

The Eddington Transport Study

The case for action:
Sir Rod Eddington's
advice to Government

December 2006

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FOREWORD

Dear Chancellor and Secretary of State,

I was asked to advise the Government on the long-term links between transport and the UK's economic productivity, growth and stability, within the context of the Government's commitment to sustainable development. I am pleased to present to you my report – *Transport's role in sustaining the UK's productivity and competitiveness*.

The UK transport system supports a staggering 61 billion journeys a year. In broad terms it provides the right connections, in the right places, to support the journeys that matter to economic performance. The UK has a greater proportion of its population connected to the strategic road and rail networks than its European competitors, and provides the connections between cities to facilitate return business trips in a day. Tellingly, investors rate London as the most attractive city to do business in Europe and view the quality of its international connections, and its domestic networks, as a key element of its advantage.

This Study demonstrates that the performance of the UK's transport networks will be a crucial enabler of sustained productivity and competitiveness: a 5 per cent reduction in travel time for all business travel on the roads could generate around £2.5 billion of cost savings – some 0.2 per cent of GDP. Good transport systems support the productivity of urban areas, supporting deep and productive labour markets, and allowing businesses to reap the benefits of agglomeration. Transport corridors are the arteries of domestic and international trade, boosting the competitiveness of the UK economy.

Correspondingly, transport policies offer some remarkable economic returns with many schemes offering benefits several times their costs, even once environmental costs have been factored in.

To sustain future productivity, transport policy must reflect the economic and structural changes that are shaping the UK's transport needs. The significance of cities and large urban areas, as highly productive centres of the service-based economy, is growing: 55 per cent of commuter journeys are to large urban areas and 89 per cent of delay caused by congestion is in urban areas. The growth in international trade makes a very significant contribution to the UK's economy: 28 per cent of the UK's national income is traded. Over the last 40 years falling international transport costs have boosted trade, increasing the UK's economy by over 2.5 per cent.

Whilst much of the system works well, it is already clear that some parts of the system are under severe strain, and looking ahead, significant transport challenges are looming. Continued economic success is forecast to lead to rising demands – if left unchecked 13 per cent of traffic will be subject to stop-start travel conditions by 2025. The CBI identifies transport as one of the three future competitiveness issues for the UK.

Given their significance to the economy, and the fact that most transport challenges are – or will be – concentrated in these areas, my Study shows that the strategic economic priorities for long term transport policy should be growing and congested urban areas and their catchments; the key inter-urban corridors; and the key international gateways.

Addressing the challenges in these areas requires a sophisticated approach. There is a major prize from getting the prices right across all modes – this makes strong economic as well as environmental sense.

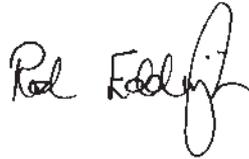
At the same time, Government should continue to deliver sustained investment, targeted in those places. There is plenty to be done and concerted action to avert future transport problems is now needed.

To ensure this investment is successful, the delivery chain for transport needs to adapt to changing demands: there are challenges for national and sub-national governance, and for the operation of the planning system for major projects.

The transport sector also needs to play its role in economy-wide reductions in greenhouse gas emissions. To meet that challenge, I have long argued that the transport sector, including aviation, should meet its full environmental costs. Indeed, my report and my recommendations extend that principle and arguing that, for economic reasons as well as social or environmental, all transport users should meet all their external economic, social or environmental costs: hence my strong backing for congestion-targeted road pricing. As the Stern Review made clear, pro-environment is also pro-growth, and I am grateful to Sir Nicholas for chairing the input of academics to this Study.

I set out my arguments, and the evidence supporting them, in my main report. The four volumes run to over 350 pages. I am also publishing online, ten very detailed supporting documents and a full set of stakeholder submissions. However, I have also written a much shorter, summary report, setting out my key conclusions and key recommendations: I suggest that readers should start there.

I hope you will find the report both interesting and compelling, and a sound contribution to future transport policy in the UK.



Sir Rod Eddington

Acknowledgements

In conducting this study I have benefited enormously from the help and assistance of many people. I would like, first, to thank the small team who supported me: Catherine Adams, James Brown, Michael Clark, Eric Crane, Kat Deyes, Gavin Gaunt, Ruth Harper, Oliver Jones, Rita Patel, Lara Rose, Tracey Waltho and Caroline Wood.

Whilst it is impossible to name them all, I would particularly like to thank a number of important groups: all the stakeholders who provided input and evidence to the study; the many people, organisations and businesses who gave their time to debate the issues with me as I went around the country; Sir Nick Stern, who chaired the Academic Friends and has been a trusted adviser; the Academic Friends – Paul Cheshire, Robert Cochrane, Nick Crafts, Stephen Glaister, Dieter Helm, Steve Machin, Peter Mackie, Henry Overman and Tony Venables – all of whom provided great insight, rigour and challenge to assist me in reaching my conclusions; and the many people within government, and particularly within the Department for Transport, who have contributed evidence to the study. Whilst these contributions were fundamental to my thinking, I would stress that the conclusions and recommendations are my own.

KEY FINDINGS AND RECOMMENDATIONS

1 There is clear evidence that a comprehensive and high-performing transport system is an important enabler of sustained economic prosperity: a 5 per cent reduction in travel time for all business and freight travel on the roads could generate around £2.5 billion of cost savings – some 0.2 per cent of GDP.

2 Historically, new connections have played a pivotal role in periods of rapid economic growth in many economies, but in mature economies with well-developed transport networks it is transport constraints that are most likely to impact upon a nation's productivity and competitiveness. For example, Ireland's recent growth was achieved predominantly on the back of an attractive investment environment and investment in skills.

3 Transport networks support the productivity and success of urban areas and their catchments, by getting people to work, supporting deep and productive labour markets and allowing businesses within the area to reap the benefits of agglomeration. 55 per cent of commuter journeys are to large urban areas. 69 per cent of business trips are less than 15 miles in length. 89 per cent of the delay caused by congestion is in urban areas, and agglomeration effects add up to 50 per cent to the benefits of some transport schemes in London.

4 Transport corridors are the arteries of domestic and international trade, boosting the competitiveness of imports and exports. 28 per cent of the UK's national income is traded and, over the last 40 years, falling international transport costs have boosted trade, increasing the UK's economy by over 2.5 per cent.

5 However, emissions from the transport sector are a significant and growing contributor (around a quarter in 2004) to the UK's overall greenhouse gas emissions, although the growth in emissions is forecast to plateau in 2010. Those emissions impact on long-term economic growth by contributing to global climate change – a point reinforced by the recent Stern Review of the economics of climate change. Transport will therefore need to play an important role in an economy-wide response to that challenge. To do so, it is essential, both from an economic and environmental perspective, that the environmental impacts of transport are fully reflected in decision making. The transport sector, including aviation, should meet its full environmental costs. The conclusions in this Study therefore, are based on analysis which reflects environmental costs and benefits.

6 Delays and unreliability on the network have direct costs to people and businesses, increasing business costs and affecting productivity and innovation. Eliminating existing congestion on the road network would be worth some £7-8 billion of GDP per annum. It would never be economically rational to eliminate this completely but it does illustrate that the sums involved are far from trivial.

7 The UK transport system supports a staggering 61 billion journeys a year. In broad terms, it provides the right connections in the right places to support the journeys that matter to economic performance. The UK has a greater proportion of its population connected to the strategic road and rail networks than its European competitors and provides the connections between cities to facilitate return business trips in a day. Logistics companies can deliver to over 75 per cent of the UK population from their West Midlands warehouse hubs in a half-day truck drive. Tellingly, investors rate London as the most attractive city in which to do business in Europe, and view the quality of its international connections and its domestic networks as a key element of its locational advantage.

8 However, travel demand is growing rapidly due to continued economic success and is densely concentrated on certain parts of the networks at certain times of day. As a result, parts of the system are under serious strain. If left unchecked, the rising cost of congestion will waste an extra £22 billion worth of time in England alone by 2025. By then 13 per cent of traffic will be subject to stop-start travel conditions. Commuter rail lines are forecast to see further increases in overcrowding, and intercity rail services will see many trains at or beyond seating capacity on the approaches to cities.

9 Because the UK is already well connected, the key economic challenge is therefore to improve the performance of the existing network. But there is little strategic case for action in all places. To meet its economic goals for transport, Government should prioritise action on those parts of the system where networks are critical in supporting economic growth, and there are clear signals that these networks are not performing.

10 On this basis, the strategic economic priorities for long-term transport policy should be growing and congested urban areas and their catchments; and the key inter-urban corridors and the key international gateways that are showing signs of increasing congestion and unreliability. Government should focus on these areas because they are heavily used, of growing economic importance, and showing signs of congestion and unreliability – and these problems are set to get significantly worse. They are the places where transport constraints have significant potential to hold back economic growth.

11 There should be a sophisticated policy mix in response to these challenges: transport projects in these places offer remarkably high returns, with benefits four times in excess of costs on many schemes, even once environmental costs have been factored into the assessment. There are very high returns from making best use of existing networks. Getting the prices right across all modes offers a very real prize: pricing on the roads offers potential benefits of up to £28 billion each year in 2025 (around £15 billion of which are direct GDP benefits); and getting the environmental prices right across all modes makes strong economic as well as environmental sense. Better use measures, such as traffic flow management, can offer returns as high as £5 for every pound spent, and mixed mode at Heathrow would offer lifetime benefits of £1.7 billion.

12 The economic case for targeted new infrastructure is strong and offers very high returns – the best schemes offer returns in the region of £5-10 for each pound invested. Government should therefore continue to deliver, together with the private sector, sustained transport investment. There are good returns across the priority areas, but smaller projects which unblock pinch-points, variable infrastructure schemes to support public transport in urban areas and international gateway surface access projects are likely to offer the very highest returns, sometimes higher than £10 for every pound spent. However, large projects with speculative benefits and relying on untested technology, are unlikely to generate attractive returns.

13 Getting the prices right means making a comprehensive assessment of the full range of economic, environmental and social impacts of transport policies, including climate change. Not only does this ensure that full account is taken of environmental and social impacts but as these impacts have economic consequences, it also ensures that the economic assessment is sound. As expected, the evidence suggests that, on average, the inclusion of such effects reduces the returns from transport. For road schemes, the benefits are on average reduced by around £1 for each pound invested, although there is significant variation: the effect is smaller for many schemes but some see significant reductions (up to £3-4 per pound spent). Public transport schemes in urban areas can have environmental and social benefits.

I4 The delivery chain for transport needs to adapt to changing demands: national government should take a rigorous and systematic approach to policymaking, by focusing on objectives and delivering high return schemes, rather than modes or technologies; sub-national governance structures need the right responsibilities and scope to support the evolving patterns of local and regional journeys – in one area alone up to ten metropolitan authorities and the Passenger Transport Authority are required to cooperate to deliver the city’s bus priority measures; and the delay and uncertainty of the planning system for major transport projects – the Thameslink 2000 scheme required over 30 consents under four different Acts and took over eight years – should be substantially reduced.

