces its own scheme before 2011 under the powers already available will continue to keep the revenue for at least the first decade after implementation, irrespective of whether or not a national scheme is introduced subsequently. The Government will take into account the existence of such schemes in the design and implementation of any national scheme.

### Road charging feasibility study

The Government will establish a comprehensive study which will examine possibilities for charging, with the following terms of reference:

To advise the Secretary of State on practical options for the design and implementation of a new system for charging for road use in the UK.

The study should take into account the following objectives for any new charging system:

- to deliver a more efficient approach to the structure of transport pricing
- to be fair, respect privacy, and promote social inclusion and accessibility
- to deliver higher economic growth and productivity for all regions of the UK
- to deliver environmental benefits.

#### The advice should cover:

- (i) the options for the structure of the charging regime
- (ii) the estimated impact of each charging regime, based on a range of scenarios. The impacts should include those on congestion and accidents, on the environment (in particular energy consumption, carbon emissions and local air quality), on public and private modes of transport (including rail and air), on different groups of people and on different areas (including urban and rural areas)
- (iii) the relationship with congestion charging schemes already in place
- (iv) legal issues, and in particular safeguards for confidentiality
- (v) the options for the technology used for the scheme (including issues of interoperability with other schemes here and abroad) and the potential costs of introduction and operation
- (vi) the options for managing the transition to a full scheme and potential timetables, including the need for practical tests and research.

The study is to be directed by a Steering Group chaired by the Department for Transport and involving key stakeholders.

95. Within this overall road strategy framework, the Government will:

- develop ready for public inquiry the road schemes that have now been agreed in principle, including the detailed mitigation of environmental effects
- introduce the new traffic manager roles, supported by new legislation, for the Highways Agency and local authorities, early in 2004
- continue to invest in and improve public transport
- report on progress of work within this framework.

## Annex A – multi-modal studies

A programme of multi-modal studies (MMS) was launched in March 1999, following the 1998 Trunk Roads Review, to take an integrated approach to some of the most severe transport problems on our strategic road network.

Prior to the announcements made in parallel with this paper on eleven of the studies, we responded to eight earlier studies:

<b>Study</b>	<b>Date of announcement</b>
Access to Hastings	July 2001
Cambridge to Huntingdon	December 2001
South East Manchester	March 2002
London to South West & South Wales	December 2002
West Midlands to North West (M6)	December 2002
North/South Movements in the East Midlands	December 2002
A453 (M1 J24 to Nottingham)	December 2002
A1 (North of Newcastle)	December 2002

Each study has looked at the contribution all modes of transport can make – including road, rail, bus, light rail/guided bus, walking and cycling – in the delivery of long term solutions.

Our responses ask delivery agencies (Highways Agency, Strategic Rail Authority (SRA) and local authorities) to take forward various work streams, subject to further appraisal and development, affordability and statutory procedures. These include:

### Roads

- increasing capacity on the M6 between Birmingham and Manchester between junctions 11a and 19 together with junction improvements, safety and traffic management measures
- a programme for the M1 in the East Midlands of junction improvements, provision of climbing lanes and widening between junctions 21 and 30, together with safety and traffic management measures

- junction improvements and climbing lanes on the M4 and M5 near Bristol and dualling most of the remaining single carriageway sections of the A303
- improvements to the A14 including the M11/A14 junction and widening the A14 between Ellington and Fen Ditton in Cambridgeshire
- improving sections of the A1 North of Newcastle.

### Public transport

- possible extensions to the Nottingham Express Transit
- enhanced public transport in the M6 corridor
- park and ride sites linked to bus priority measures in urban areas in the South West
- possible guided bus between Cambridge and Huntingdon
- possible Metrolink extensions in South East Manchester.

### Rail

The studies made a number of rail recommendations which will feed into the SRA's longer term strategies for the rail network. In the shorter term, we have asked the SRA to examine opportunities for taking forward improvements recommended by the studies. These could be achieved, for example, through the SRA's Route Utilisation Strategies, franchising process and incremental enhancements to existing renewal of track and signalling.