I5 In the face of these challenges, government will therefore need to show considerable foresight to deliver a transport system capable of supporting the continued success of the UK economy in the global market place, whilst ensuring that transport plays its role in meeting environmental challenges. In order to do so, I recommend that:

1. To meet the changing needs of the UK economy, Government should focus policy and sustained investment on improving the performance of existing transport networks, in those places that are important for the UK’s economic success;
2. Over the next 20 years, the three strategic economic priorities for transport policy should be: congested and growing city catchments; and the key inter-urban corridors and the key international gateways that are showing signs of increasing congestion and unreliability. These are the most heavily used and economically significant parts of the network;
3. Government should adopt a sophisticated policy mix to meet both economic and environmental goals. Policy should get the prices right (especially congestion pricing on the roads and environmental pricing across all modes) and make best use of existing networks. Reflecting the high returns available from some transport investment, based on full appraisal of environmental and social costs and benefits, the Government, together with the private sector should deliver sustained and targeted infrastructure investment, in those schemes which demonstrate high returns, including smaller schemes tackling pinch points;
4. The policy process needs to be rigorous and systematic: start with the three strategic economic priorities, define the problems, consider the full range of modal options using appraisal techniques that include full environmental and social costs and benefits, and ensure that spending is focused on the best policies; and
5. Government needs to ensure the delivery system is ready to meet future challenges, including through reform of sub-national governance arrangements and reforming the planning process for major transport projects by introducing a new Independent Planning Commission to take decisions on projects of strategic importance.

16 I believe that, if Government implements these recommendations, the UK will create and maintain a modern, responsive and efficient transport system. Such a system is needed to improve the experience of all who use the UK's transport networks and to support the UK's competitiveness, boost the productivity of the economy, help UK businesses to compete on the global stage, whilst enabling government to meet its challenging environmental goals and improving the quality of life for all who live in this country.

17 It should be noted that in Scotland and Wales (and Northern Ireland when devolution is restored) it is for the devolved administrations to decide policies in devolved areas. Therefore the recommendations in this report do not apply to devolved areas of responsibility.

THE CASE FOR ACTION: SIR ROD EDDINGTON'S ADVICE TO GOVERNMENT

INTRODUCTORY REMARKS

From the invention of the wheel...

I.1 There is a wonderful story to be told about the role of transport in human history. Road networks underpinned the Roman Empire; ocean vessels gave different civilisations the means to exchange goods and learning across the world; and international travel has transformed our horizons and brought communities closer together.

I.2 From the invention of the wheel onwards, transport has been fundamental to economic progress and has led to huge improvements in our quality of life: rail, shipping, road and air transport revolutions drove industrialisation; created the world's great cities; gave birth to international trade and globalisation; and gave individuals unprecedented freedom to travel around their own countries and the world. In the UK, the advent of the railways gave many Britons their first taste of a day at the seaside – and even led to the creation of the first national football league. Today, rail networks facilitate the success of the biggest cities by providing large workforces to dense and hugely productive economic agglomerations; air transport and advancements in shipping are contributing to a new phase of globalisation and world growth; and transport services of every type allow people to move in search of better jobs and a better life.

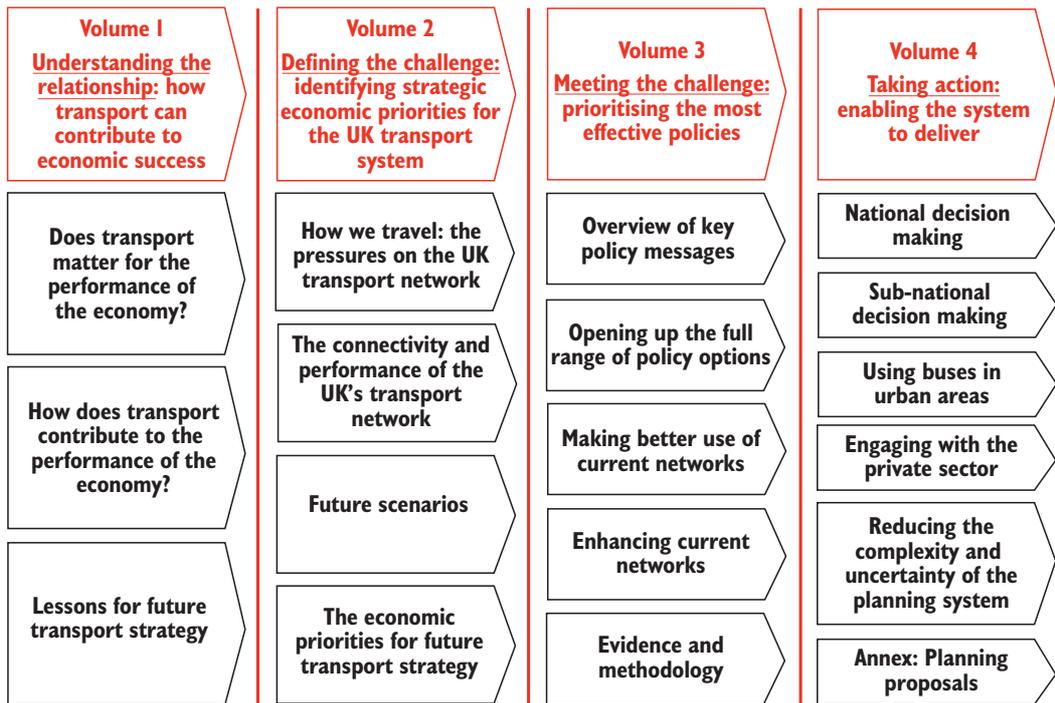
I.3 But these advances come with a cost: transport can affect the landscape, noise and pollution can damage human health and the environment, and the fuels that power current transport technologies are significant contributors to emissions of greenhouse gases. Sir Nicholas Stern's¹ report on the economics of climate change has provided compelling new evidence that these problems impact significantly on the environment, and on economic growth.

I.4 Whilst these insights are powerful, translating them into policy action requires a more sophisticated, evidence-based approach. Vested interests make claims about new technologies and new ideas, for instance arguing that transport projects will transform regional economic performance without addressing other underlying causes of underperformance. Studies make blunt comparisons between the infrastructure in nations with different histories, different geographies and different economic needs; overplaying the importance of transport investment, or denigrating the role transport has played in creating the quality of life we enjoy today.

I.5 In order that we can all understand these complexities of transport's relationship with growth more clearly, I was asked by the Chancellor and the Secretary of State for Transport to provide advice on the long-term impact of transport decisions on the UK's productivity, stability and growth within the context of the Government's commitment to sustainable development. I want to tell a balanced and thoroughly evidence-based story about the relationship between transport systems and economic success, in the particular context of the United Kingdom. I seek to assess the benefits that improvements to the UK's transport system can bring to the economy and to our daily lives. I warn of the economic consequences of allowing a decline in the UK's system – whilst guarding against the costs of excessive provision, highlighting the consequences of meeting unconstrained demand (not least on the environment), and warning of the cost of poor investment decisions.

¹ *Stern Review on the economics of climate change*, HM Treasury and Cabinet Office, 2006. See: www.sternreview.org.uk

1.6 In this summary I highlight the main messages that emerge from my work, following the structure of my main report. The Study looks first, in Volume 1, at the latest international evidence describing transport's link with economic growth and productivity. It applies this understanding to the UK context, in Volume 2, in order to draw conclusions about where transport may hold back the future success of the UK economy. In Volume 3 the study then draws on a wide-ranging database of transport policies and projects in order to make recommendations about the broad types of policy measures that are likely to deliver the biggest overall benefits taking account of the full financial and environmental costs. Finally, in Volume 4, the Study considers the various barriers that may hinder the successful delivery of these policies at a national, regional and local level.



VOLUME I: UNDERSTANDING THE RELATIONSHIP – HOW TRANSPORT CAN CONTRIBUTE TO ECONOMIC SUCCESS

I.7 Transport can play an important role in the success of modern economies. The evidence drawn together in Volume 1 suggests that:

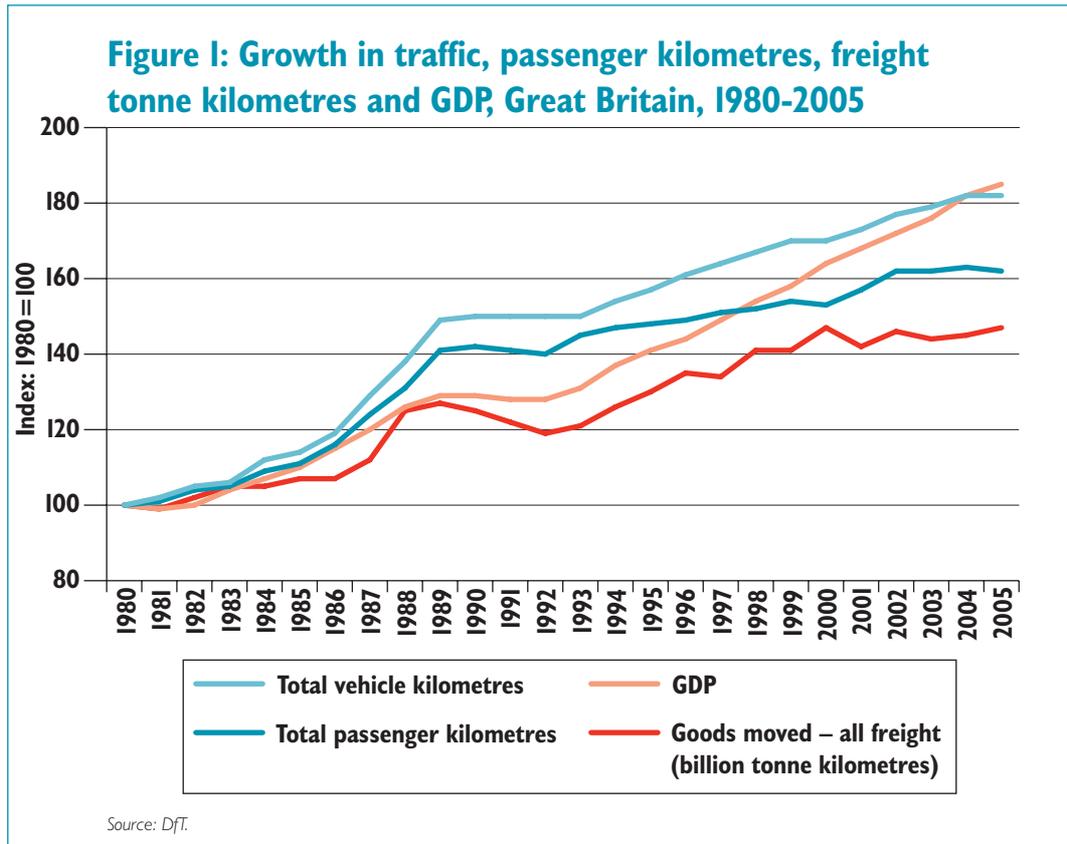
- History has shown a compelling link between the transport system and economic prosperity, with new transport connections enabling new economic relationships to be forged.
- In mature economies such as the UK, with established transport networks, the benefits from improved transport are likely to be greatest when focusing on congestion and bottlenecks. Though at a global level, increasing international connectivity may yet have an ongoing role in enabling new trading relationships that could unlock significant growth benefits.
- Transport cannot of itself create growth: it is an enabler that can improve productivity when other conditions are right. Economic growth itself causes rising transport demands which, if left unchecked, can put the transport network under strain, damaging productivity and competitiveness.
- How infrastructure is used can be as important as the overall level of investment.
- Looking forward, transport's key economic role is likely to be in supporting the success of the UK's highly productive urban areas in the global market place, and enabling efficient freight distribution.

I.8 Transport will also need to play its role in an economy-wide response to the global challenge of climate change. Sir Nicholas Stern has powerfully demonstrated that acting now and acting intelligently is the pro-environment, pro-growth strategy; and that this should be achieved through pricing environmental costs, promotion of low carbon technologies, and measures to encourage behavioural change. The Stern Review argued that in moving to a low-carbon economy the transport sector could be among the last sectors to experience absolute levels of emissions cuts because it would be more efficient to focus first on those sectors which can abate most cheaply.² Significant emissions reductions will, however, need to be made in all sectors.

The need for transport in a successful modern economy

I.9 A good transport network is important in sustaining economic success in modern economies: the transport system links people to jobs; delivers products to markets; underpins supply chains and logistics networks; and is the lifeblood of domestic and international trade. Policymakers have long recognised that transport plays an important role in the economy, and modern economies spend substantial sums on investing, maintaining and managing their transport networks.

² *Stern Review on the economics of climate change*, HM Treasury and Cabinet Office, 2006.



I.10 As incomes rise, so people and businesses want to use transport more: the relationship between transport demand and GDP (Gross Domestic Product) growth in the UK in the post-war years, shown in Figure 1, illustrates clearly the very close relationship between transport and growth.³ Born of this economic success, congestion and reliability problems arise when demand starts to outstrip available capacity. Unless policy responds, these transport impacts will impose increasing costs on business and damage the UK's quality of life. But to understand this relationship better, I turned first to lessons from history.

There has been a compelling link between the transport system and economic prosperity throughout history

I.11 History is full of examples of how transport networks have played a critical role in driving phases of particularly rapid economic growth. Step changes in connectivity, often associated with new transport (and more recently communications) technologies, have often been of particular significance. This is an association explored in detail by a paper produced for this study, authored by Professor Nicholas Crafts and Dr. Tim Leunig.⁴

I.12 The evidence shows that some of the most significant step changes in connectivity have included: the impact of canals upon the location of domestic production; the effect of international shipping routes in opening up early phases of world trade; the role of mass transit railways in the creation of cities throughout the world; and the impact of the completion of motorways and inter-state highway networks in the United States on productivity growth. Such inter-urban and international connections have permitted radical

³ See Volume I of the main report for a longer discussion of the relationship between transport and economic success, and for a discussion of the evidence unperpinning these conclusions.

⁴ *The Historical Significance of Transport for Economic Growth and Productivity*, Crafts and Leunig, 2005, published alongside this study.

new production processes and allowed regions and countries to start trading in order to reap the benefits of increasing specialisation in the production of goods and services. The evidence is clear that in the context of a developing economy, establishing basic connectivity is a very significant contributor to rapid economic growth.

I.13 In countries with well-established transport networks, where connectivity between economic centres already exists, there is considerably less scope for transport improvements to deliver the periods of rapid growth seen historically. Instead the debate for such countries, including the UK, should be focused on the capacity and performance of existing domestic links, and the addition of new links to support the growth and performance of the labour market in growing and congested urban areas. Increasingly, studies are suggesting that the efficiency with which existing transport networks are used is at least as important as the underlying level of investment.

I.14 So it can no longer be expected that the impacts of domestic transport improvements will be transformational in economies such as the UK. Instead, such improvements can have important impacts by releasing constraints on the economy. Since most developed economies have well-established infrastructure networks, the relationship between transport and economic prosperity is likely, therefore, to be a more incremental one. But, as the evidence of this study goes on to show in Volume 3, it is a relationship which is still of considerable economic significance.

I.15 Having considered domestic connectivity, it is also important to consider the rapid expansion of international passenger and freight connectivity in the light of historical experience. The most recent phase of globalisation appears to be driven by a rapid expansion in global connectivity, provided both by new communications technologies, and falling international transport costs. Could this current transformation in international connectivity represent another step change that will drive significant growth in the global economy? It is perhaps too early to judge and I do not claim to have a definitive answer to this question. I have not scored any such transformational benefits when estimating the potential of aviation and shipping to contribute to future economic success. Nonetheless, policy makers must be alive to the role that international connectivity can play in supporting global economic growth.

Understanding how transport supports the economy

I.16 Transport has played a critical role in economic development but the historical and macro-economic evidence can only take us so far. To focus transport policy on where it will make a real difference it is crucial to understand: what users value from the transport system; the mechanisms by which transport impacts on the economy; where transport may be the answer to economic challenges; and what the future implications are for the UK given its role in the world economy.

I.17 Good measurement of transport's effects on the economy is of fundamental importance, and UK experts are at the forefront of this agenda. I am extremely grateful to the members of the small group of expert academics and government officials who advised my team and me on these matters. This study has sought to build on their expertise, and that of many others in the field.

I.18 The different mechanisms that underpin the relationship between transport and growth have been discussed at length in many previous studies⁵ and are the subject of a great

⁵ These are detailed more fully in Volume 1 of the main report.

deal of academic research. This study has sought to develop an understanding of those mechanisms which impact on GDP, in a way that can explicitly guide policy development and option generation to focus on the characteristics of the transport system that matter most to productivity and competitiveness.

I.19 The evidence is very clear that users want several things from the transport system, placing different weights on their relative importance. The key characteristics which are valued are: journey time, journey time reliability, cost, network coverage, comfort, safety and security.

I.20 When users experience an improvement or worsening of these characteristics, they feed through to impact on the economy through a variety of mechanisms – increasing business efficiency, investment and innovation, improving the functioning of agglomerations and labour markets, increasing competition, increasing trade and attracting globally mobile resources. These drivers are summarised in Figure 2 and detailed in Volume 1.2.

I.21 It is also clear that some of these microeconomic drivers are becoming more significant: notably the importance of reliability grows with wide-spread adoption of just-in-time management techniques; the importance of urban areas as centres of highly-productive service industry growth means an increasing role for transport in supporting agglomeration economies; and transport's role in facilitating trade and attracting and retaining globally mobile resources becomes ever-more important in a globalising world.

I.22 In addition to these GDP impacts transport affects the population's quality of life – which economists sometimes call 'welfare' – through its impact on the environment, by reducing commuting times, and by allowing people to make good use of leisure opportunities and participate in social activities that are fundamental to the fabric of their daily lives.

I.23 Detailed assessment of the impact of transport projects forms the bedrock of project appraisal, covering economic, environmental and social impacts. A significant proportion of the economic benefits (from freight and business time savings) are already well captured. However, current methodologies do not reflect other potentially significant impacts on the economy. Assessments of overall benefits on a project-by-project basis could increase by up to 50 per cent in some cases, if new evidence concerning the importance of reliability and agglomerations were to be included in the appraisal of transport schemes.

I.24 The incorporation of these 'missing' effects is particularly likely to impact on interventions in highly agglomerated major cities. Furthermore, important international effects, namely transport's role in boosting trade and globally-mobile activity are strategically significant, but as yet unmeasured even with significant recent advances in appraisal techniques.

I.25 In addition, current methodologies do not fully encompass the environmental impacts of projects. Until recently, carbon impacts were dealt with qualitatively, whereas recent developments permit an estimate of the price for the social cost of carbon emissions. My report recommends that transport strategy and appraisal should continue to develop as our understanding evolves, and in particular that the full range of effects described above should be incorporated into appraisal as a matter of urgency.

Figure 2: How transport impacts on the economy – the seven micro driver mechanisms:

- Increasing **business efficiency**, through time savings and improved reliability for business travellers, freight and logistics operations. A 5 per cent reduction in travel time for all business travel on the road network in Great Britain could generate around £2.5 billion of cost savings: 0.2 per cent of GDP.
- Increasing **business investment and innovation** by supporting economies of scale or new ways of working. The 2001 change in regulations that permitted 44 tonne trucks is estimated to have saved 134m truck km, £160 million of operating and fuel costs, and 135,700 tonnes of carbon dioxide.
- Supporting **clusters and agglomerations** of economic activity. Transport improvements can expand labour market catchments, improve job matching, and facilitate business to business interactions. Transport's contribution to such effects is most significant within large, high-productivity urban areas of the UK. London is the most significant example, adding 30 per cent to the time saving benefits of some transport schemes. Such productivity effects extend across commuter catchment areas, dropping away after forty minutes of travel time.
- Improving the **efficient functioning of labour markets**, increasing labour market flexibility and the accessibility of jobs. Transport can facilitate geographic and employment mobility in response to shifting economic activity e.g. in response to the forces of globalisation, new technological opportunities, and rising part-time and female participation in the labour market. Nationally, transport improvements are unlikely to have a large effect on the employment rate, though may do so in some local circumstances.
- Increasing **competition** by opening up access to new markets. Transport improvements can allow businesses to trade over a wider area, increasing competitive pressure and providing consumers with more choice. The UK is already well connected, so significant competition impacts are most likely to be felt from the integration of markets globally.
- Increasing **domestic and international trade** by reducing the costs of trading. Since 1960, falling transport costs have boosted the international trade of goods by 10-17.5 per cent, raising UK GDP by an estimated 2.5-4.4 per cent. Domestic trade links are particularly important to the economic success of some urban areas e.g. the relationship between the financial services sectors in Leeds and London.
- Attracting **globally mobile activity** to the UK by providing an attractive business environment and good quality of life. Such effects are of increasing importance but extremely difficult to quantify. However, the strategic focus of transport policy can be guided by the survey evidence which suggests that both domestic and international transport links can be important to attracting, retaining and expanding such activity, and that there is much commonality between the transport requirements of domestic and global firms.

See Volume I for more details on the sources of these estimates.

Look for clear signals before taking action

I.26 My reading of the evidence suggests that transport improvements aimed at tackling problems and shortages are most likely to offer real benefits: this is not about picking winners, but is about sustaining success.

I.27 As economic growth leads to increasing demand, an economy can ultimately become the victim of its own success because as congestion rises, so it starts to dampen growth. This is the most direct way in which transport will impact on growth in a developed economy, and such congestion effects can be particularly damaging in agglomerations or where they impact on the costs of doing trade, be that within the UK or beyond. In most cases, the best signals to identify where transport is acting to hold back growth will be the presence of clear signs of economic success (economic growth and very high wages and land prices), and that transport demand is starting to outstrip supply (signs of congestion and unreliability).

I.28 In areas without such clear signs, it is unlikely that transport is holding back productivity and growth. Without signs of congestion and high prices, any transport investment is likely to be high-risk in terms of delivering productivity and competitiveness benefits. The economic fortunes of areas which already have sufficient transport capacity to meet demand will not depend in any great part on transport improvements: such economies can continue to succeed without significant increases in transport provision. Even in less vibrant areas transport improvements will not turn around a local economy when adequate transport provision already exists. Instead, other policy measures will be important.

I.29 However, there are some potential opportunities, where economic theory suggests that investment could release latent economic potential despite the absence of congestion signals:

- if transport improvements enable an urban area to grow the size of its labour market significantly, this may lead to agglomeration benefits; or
- if new connections open up access to genuinely new markets, this will deliver trade benefits, particularly when providing new global connectivity; or
- if transport improvements contribute to the global attractiveness of the UK as a place to live, work and invest.