The SRA's Strategic Plan over the next decade will help to deliver service improvements recommended by the multi-modal studies. Planned improvements include:

- upgrading the West Coast Main Line will provide major benefits in the M6 corridor
- on the M1 corridor new rolling stock, faster trains and improved frequency will be delivered on the Midland Main Line
- a range of measures to improve capacity and performance on routes from London to the South West and Wales
- replacement of "slam door" rolling stock with air conditioned rolling stock on the South Central, South Eastern and South West Trains franchises.

# Annex B – the Government's *Powering Future Vehicles* strategy

## Introduction

The Energy White Paper *Our energy future – creating a low carbon economy*<sup>1</sup> earlier this year announced the steps which the Government was taking to put the UK on the path to a 60% reduction in its carbon emissions by 2050.

Transport is important because it accounts for around one quarter of the UK's carbon emissions – 85% of it from road transport. But there is major potential to reduce transport's impact on the environment, in particular through cleaner, more fuel efficient vehicles, and through increased use of low-carbon fuels such as biodiesel and bioethanol.

Transportation is a shared responsibility, and the Government is working closely with the automotive and fuel industries, vehicle users, consumer and environmental interests and other stakeholders, towards two fundamental objectives:

- to promote the development, introduction and take up of new vehicle technologies and fuels
- and at the same time, to ensure that the UK's automotive industries are fully engaged in the new technologies.

This is so that the UK will lead the global shift to low-carbon transportation, building competitive advantage for UK industry.

The measures to achieve this are set out in the *Powering Future Vehicles* strategy, published in July 2002 jointly by DfT, DTI, DEFRA and the Treasury<sup>2</sup> – all of which have key policy responsibilities in this area.

An important development since *Powering Future Vehicles* issued is the setting up of the UK *Low Carbon Vehicle Partnership* – Low CVP<sup>3</sup>. The Partnership is an action and advisory group, bringing together the vehicle and fuel industries and other stakeholders, to encourage business engagement in the shift to low carbon transport. The Partnership is steered by a Board of senior industry, NGO and other leaders. The Board Chairman is the Managing Director of Toyota GB. DfT and DTI are members of the Partnership, and are providing financial support for its secretariat.

<sup>1</sup> Available on [www.dti.gov.uk/energy/whitepaper/index.shtml](http://www.dti.gov.uk/energy/whitepaper/index.shtml)

<sup>2</sup> Available on [www.roads.dft.gov.uk/cv/power/pdf/strategy.pdf](http://www.roads.dft.gov.uk/cv/power/pdf/strategy.pdf)

<sup>3</sup> Further information available from [www.lowcvc.org.uk](http://www.lowcvc.org.uk)

## Fuel efficiency – reducing fuel use and carbon emissions

The fuel efficiency of cars is progressively improving. This reflects in particular the Voluntary Agreements which the European, Japanese and Korean car makers have entered into with the EU Commission, under which they will cut the fuel consumption and CO<sub>2</sub> emissions of the average new car to 140 grams per kilometre (g/km) by 2008-09 – a reduction of 25% compared with the base year 1995. (140g/km equates to around 53 miles per gallon for diesel, or 48 mpg for petrol – the 1995 new car averages equating to around 40 and 37 mpg respectively for diesel and petrol cars.) At the same time, cars have become safer, larger, better performing, and with cleaner emissions.

The fiscal treatment of cars is important, and the UK has led the way internationally in moving our key vehicle taxes – Vehicle Excise Duty and Company Car Tax – on to the basis of cars' carbon emissions. These tax changes complement and support the successful operation of the Voluntary Agreements, under which the auto companies develop and bring increasingly low-carbon cars into the showroom, by encouraging and incentivising motorists to take up the lower-carbon cars on offer.

## Pushing fuel efficiency further

The Government's research and development programmes also support industry's development of more fuel efficient vehicles. These programmes include the DfT's New Vehicle Technology Fund which supporting the building of demonstration pilot vehicles, testing out ideas coming out of the research laboratories.