I.30 Projects aimed at achieving such goals should be approached with a high degree of caution. There is no substitute for careful cost-benefit analysis based on robust economic evidence and there are many examples around the world of projects founded on speculative demand forecasts, which did not deliver their purported economic benefits. Further research would be needed to understand the potential scale of these latent demands and the benefits may well be speculative. There is certainly enough for government to be getting on with in the meantime, to tackle the more certain looming challenges of congestion and overcrowding, where intervention offers far more certain economic benefits. Prioritisation of transport spending must mean focusing on those schemes where the economic benefits are more certain.

I.31 Nonetheless, I would urge the research community to fill these important gaps, particularly in light of the changing nature of the UK economy.

Informed choices: the right policies in the right places will contribute to productivity and competitiveness

I.32 Whilst there are circumstances where transport is very important in enabling economic growth, there are a number of reasons why it is wrong to think that transport is the key ingredient in all circumstances:

- there are times and places where countries have grown rapidly without significant transport improvements. For instance, Ireland's recent growth was achieved predominantly on the back of an attractive investment environment and investment in labour force skills. Only now, as greatly increased demand has started to outstrip supply, has transport become a factor in limiting that growth;
- not all transport projects will deliver growth benefits. In particular, where adequate transport infrastructure is already in place, additional investment is unlikely to deliver further economic benefits;
- “build it and they will come” is a dangerous approach to transport projects which attempt to regenerate areas and regions. Often the result is a two-way process in which local businesses actually lose out, as more productive and competitive firms from other regions can access the area and compete for previously protected markets. Only in some circumstances will transport have a role to play in regenerating an economy. In many potential regeneration cases there will not be signs (e.g. congestion) that inadequate transport capacity is constraining the growth potential of a particular area. It may well be other structural problems, such as skills shortages. For example, areas of London which benefit from very good transport connectivity, can also show very high signs of deprivation. Transport can only support growth if other vital conditions are right, and sometimes policies such as skills or fiscal incentives may be more appropriate in driving economic performance; and
- where the environmental impact of transport growth is not factored into decision-making, the positive impact of a transport project is likely to be overstated, since the negative long-term impact of transport emissions is not balanced against the short-term benefits. Correspondingly, the social benefits provided by transport, should also be factored into decision-making.

I.33 This important truth – that there are both good and bad transport policies and investments – suggests that being as smart as possible about investment and pricing decisions could yield considerable benefits for the UK economy. Such an approach needs to be alive to future economic and social dynamics and how they may impact on the country's changing transport needs.

A changing economy will mean changing demands on the transport system

I.34 The UK economy is changing rapidly and is likely to continue to do so in the face of the dynamics of the world economy. Over recent decades the UK economy has increasingly specialised in services and high-value manufacturing (such as precision instruments and pharmaceuticals), reflecting the UK's considerable comparative advantage in the 'knowledge-economy'. Looking forward, globalisation will continue to alter the structure of the UK economy and as the economy changes so will the demands on the transport system: aspects that were important ten years ago may be all but obsolete in ten years' time.

I.35 Urban agglomerations are becoming significant growth centres.⁶ Large urban areas are increasingly central to the productivity of the services economy, through deep, flexible labour markets that permit considerable specialisation and flexibility. Such urban areas are likely to demonstrate the characteristics that would be expected of rapid economic growth: high levels of congestion; high wages; and high land prices.

I.36 It seems clear that these large urban areas will be the drivers of UK growth over the next few decades. In turn, it is clear that their respective transport networks will continue to play a crucial role in supporting their ongoing success: by underpinning commuting journeys that create deep labour markets; by enabling rapid business to business contacts; and by providing international connections to support the export of high-productivity services.

I.37 Over coming years this anticipated growth of urban areas, and their catchments, is likely to be fed by increasing population and migration. Where additional housing is needed to support the continued success of a growing urban area, particularly to maintain and expand its labour market catchment, it is intuitive that in some circumstances new or improved transport connections will be needed to deliver potential agglomeration benefits. That is not to say that housing policy should simply drive transport needs: the importance of cost-effective policy-making applies here, as in any other area. The location of new housing, its transport and other infrastructure requirements, all need to be planned together in order to maximise the available benefits. Again this is an area which needs a much-improved evidence base to support robust decision making, particularly to quantify the economic benefits provided by housing expansion and how that interacts with transport provision.

I.38 There is another side to the UK's specialisation in services and high-value manufacturing, and that is an increased reliance on imported food, raw materials and low-end manufactured goods. Efficient import channels, both ports and airports, with sufficient capacity and resilience will be vital in allowing the economy to import these goods and to maintain low prices for industry and for consumers. So will efficient onward distribution channels.

I.39 A further dimension of globalisation is a world in which employees, businesses and investment capital are ever more mobile. The attractiveness of our urban areas, as places to live and work, could become increasingly important considerations in attracting globally mobile resources to contribute to the UK's productivity and growth.

I.40 In summary, these dynamics suggest that transport system will play an increasingly important role in supporting the economy in three principal ways:

- supporting deep labour markets and business to business connections in agglomerated urban areas, boosting productivity and flexibility;

⁶ *State of the English Cities*, ODPM 2006.

- providing international connectivity: (i) for services exporters – through aviation capacity and better surface connections; and (ii) for food and manufactured goods importers – through ports and internal distribution networks; and
- contributing to quality of life factors which will ultimately impact on growth and productivity through their influence on migration and investment decisions.

Climate change demands a different policy context for transport decisions: prices must reflect the true costs to the environment and will moderate transport demand

I.41 Alongside these changes in the global economy, environmental damage will increasingly have economic consequences. A series of important studies, culminating in the publication of Sir Nicholas Stern's Review in October 2006,⁷ have provided compelling evidence of the adverse impact that climate change will have on economic growth unless there is urgent, global action. I firmly believe that the world needs to face up to the reality of climate change, and that implies learning to live with a carbon-constrained future.

I.42 As transport contributes around a quarter of UK emissions and is the fastest rising source of carbon emissions within the economy in the near term, addressing the challenge of climate change has important implications for any long-term transport strategy. I support Stern's conclusion that urgent action is needed, through pricing, technology and innovation policy, and promoting behavioural change, to influence the behaviours and consumption choices of society. This will include the type and quantity of travel that the economy and society will choose to undertake. And as the UK contributes just 2 per cent of global emissions, it is obvious that some of the most effective policy responses will be international in nature.

I.43 The Stern Review shows that setting a price for carbon will be one of the most effective ways of bringing about a low-carbon economy (as part of a three-pronged strategy: see Figure 3). Such prices ensure that people feel the consequences of their decisions and encourages them to change their behaviours. For example, widespread trading mechanisms could allow carbon reductions to be achieved cost-effectively by 'buying' carbon reductions from the cheapest sources. To deliver the most effective actions will require global cooperation and national governments should start to plan for the impact of carbon prices on future transport needs.

I.44 I have long argued that all users, including air travellers, should pay the full costs of their travel, whether those are the costs of congestion or environmental damage.⁸ Accordingly, this was the starting point for my work 18 months ago. I have applied the same economic principles in my work, to inform my advice on managing congestion, namely to price externalities such that users bear the full costs of their journeys. The analysis includes evidence on the potential impacts of carbon pricing on transport demand when assessing the case for new infrastructure, and whilst uncertainties remain, the evidence suggests that the case for investment can be robust to such pricing.

⁷ *Stern Review on the economics of climate change*, HM Treasury and Cabinet Office, 2006.

⁸ For example, *How airlines can fight climate change*, Rod Eddington, 3 January 2005. See: www.ft.com.

Figure 3: The Stern Review – transport's role in an economy-wide response

The Stern Review argues that to stabilise concentrations levels at 550ppm CO₂ equivalent, a 25 per cent reduction in total emissions is needed by 2050. It prescribes policy action on three fronts:

- Prices – polluters should be faced with a carbon price;
- Technology – innovation policy is needed to bring forward new clean technologies; and
- Promoting behavioural change – for example, through information policies.

The Review identifies different types and timescales for adjustment in different sectors, according to where the costs of carbon reduction may be cheapest. It identifies that transport has a role to play in contributing to emissions reductions, that transport is amongst the fastest-growing carbon-emitting sectors and also has among the highest abatement costs. So, the Review acknowledges that, in moving to a low-carbon economy, the transport sector could be among the last sectors to experience absolute levels of emissions cuts because it would be more efficient to focus first on those sectors which can abate most cheaply.

The Review highlights, for instance, that a 60 per cent reduction in the carbon intensity of electricity production will be necessary, and that transport is likely to remain largely oil-based until 2050.

I.45 The second key part of Stern's analysis is that innovation policy has a crucial role in helping to bring forward the technological developments which can help us move to a low carbon world.

I.46 As I go on to argue later in this advice, helping to move transport to a low-carbon future is one of technology's most important challenges, and one to which innovators cannot fail to rise.

Conclusions and recommendations

I.47 I draw four main conclusions from this analysis:

- There has been a compelling link between the transport system and economic prosperity throughout history.
- This link continues to hold true in the UK and transport's key role now is supporting the success of the UK's highly productive urban areas in the global market place and enabling efficient movement of goods.
- Only by finding the right policies in the right places and focusing on releasing bottlenecks can transport improvements contribute to economic growth and productivity; many places will already have sufficient transport infrastructure to enable their economic success.
- Transport policy has no choice but to respond the challenge of climate change, for both environmental and economic reasons. Transport prices must fully reflect environmental externalities, and transport planning must take account of likely carbon prices.

VOLUME 2: DEFINING THE CHALLENGE – IDENTIFYING THE STRATEGIC ECONOMIC PRIORITIES FOR THE UK TRANSPORT SYSTEM

1.48 It is clear that the performance of a nation's transport network is a key component of its productivity and competitiveness.

1.49 It is therefore critical to understand how well the UK's current network supports the economy, and to identify future challenges. The analysis shows that:⁹

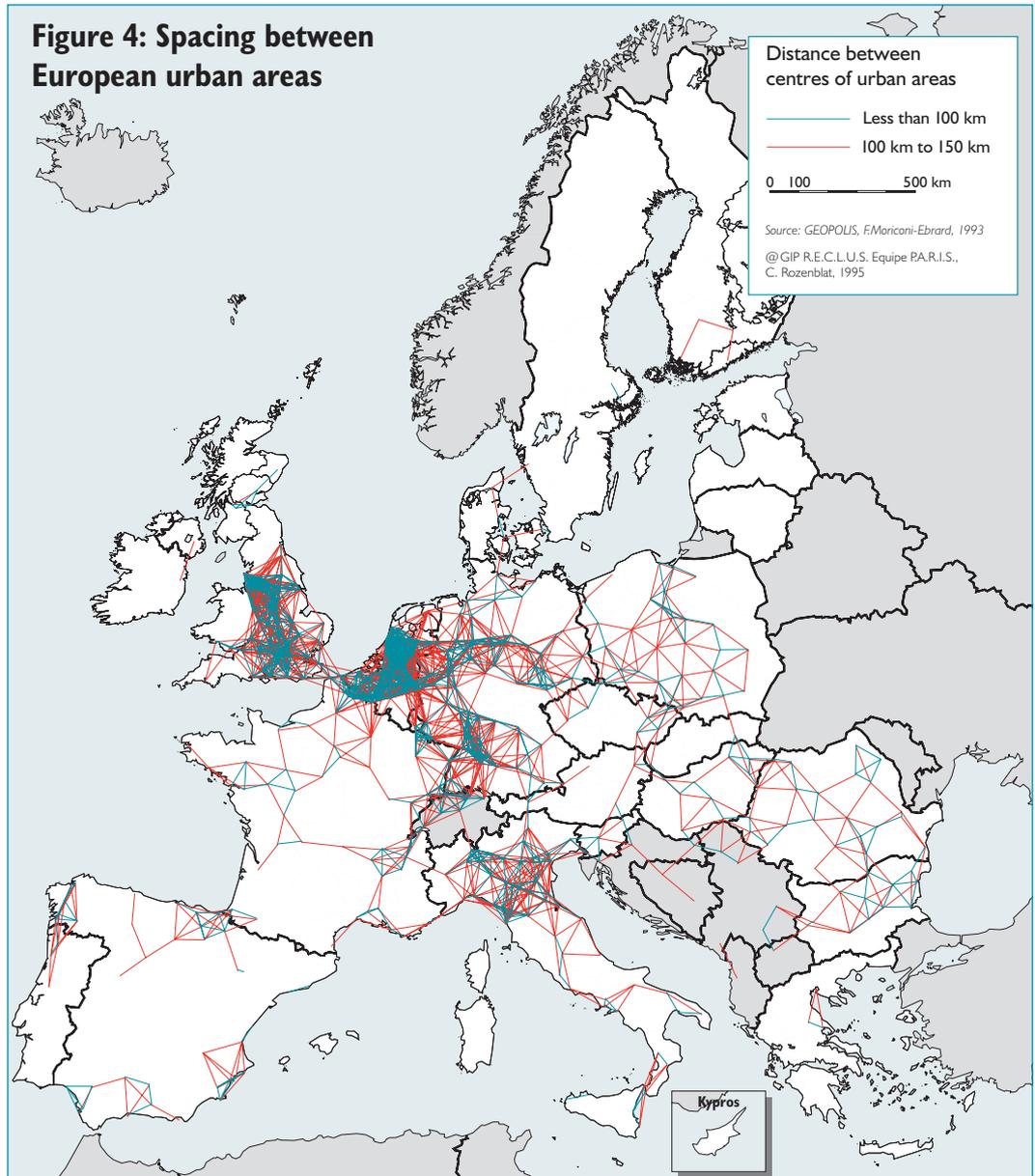
- The UK has good levels of connectivity – the national networks are in the right places, comparing well with European competitors.
- Demand for transport is concentrated on particular places, modes and times of day; and, together with continued economic success, this creates increasing demands on the network.
- These demands are putting parts of the system under serious strain.
- This will constrain the economy, and continued growth in demand, even when the sector pays its full environmental costs, will mean that these issues will persist without continued action.
- Looking ahead, the key strategic economic challenge is to improve the capacity and performance of the existing network in the UK's growing and congested urban areas and their catchments; the key international gateways; and the key inter-urban corridors.

The UK has good levels of connectivity – national networks are in the right places

1.50 Public perceptions of the UK's transport system are sometimes negative. However, benchmarking the UK's network against other countries suggests a more encouraging and complex picture. This Study's benchmarking does not seek to make simple and mode-based comparisons of motorway length or kilometres of high-speed rail line, which are often based on an assumption that "more" and "faster" are always better.

1.51 Importantly, instead this Study seeks to take into account the advantages and disadvantages of the UK's physical and economic geography when assessing performance. Although care should be taken with generalisations, the UK's economic geography means that the principal task of the UK transport system is not, in comparison to the needs of France or Spain, to put in place very high-speed networks to bring distant cities and regions closer together, in order to enable trading and facilitate economies of scale. Instead, because the UK's economic activity is in fact densely located in and around urban areas, domestic freight routes and international gateways, the greater task is to deal with the resulting density of transport demand.

⁹ Volume 2 of the main report sets out this analysis in detail.



1.52 This Study has developed new metrics to demonstrate how well the networks support actual demands on the system, given the different economic geographies: how the networks support dense urban labour markets; or facilitate access to a wide range of European business destinations within a day; or allow domestic logistic journeys to be completed within the permissible shift hours of Heavy Goods Vehicles (HGV) drivers. These more complex metrics, in avoiding a modal approach, provide a better understanding of how networks meet the demand placed upon them. For example, a new high-speed rail line between two cities would not offer the economy significant new connectivity or trading opportunities, if those cities were already a day-trip away from each other by existing rail, road or air links; likewise the level of motorway capacity is more important than the total length across the country if economic activity is densely located. In each case, an assessment of total length, even on a per capita or per unit of GDP basis, would not reveal any real insight into how well the transport systems meet respective demands.

I.53 Such metrics are very difficult to build, but from the evidence compiled by and made available to the team, it is clear that:¹⁰

- the UK has a higher percentage of its urban population connected to the strategic road and rail network than our major European competitors (over 45 per cent are connected to the strategic road network); over two-thirds of the UK's 73 town and cities with more than 100,000 inhabitants are directly connected to the motorway network and nearly two-thirds to the rail network;¹¹
- national connectivity between cities and regions compares well with European benchmarks: road and rail journey times between the biggest cities in the UK is close to the EU average;
- international linkages are world-leading: Heathrow is the best connected international airport in the EU.¹² Although the number of destinations served by some regional airports is below the EU average, the UK has four cities amongst the top 20 best-connected cities in Europe – more than any other country;
- nearly two-thirds of the UK's 73 large towns and cities are within an hour's free-flow travel time of a major international airport¹³; and the ten biggest UK ports on the British mainland all have rail connections to the main inter-urban rail networks.

I.54 This connectivity allows businesses to complete the passenger or freight journeys within their required timescales. Commuter and business travel within cities is supported by road, bus and, in some cities, rail networks; business travellers can conduct business in other UK cities within a day by road, rail or air; and logistics companies based in the Midlands freight warehousing hubs can deliver to over 75 per cent of the UK population by road and return to base within a day, supporting lean logistics models.¹⁴

I.55 Therefore, whilst there are exceptions, the fundamental infrastructure networks are in place in the UK. However, to form a rounded view of how the system supports growth, capacity and reliability need to be assessed alongside connectivity.

¹⁰ See Volume 2, Chapter 2 for more details on these measures.

¹¹ Eddington study analysis of data from www.citypopulation.de, the AA Big Road Atlas Europe and information from European rail authorities.

¹² Eddington study analysis of OAG data provided by the Civil Aviation Authority, using York Aviation metric of connectivity.

¹³ Eddington study analysis of data from www.viamichelin.com.

¹⁴ www.locatebirmingham.com

Demand for transport is concentrated on particular places, modes and times of day

Geography I.56 Transport demand in the UK is predominantly local and is concentrated within urban areas and their surrounding catchment areas. The majority of journeys are local – 69 per cent of business journeys and 84 per cent of commuter journeys are shorter than 15 miles.¹⁵ Of the 30 million commuters, 55 per cent of their journeys are destined for large urban areas;¹⁶ over 31 per cent of freight vehicle kilometres are in urban areas;¹⁷ Perhaps surprisingly, over 52 per cent of business journeys start or end in the 22 largest urban areas.¹⁸ In most urban areas, all three types of users (freight, commuter and business) compete for the same pieces of infrastructure.

I.57 By contrast, the volume of long-distance inter-urban or inter-regional journeys is low. Long-distance commuting, though on the increase, remains rare (only 8.3 per cent of commuters travel over 30kms to their workplace);¹⁹ and there are approximately 60,000 long distance (above 200 miles) domestic business trips made each day.²⁰ Only the HGV freight sector, where 72 per cent of journeys are over 100kms,²¹ sees large volumes of inter-regional traffic, much of it centred on the Midlands/M1 corridor and M25 logistics hubs. Freight demand is very sharply concentrated on a few key corridors: notably London to Birmingham/Manchester; the Liverpool/Manchester/Leeds corridor, and links to the major ports.

I.58 Demand for access to international freight and passenger gateways is high, since 28 per cent of the UK's national income is generated through international trade in goods and services.²² Furthermore, as the share of GDP accounted for by trade grows, this demand is set to increase rapidly. The flows of international trade in both services and goods are large: each day there are 72,000 international air business passenger journeys made to and from the UK²³ (compared to 60,000 long-distance domestic business trips). On the freight side, the UK imports 750,000 tonnes of goods each day, worth over £750m;²⁴ and whilst only 0.5 per cent by volume is airfreight,²⁵ a full 25 per cent by value travels by air.²⁶ Surface access routes to ports and airports are critical parts of international journeys and often these routes and networks are shared with large volumes of urban traffic and the more limited levels of inter-regional traffic.

I.59 Again, this demand tends to be concentrated. London–Heathrow dominates the market for long-haul business travel to and from the UK, handling over two-thirds of long haul business passengers but flights to EU25 countries are more evenly spread across airports:²⁷ Heathrow handles 37 per cent of EU passengers, London–Stansted 12 per cent, London–Gatwick 10 per cent, Birmingham International 9 per cent, Manchester 9 per cent, and Scottish airports 4 per cent.

¹⁵ National Travel Survey 2005 data

¹⁶ Eddington study analysis of data from Census 2001 Journey-to-work data

¹⁷ *Transport Statistics Great Britain*, DfT, 2006. Light goods vehicles and heavy goods vehicles.

¹⁸ National Travel Survey 2005 data

¹⁹ Census 2001 journey to work data, ONS

²⁰ National Travel Survey 2005 data

²¹ *Road Freight Statistics*, DfT, 2005

²² *Balance of Payments – The Pink Book*, ONS, 2006

²³ *Transport Statistics Great Britain*, ONS, 2005

²⁴ HM Revenue and Customs data from www.uktradeinfo.com. 2005 data.

²⁵ *UK Air Freight Study Report*, DfT, 2000

²⁶ *The Economic Impact of Express Carriers for UK plc*, OXERA, 2006

²⁷ International Passenger Survey 2005 data, ONS

I.60 For freight, much of the UK's total tonnage enter or leaves the country through a relatively small number of ports: the top 15 ports account for almost 80 per cent of the UK's total port traffic.²⁸ Grimsby & Immingham, the largest port in the UK by tonnage, is the sixth largest port in Northern Europe, whilst Tees & Hartlepool and London follow in seventh and eighth places respectively. Heathrow airport handles the vast majority of airborne freight (typically in the holds of scheduled passenger flights); although the amount handled by Nottingham East Midlands and Stansted airports has grown rapidly as they have developed as hubs for dedicated airfreight carriers.²⁹

Mode I.61 It is an inescapable fact that the UK road network is the backbone of the UK economy: it is the dominant means of transport (73 per cent of passenger travel³⁰ and 65 per cent of freight moved).³¹ Even over long distances, road dominates: for distances of above 200 miles, roads account for 87 per cent of journeys.³² This dominance should not be surprising: the car, van or lorry provides unrivalled flexibility in choice of route, time of travel and destination, and there are no realistic alternatives for some journeys.