In April, the Secretary of State announced a major new "Ultra Low Carbon Car Challenge" project under the Fund. This invites and offers up to 50% Government contribution to the building of a demonstration pilot – the specification being that the qualifying cars must be full size family cars, must have fuel consumption and CO<sub>2</sub> emissions of 90g/km or below (which is around 40% below today's average new car, and means that the car would travel up to 1,000 miles between refills, with today's 12 gallon tank), and must be capable of being mass produced at an affordable price within the near to medium term.

The Low Carbon Car Challenge reflects the major potential for improving vehicles' fuel consumption and cutting CO<sub>2</sub> emissions through a whole range of technology advances, including:

- light weight materials
- improved gear-boxes and drive-lines
- "direct petrol injection" technology, which can improve fuel efficiency by up to 15%, particularly with the zero sulphur fuels now becoming available – and which the Government is to support with a fuel duty differential from September 2004
- continuously-variable transmission, ensuring that engines run constantly at peak efficiency

- regenerative braking, in which the energy presently wasted through friction is instead captured and recycled
- engines which cut off when the car is at rest, and restart instantaneously – reducing air pollution and noise also
- "hybrid" engine technology – a combination of electric and internal combustion power, which enables cars to work with maximum energy efficiency in stop-start urban driving as well as motorway cruising.

With these and other improvements coming through the development pipeline, a further doubling of fuel efficiency looks feasible.

## International action

UK policy action is important. But so also is international action, recognising the global nature of today's automotive industry – as the EU Voluntary Agreements on new car carbon emissions shows. In the Energy White Paper, the Government strongly endorsed the Voluntary Agreement approach, and announced that it wanted to work with the Commission in developing further voluntary agreements, or other arrangements with the same objective, to continue the reduction in average new car emissions.

## The long term shift to a very low carbon transport economy

Thus vehicles have got very much cleaner and more efficient – and look able to cut fuel consumption by another half – possibly more. But the UK's long term target of very deep reductions in CO<sub>2</sub> mean that we need to look at ways of reducing the emissions from road transport, and particularly at the nature of the fuel used in vehicles – at how transport can increasingly run on non-carbon energy.

The Energy White Paper identified this issue. It identified two major technology possibilities, both of which could contribute to the solution. These are fuel cell vehicles, running on renewably-produced hydrogen; and the large scale use of biomass-based fuels, which can potentially be made cheaply from a range of inputs – coppice and other woody raw materials, forestry and other agricultural by products, and also domestic and other refuse – which also alleviates another environmental problem, reducing the need for landfill and other ways of disposing of waste.

Both these options have wider implications for the UK's energy systems. Significant hydrogen use in transport significantly increases the demand for non-fossil electricity, and for future energy infrastructures. And significant use of biofuels for transport major implications for biomass production or international sourcing – and also biofuel production and distribution.

And the Government is now carrying out a detailed assessment of the overall implications of both these long term possibilities.

## Annex C – road safety

1. While Britain already has one of the best road safety records in the world – including the lowest rate of road deaths per head of population – the Government is committed to reducing road casualties and to improving our record still further.
2. In March 2000, the Prime Minister personally launched the Government's new road safety strategy *Tomorrow's roads – safer for everyone* which set some challenging targets for casualty reductions by 2010 and the policy framework for achieving them.
3. The two main targets in the strategy are a 40% reduction in the total number of people killed or seriously injured and a 50% reduction in the number of children (aged under 16) killed or seriously injured – compared with the averages for the years 1994 to 1998.
4. The measures in the strategy fall into 10 main themes:
  - safer for children
  - safer drivers – training and testing
  - safer drivers – drink, drugs and drowsiness
  - safer infrastructure
  - safer speeds
  - safer vehicles
  - safer motorcycling
  - safety for pedestrians, cyclists and horseriders
  - better enforcement
  - promoting safer road use.
5. Each theme has its own chapter in the strategy document detailing a range of proposals and summarising the key measures that will help to deliver the targets.
7. Progress in delivering the many strategy commitments is checked quarterly and reports are published on the Department's web site ([www.roadsafety.dft.gov.uk](http://www.roadsafety.dft.gov.uk)).
8. To help ensure that we achieve our targets, we are carrying out the first three yearly review of the strategy promised when it was launched. The review will look at the trends in different types of road casualty and the expected reduction that the further measures (new ones as well as continuing programmes) can make over the rest of the decade. The review will also help in the production of a detailed delivery plan that may offer a more effective means of checking progress through to the next review and beyond.