I.62 An important exception is that public transport is fundamental to the success of the central London economy, by providing a uniquely deep labour market. 89 per cent of travellers to central London in the peak (1 million each day) arrive by public transport; and only 8 per cent by car. Even then, the car accounts for 61 per cent of commuters destined for Outer London,³³ where the public transport alternative is less viable. In other some other urban areas, notably Glasgow and Leeds, public transport plays a lesser, but still significant role in commuting.

²⁸ *Focus on Ports*, 2006

²⁹ UK Airport Statistics 2005 data-set, CAA

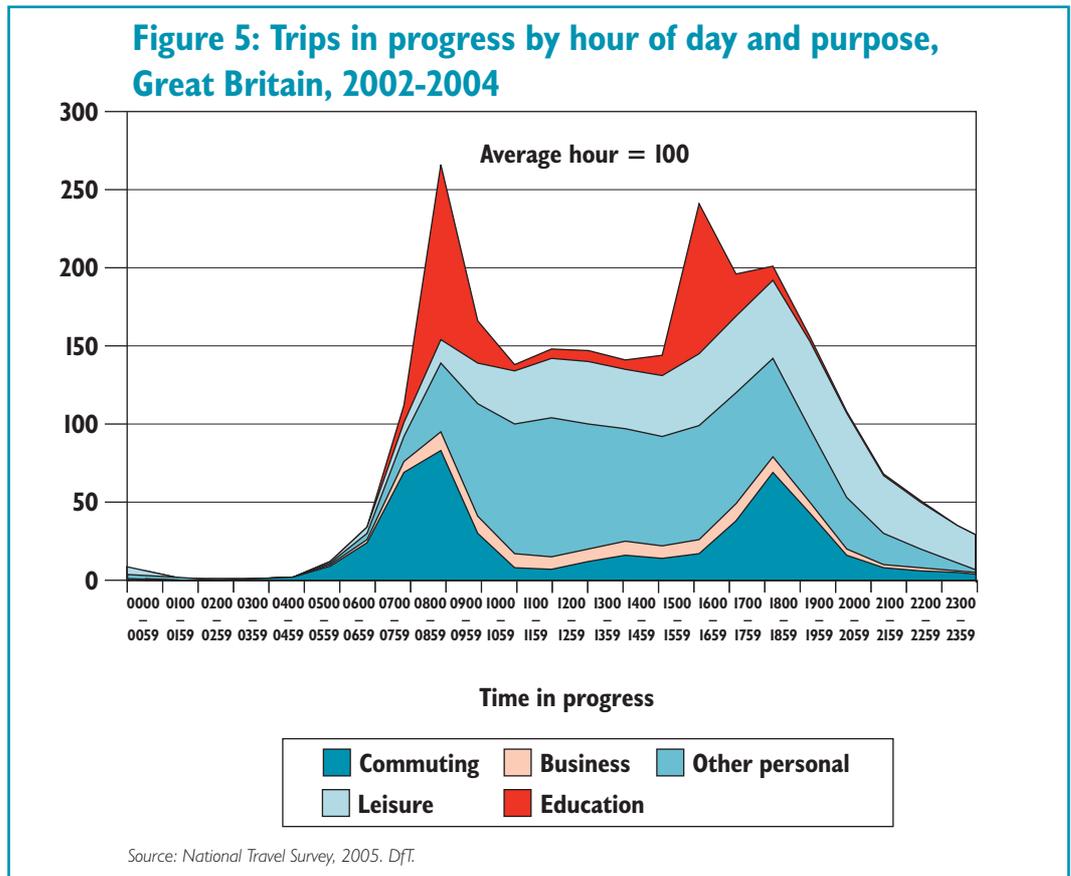
³⁰ *National Travel Survey*, DfT, 2005

³¹ *Transport Statistics Great Britain*, ONS, 2006

³² *National Travel Survey 2005 data-set*, DfT

³³ *Transport Statistics Great Britain*, ONS, 2006

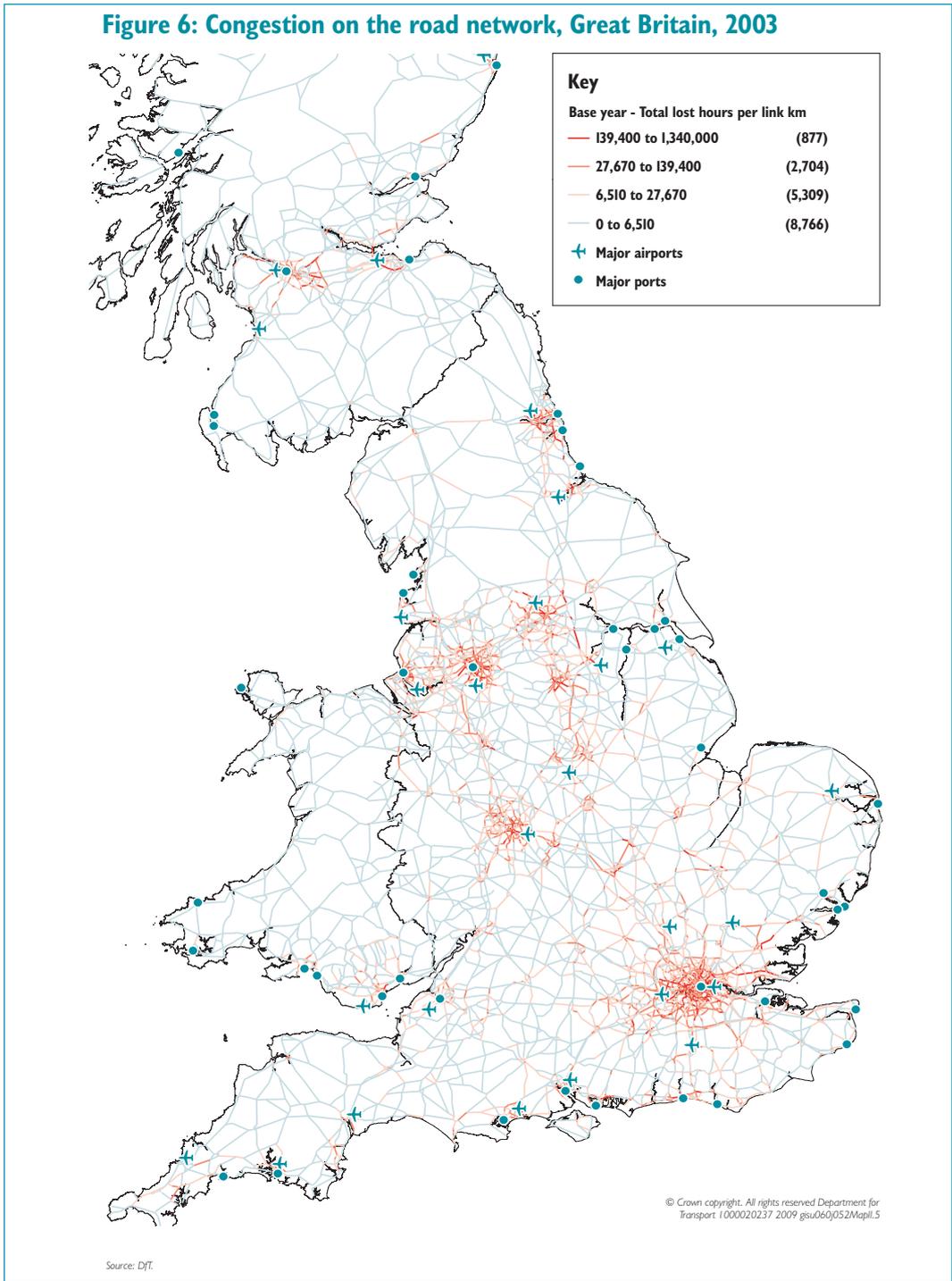
Time of day I.63 Whilst freight, business and international travel are fairly evenly distributed throughout the day, commuting flows are concentrated in the peak periods of 8-9am and 4-6pm on weekdays. Interestingly, there is also a weekend peak between 10-2pm for all travel.



I.64 As a whole, this is a picture of concentration: the demands on the UK network are concentrated on particular networks; particular modes; and at particular times of day.

This density of demand, and continued economic success, creates unique demands on the network

1.65 This density and focus of activity creates unique challenges. At the same time, sustained economic growth, rising incomes, rising population, rising employment and greatly increased personal mobility have all led to increasing demand for transport. As a result congestion, reliability and overcrowding on those sections of the network, where demand is high, can become genuine problems at specific times: particularly those parts of the network where different users (commuters, business travellers and freight) compete for access to the same sections of infrastructure. These pressures are reflected in the fact that 8 per cent of UK road traffic is subject to very congested conditions.³⁴



³⁴ DfT National Transport Model output

1.66 89 per cent of delay is estimated to be on urban roads; those sections of the strategic road network near major urban areas, such as the M25, the Birmingham and Manchester motorway 'boxes' are also very busy. This reflects the success of these city-regions, and that urban business traffic, commuters and national freight distributors compete for scarce road space.

1.67 On the railways, performance has improved significantly in recent years, despite rapid growth in passenger numbers. In the first quarter of 2006-07, 90.4 per cent of trains ran on time, the highest percentage since 1999.³⁵ However, due to the continued population and economic growth in the greater South East, the capacity of commuting lines in the region, and of the London Underground, at peak hours is tested severely, with overcrowding common at those times. For example, the majority of London commuter lines carry passengers in excess of capacity in the morning peak ('capacity' is defined as all passengers seated for journeys over 20 minutes; with no more than 30 per cent standing on shorter journeys).

1.68 The UK's international gateways are world-class in terms of connectivity, but rising demands on these facilities can lead to reliability issues at certain times. For example, around 28 per cent of flights at Heathrow and 24 per cent of Gatwick flights are delayed for over 15 minutes, some of the highest levels of delay in the EU.³⁶ At peak pre-Christmas periods, the port system can run short of capacity, a situation that will be greatly improved with the Government's recent approval of several major new port developments.

Perceptions 1.69 Survey evidence testing perceptions of the transport network suggest that the UK's transport network compares favourably against key competitors: investors rate London as the most attractive European city in which to do business, and view the quality of its international connections and its domestic networks as a key element of its locational advantage.³⁷ Domestic rail passengers are also largely content with the frequency and punctuality of services.³⁸ However, looking ahead, transport is one of the three main future competitiveness issues identified by British businesses by the Confederation of British Industry (CBI).

Continued economic success will pose increasing challenges

1.70 Rising transport demand is a result of economic success, but if left unchecked can lead to economically damaging congestion and delay. Rising incomes, rising population and rising employment have all radically increased the demand for transport and there is no sign of this trend slowing: continued economic growth, together with the opportunities and challenges of the globalised economy, point towards significant and changing growth in travel demands. However, the extent and nature of that growth is uncertain, given the many different factors that shape demand.

Figure 7: Forecasting the future: outcomes under different scenarios

A number of different factors will shape future demands. The main external influences are likely to be the rate of economic growth, population growth and migration patterns, oil prices and the price of carbon. It is also often argued that improved communication technologies will also dramatically reduce the need to travel. On the domestic network, computing technologies have facilitated a consolidation of logistics distribution networks, which may have been a factor in the recent decoupling of freight growth from GDP growth. However, improvements in communications technologies can often lead to changing travel demands. As the world becomes more inter-connected with increasing international specialisation and trade, this generates greater demand for the international movement of passengers and goods.