### Progress

6. The statistics just published for 2002 show that good progress is being made, with total deaths and serious injuries, at 39,407, being 17.3% less than the 1994-1998 baseline figure (nearly half way to the 40% target); and with child deaths and serious injuries, at 4596, being 33% less than its baseline (well over half way to its target).

# Annex D – demand and incident management and driver information – international experience

## Vehicle incident detection

In France, the DIVA (Immediate Detection of Stopped Vehicles) system is used for incident detection. DIVA comprises cameras installed on high poles along the emergency lanes and each camera covers 100-500 metres. Digital image processing tracks pixel movements and raises alerts for specific incident types. Operators also view the images from the cameras and can determine what form of intervention is required. It takes this system only 30 seconds to raise the alarm from the time when the vehicle stopped. A 99% detection rate is claimed, with the false alarm rate at less than 1% in tunnels and 5% on highways.

## Combined traffic management systems

Combined traffic management systems such as the Motorway Traffic Management System used in Sweden and the Netherlands, incorporate queue detection. In Gothenberg, this system is used on the Lundby Tunnel, using loop detectors and CCTV. Flows and speeds are measured, vehicles classified, vehicles travelling the wrong way can be identified, and incidents detected. The system uses individual lane control signals to provide smooth transitions for lane closures and uses variable speed limits to control speeds. Variable message signs provide relevant information for approaching drivers.

## Specialist highway personnel

In the Greater Stockholm area of Sweden “Highway Helpers” exist to assist with incident response and management. The Highway Helpers scheme consists of emergency vehicles equipped with a variety of high-tech and safety equipment. The Swedish National Roads Authority (SRNA) dispatches these vehicles to incidents. The Highway Helpers scheme was developed because, during rush hours, traffic on the road network is concentrated on a limited number of heavily congested motorways and truck roads, including bridges and tunnels. A single incident results in long queues, delays and a high risk of secondary collisions. The Highway Helpers operate on the main roads within a 10 mile radius of Stockholm City Centre. All of the emergency vehicles (except motorbikes) have on board computers that are used for communication and logging information. They have video cameras mounted on the windscreens and a GPS system for vehicle positioning.

The scheme started in 1996 and, following a successful trial period, was put into full operation in June 1998. Additional vehicles have been added to the original Highway Helpers fleet of four vehicles. The scheme has reduced congestion resulting from incidents, improved traffic safety (the risk of secondary accidents has reduced) and, in terms of costs, the scheme only needed to operate for one month to repay the cost of implementation.

## TECHNOLOGY

### Smartway in Japan

The Ministry of Land Infrastructure and Transport in Japan is developing an infrastructure based intelligent transport system known as “Smartway”. It will integrate Electronic Toll Collection (ETC), Advanced Cruise Assist Highways Systems (AHS) and the Vehicle Information and Collection System (VICS). Smartway is a conceptual highway which will enable a wide range of information to be exchanged among users. Smartway is based on advanced communication technologies comprising roadside sensors and detectors, optical fibre networks and vehicle based sensors. It is proposed that drivers will be supported at three levels: information (e.g. providing warnings of congestion and safe driving speed); control of part of the driving process (e.g. infrastructure controlled braking on the approach to a tight bend; and fully automated driving. It is proposed that Smartway will be implemented on all expressways and main roads by 2015. Japan Highways is proposing to implement a number of AHS services this year, including lane departure control, on part of the 2nd Tomei expressway, currently under construction between Tokyo and Osaka.