³⁵ *National Rail Trends*, Office of Rail Regulation, 2006

³⁶ Eddington study analysis of Association of European Airlines data

³⁷ *European Cities Monitor*, Cushman and Wakefield, 2006

³⁸ *National Passenger Survey Autumn 2005*, Passenger Focus

1.71 Volume 2 sets out a detailed picture emerging from the modelling work on which this study has based its analysis. A range of scenarios has been modelled, looking at the effects of changes in supply and demand factors. They suggest that the costs of congestion will rise significantly in all but the most extreme of scenarios. Under the central scenario:

- by 2025, without action, there will be a 31 per cent increase in road traffic, 30 per cent increase in congestion on the roads and a 4 per cent decrease in carbon dioxide emissions;
- congestion on England's roads, if unchecked, will increase costs to businesses and freight by over £10bn a year, and a further £12bn of wasted time for households in 2025; 13 per cent of traffic will experience stop-start travel conditions; and this congestion will be focused on urban areas, with some problems on some parts of the inter-urban road network, and around key international gateways;
- rail demand has been growing strongly over the last 10 years – a break in previous trends. Overcrowding is forecast to increase significantly under current fares policy, focusing on London and approaches to cities where commuting forms a high proportion of demand on inter-urban lines. Rail unreliability problems have recently cost business at least £400m a year,³⁹ and without action, will ultimately rise as growing demand puts more pressure on the network;
- shipping demand is forecast to outstrip existing and currently anticipated ports capacity, and without further expansion delivery costs could increase by some £140m per annum beyond 2030; and for airports, the costs to business of not adding additional capacity in line with the Air Transport White Paper are estimated to be £6bn; and there could be a doubling of aviation's carbon emissions from 2000 levels.⁴⁰
- without congestion pricing, maintaining congestion around current levels requires an unattractive combination of significantly lower population and economic growth; lower car-driver licence holding; fewer trips per person and shorter commuting trip lengths.

Addressing greenhouse gas emissions and the role of technology

1.72 The transport sector also faces the critical challenge of contributing to reductions in the UK's greenhouse gas emissions. On current forecasts, though, emissions will rise as the growth in motoring, rail and air travel continues, then is likely to peak and return to around 2000 levels by 2050.⁴¹ I have long argued, and do so again in this report, that transport users across all modes should meet the full environmental costs of their travel. From an economic and an environmental perspective, demand management through proper pricing should play a major role in slowing the future rate of growth in demand.

1.73 However, even with users paying the full price, it is clear that transport demand will still continue to grow. For instance, an oil price of \$100 per barrel, as a proxy for a high carbon price, is likely to result in road traffic growth just 6 per cent lower than a central forecast by 2025. Travel plays a fundamental role in supporting economic success and people's quality of

³⁹ *Passenger Rail Services and Economic performance*, OXERA for SRA, 2003. 2003 prices.

⁴⁰ *Aviation and global warming*, DfT, 2004.

⁴¹ *The Energy Challenge: Energy White Paper*, DTI, 2006.

life, and as extensive personal mobility extends to most of the population simply stopping growth in transport demand is not a realistic scenario. Therefore technological progress is fundamental if we are to break the link between economic success, energy use and greenhouse gas emissions.

Role of technology **I.74** In addition to meeting the greenhouse gas challenge, new and existing technologies have the potential to transform transport services more widely. Technology developments have the potential to help manage demand and improve the supply of transport: technology has the potential to allow more efficient and flexible pricing mechanisms, which make much better use of available capacity. In the near-term, the other most relevant technology developments are likely to be increased use of asset tracking (e.g. to allow greater real-time management of freight movements); and some increased automation of vehicle control, with potential safety and reliability benefits.

I.75 However, some of the most exciting prospective technologies are undeveloped or untested and carry significant uncertainties and risks around cost, deliverability, public acceptability and the scale of benefits. It is too soon to second-guess what will be available at a sensible price in 20 years' time. Instead the right answer is to create a policy framework that will encourage technological innovation and identify the key points when technology developments should start to influence strategic decisions – and to make sure policy does not make expensive mistakes by pursuing untried and untested technologies.

Transport is one of the UK's greatest strengths – and one of its greatest challenges

Key economic challenge **I.76** It is striking that transport demand in the UK is concentrated on particular places – a result of the UK's compact economic geography and urban concentration. With some exceptions, my assessment is that the UK has the infrastructure networks it needs, in the right places. However, the performance of those networks, in terms of capacity, delays, reliability and comfort, is poor in some places today, particularly at peak times. Continued demands, driven by economic success, will mean congestion and reliability will deteriorate in the next 20 years unless action is taken.

I.77 Since the UK is a small place with a compact economic geography, a growing economy and increased personal mobility, it is not surprising that the UK's problems are not ones of connectivity or distance, but are instead of competing demands and overload. At a strategic level, this analysis argues powerfully that policy should focus upon improving the capacity and performance of the existing transport network. Ambitions and dreams of extensive new networks – that will only ever make only marginal improvements to the domestic connectivity of the UK – should be put on hold. Any sensible business would ensure that existing assets perform properly before embarking on new speculative investments: the guardians of the transport system should follow this lead.

I.78 My first headline recommendation is therefore that, to meet the changing needs of the UK economy, the key strategic economic challenge is to improve the performance of the existing network.

I.79 However, I am also clear that there is little strategic case for policy to take action in all places. Many parts of the network function very well and have the capacity and connectivity to meet foreseeable demands. To meet its economic goals for transport, the Government should prioritise action on those parts of the system where the networks are critical in supporting economic growth *and* there are clear signals that those networks are not performing.

I.80 I believe that the evidence points to three distinct strategic priorities where policy should focus because: they are heavily used; they are showing signs of congestion and unreliability; and in the case of urban areas are highly productive and growing. Where there are problems with transport performance, those problems are set to get significantly worse over the period 2015 to 2030. In other words, they are the places where transport constraints have significant potential to hold back economic growth.

I.81 My second headline recommendation is therefore that, over the next 20 years, the strategic economic priorities for transport policy should be: congested and growing urban areas and their catchments; together with key inter-urban corridors and key international gateways that are showing signs of increasing congestion and unreliability.

1. **Supporting the UK's successful, agglomerated urban areas and their catchments.** These are places where high congestion, high land prices or high wages suggest that transport improvements could have a real impact.
2. **Maintaining or improving the performance of the UK's key international gateways.** Specifically: deep sea and feeder container ports; roll on/roll off ports; and international airports, that support a high-level of business and/or freight usage and are showing signs of congestion and unreliability. This focus should incorporate surface access routes to these gateways, again where such links are showing signs of congestion and unreliability.
3. **The key inter-urban corridors between these places,** where they show signs of congestion and unreliability. From a passenger perspective, these corridors may connect urban areas with each other and with international airports; and from a freight perspective, they may connect ports with distribution hubs and distribution hubs with their eventual markets.

I.82 Identifying current and future strategic priorities is just the first stage of the option generation and prioritisation process, and is in no way a substitute for rigorous cost-benefit analysis of a range of options on each corridor. Before acting, Government needs to be clear that the benefits justify the costs of action; should prioritise the best policies and projects; and should be responsive to future changes in the places where transport is constraining growth. Nevertheless I am clear that, at the present time, these priority areas should provide a strategic focus for policy making: these are the places to bring forward targeted options for cost benefit analysis and prioritisation.

VOLUME 3: MEETING THE CHALLENGE – PRIORITISING THE MOST EFFECTIVE POLICIES

I.83 Having identified the three strategic economic priorities, I went on to examine a wide range of transport schemes, to highlight those policies that are most likely to support the UK's productivity and competitiveness.

I.84 The analysis suggests that a sophisticated policy mix offers strong economic returns:

- Transport projects can offer remarkably high returns, with benefits four times in excess of costs on many schemes, even once environmental costs have been factored in.
- Better use measures are a key part of the policy mix. In particular, road pricing stands out in its potential to deliver economic benefits.
- Some of the best projects are small scale, such as walking and cycling schemes, and schemes that tackle bottlenecks; but on their own such schemes may not be sufficient to tackle the full scale of the challenge.
- Even in a world with road pricing, there remains a good economic case for continued investment in transport infrastructure.
- Increasing ports and aviation capacity can offer strong economic benefits, including under carbon pricing scenarios.
- Step changes intended to deliver an economic transformation are not likely to be a high priority, in a world of constrained resources.
- Given that domestic aviation accounts for 1.2 per cent of the UK's carbon emissions, it is unlikely that building a high-cost, energy-intensive very high-speed train network is going to be a sensible way to reduce UK emissions.

Generating and prioritising the right options

I.85 Having identified the strategic economic priorities where transport may constrain the UK's future economic success, the next step is to understand which types of transport policies are most likely to deliver the best overall outcomes for society. To do so, it is critical to get the option generation right: to bring forward the right types of policies to contribute to productivity and competitiveness in these priority areas; and to see which provide the greatest overall benefits (i.e. the highest returns per £1 of expenditure).

I.86 Because there is usually a range of alternatives available to meet most transport challenges, comparing options to identify the highest-return solution is critical to supporting the economy, protecting the environment and promoting an inclusive society. The 'menu' of policy options ranges from encouraging changes in behaviours (e.g. through pricing or information campaigns), making better use of existing assets, investing in variable capacity investment such as increased bus frequencies or train lengthening, through to investments in new fixed infrastructure. It is important to consider the full range of these interventions and to identify the one that best meets policy goals taking account of both financial and environmental costs. Policies to influence demand must be considered alongside, and in many cases before, turning to increase supply. As argued throughout this Study, policies should also take account of the likely impact of carbon pricing.

Measuring the returns from different types of policies

Options assessed according to a rounded measure of society's well-being

I.87 My focus on these strategic economic priority areas is directly motivated by the desire to ensure that transport does not become a constraint on sustainable economic growth by damaging productivity and competitiveness. However, the evidence assembled assesses policies by taking account of the full impact on what economists call the 'welfare' of society.⁴² Appraisal of the welfare consequences of a project will take account of social and environmental impacts alongside economic ones, and is therefore a much fuller measure than GDP.

I.88 The measures used in the study are summarised in the Appendix, and discussed in more detail in Volume 3 of the main report. In what follows:

- The **conventional benefit:cost ratio (BCR)** refers to the welfare measure conventionally used as part of the appraisal framework;
- The **wider BCR** adds on estimates of the 'missing' GDP impacts identified in Volume 1 – agglomeration, reliability, labour supply and imperfect competition (although as yet there is no methodology to estimate the benefits arising from increasing international trade and attracting globally mobile resources); and
- The value for money assessment (**vfm BCR**) adds in both the missing GDP impacts and a monetised estimate of environmental and some social costs and benefits.

I.89 In my view, while the conventional BCR is the most certain measure of welfare, it is incomplete in a way which makes it difficult to compare projects. The value for money measure (the vfm BCR) is the most complete 'single measure' of transport's welfare consequences, though it is more uncertain than the conventional BCR because the evidence base is relatively new, and some of the effects are inherently hard to monetise.