## PHYSICAL DEMAND MEASURES

### Ramp metering

Traffic lights on motorway slip roads – known as ramp metering – can be used for a fixed period in the day, for example during the morning peak. Or they can be responsive and used depending on local conditions near to the on-slip, thereby dealing with unexpected changes in traffic conditions. Or ramp metering can be system-wide (coordinated) traffic responsive and designed to deal with particular bottlenecks on sections of motorway. In the USA there are over 2,200 ramp metering sites and a growing number introduced in Europe. Examples of European schemes include: the A10 West in Amsterdam; a section of the Paris Ile de France; and the M-30 ring road in Madrid.

## ROAD PRICING ON NEW LANES

### Privately funded new toll roads

State Route 91, Orange County, California, USA is a 10 mile privately funded scheme which opened in December 1995. It consists of four express lanes (two in each direction) constructed in the median of an eight lane freeway. Tolls are collected electronically via windscreen-mounted transponders and overhead readers and vary according to the time of day. Tolls range from \$0.75 to \$3.50, with HOV 3 passengers+ paying a half-toll. Only vehicles equipped with transponders are permitted to use the Express Lanes.

# Annex E – modernising the taxation of the haulage industry – Lorry Road User Charge (LRUC)

## Introduction

In April 2002, Ministers from the Treasury and the Department for Transport announced that they would introduce a UK wide road user charge for all lorries – including foreign ones – using UK roads. They promised that, at the same time, there would be offsetting tax cuts for the industry.

Since that announcement, the Government has decided that the tax cuts will take the form of reduced duty on fuel for lorries liable to the charge.

Ministers hope that implementation of the charge will begin around 2006, but cannot be sure of an exact start date until it has been agreed with the market what can be delivered and thoroughly tested by when. Ministers will need to ensure that the right balance is struck between early introduction and quality and reliability.

## Background

The 2001 Pre-Budget Report said that the Government “is determined to ensure that lorry operators from overseas pay their fair share towards the cost of using UK roads. It believes that there are good economic, environmental and social reasons to introduce a lorry road user charge to ensure that lorry operators using UK roads contribute towards the costs that they impose, irrespective of their nationality. As the UK haulage industry already contributes towards the costs that it imposes, the Government will ensure that it does not pay more as a result of a new lorry road user charge, through implementing offsetting reductions in other taxes on lorry operators.”

## Objectives

The objectives for the charge are:

- fairness and efficiency – all users of UK roads should contribute at a level that reflects the costs they impose in the UK
- positive impacts on transport and the environment – the charge should reflect the costs of climate change, local air quality, road maintenance, safety, traffic congestion and noise.

To meet these objectives, the charge will:

- apply to all lorry operators, regardless of their nationality
- apply to all lorries over 3.5 tonnes
- apply on all UK roads – with the potential to have a different charge rate for motorways
- vary by lorry type (with heavier and more polluting vehicles paying more)
- have the potential to vary according to the time of day.

## Technology

The lorry road user charging scheme will contain three elements:

- the main scheme – fully automated (with vehicle on board-units) – for frequent road users
- an occasional user scheme – paper and/or web based – for infrequent road users
- an offsetting fuel duty scheme.

Details of what technology will be used to operate and manage the charging scheme still needs to be worked out in partnership with the private sector. But, the technology will probably involve a combination of satellite positioning and mobile communications systems. The overall scheme will also need to include measures to ensure confidentiality, and to combat fraud and evasion.

## More information

More information about the lorry road user charge, and links to its Progress Reports, can be found on the following Government web sites:

- [www.dft.gov.uk](http://www.dft.gov.uk)
- [www.hmce.gov.uk](http://www.hmce.gov.uk)
- [www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk).

Enquiries about the charge should be sent to the LRUC Project Team at HM Customs and Excise – [lruc.enquiries@hmce.gsi.gov.uk](mailto:lruc.enquiries@hmce.gsi.gov.uk).