I.90 In addition to factoring in these wider effects, where the evidence base is strong enough, the analysis presented below includes a high-level assessment of how far the case for different policy interventions remains robust when carbon pricing was incorporated. In other words, I have not tried to identify options which will make the greatest impact on GDP, while ignoring their environmental consequences. I have explicitly factored such environmental impacts into my recommendations.

The evidence

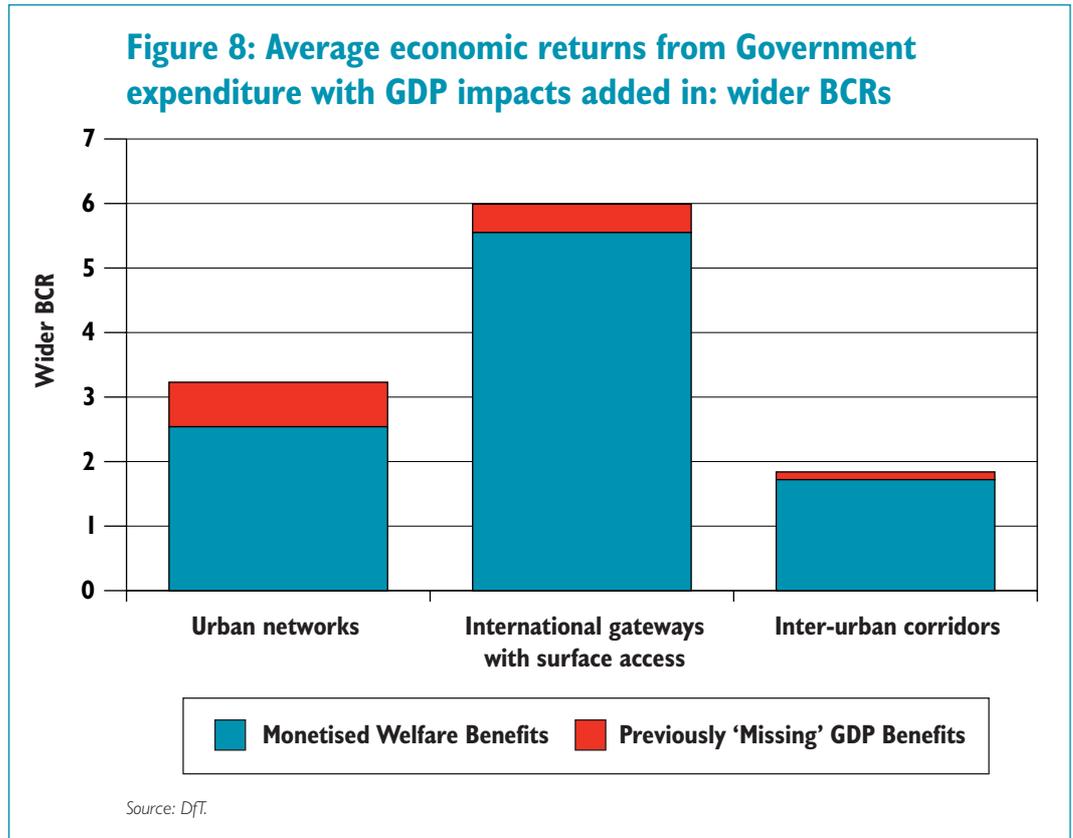
I.91 The study has compiled a range of evidence sources to provide an understanding of the types of transport policies that support productivity and competitiveness and perform well in welfare terms. The study has developed a database of nearly 200 policies and projects from across the country – including walking, cycling, bus, tram, rail and road projects – as well as looking at strategic modelling on road pricing, and aviation and ports capacity. The database consists of existing and proposed schemes, as well as interventions modelled by national and local transport models. Comparing the benefit:cost returns from such proposals allows an assessment of the highest priority projects, i.e. those that will provide the highest welfare benefits from available funds.⁴³

⁴² Welfare, sometimes referred to as economic welfare, is used to refer to the well-being or happiness of society. Conceptually it incorporates everything that individuals value, extending beyond what is captured in Gross Domestic Product (GDP).

⁴³ It should be stressed that the purpose of compiling the database and other modelling analysis is not to make judgements on individual proposals but to draw generic conclusions about the nature, size and location of schemes that are most likely to deliver growth benefits in the strategic economic priority areas. It is in this way that future option generation can be guided towards policies which are likely to perform effectively, though of course new types of intervention must also be considered where appropriate.

I.92 As discussed in the Appendix (and in Volume 3), the measurement issues involved are complicated and innovative. They provide a first attempt to incorporate new estimates of GDP and environmental impacts, and therefore care must be taken not to over-interpret the data. Nonetheless, there are already a number of powerful messages to emerge from this indicative analysis, and I start by outlining some of the generic messages, before discussing the importance of pricing and the infrastructure needs on each of the strategic economic priorities.

Message 1: Transport projects offer some remarkable returns

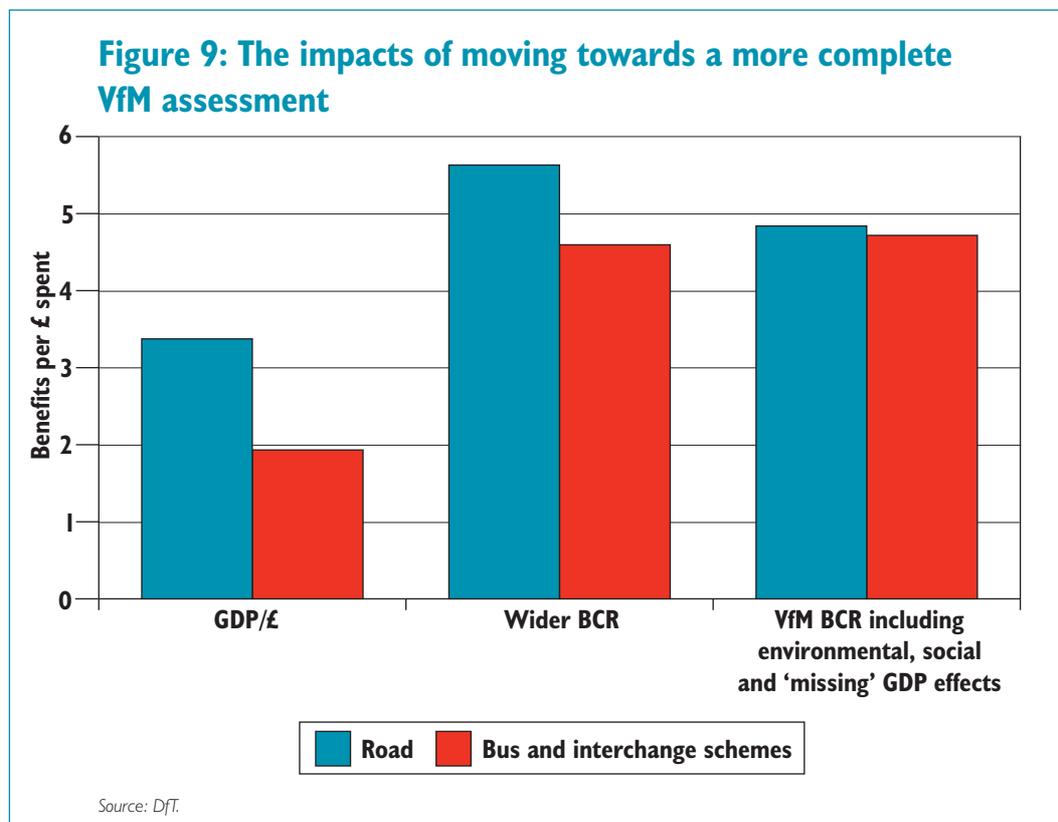


I.93 Figure 8 shows that transport interventions can provide some very high returns:

- surface access schemes to international gateways provide an average return of £6 per £1 of government expenditure;
- urban areas show an average return of over £3 per £1 of government expenditure; and
- inter-urban routes show an average return of just under £2 per £1 of expenditure, though this rises to just under £5 once some very large and expensive rail infrastructure options are removed from the average.

I.94 Even before the estimates of ‘missing’ GDP benefits are added in, transport interventions offer very high average returns. It is also clear that the ‘new’ GDP benefits add considerably to the estimated returns, particularly in urban areas which demonstrate agglomeration benefits. However, this measure does not include environmental costs, and so I have also looked at the evidence available on the full welfare measure, namely the VfM BCR.

Message 2: the inclusion of environmental and social effects lowers the average returns, but substantial benefits remain



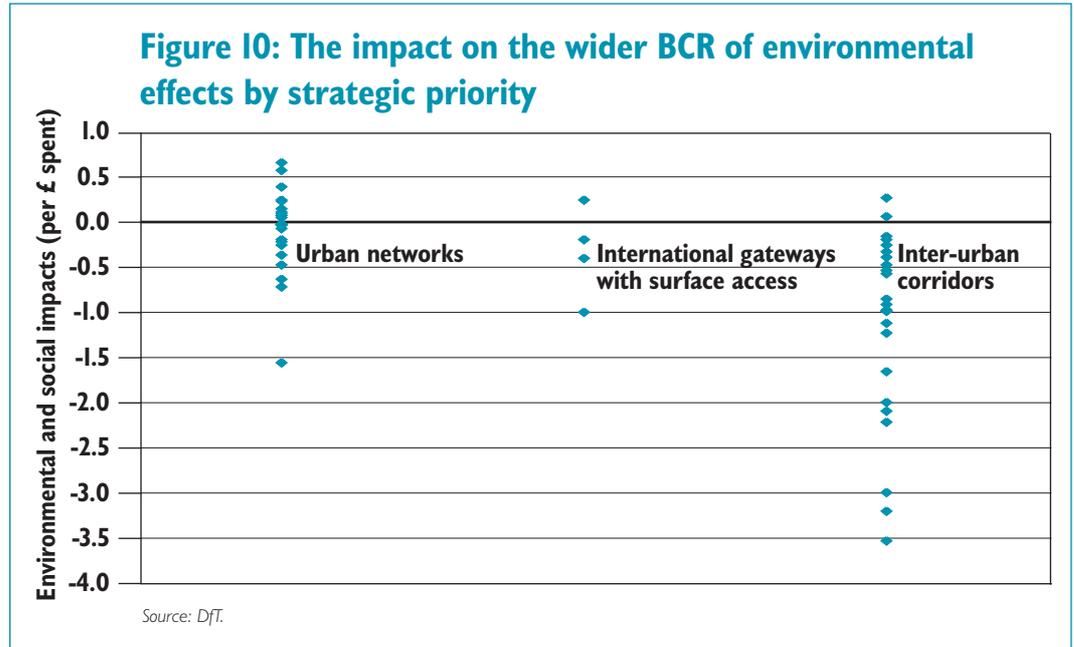
1.95 The welfare returns from most interventions are lower once environmental and social costs and benefits are factored in but by any standards these remain remarkably high returns. Figure 9 is based on the third of projects in the database for which monetised environmental and social impacts could be estimated. This has narrowed the schemes down to road and bus/interchange projects and although this limits its comprehensiveness, it does highlight a number of important generic messages:

- transport schemes, particularly roads, offer strong benefits;
- the wider BCR estimates show that the narrow GDP measure misses a very substantial proportion of the benefits provided by these projects, particularly on public transport schemes;
- adding in environmental and social impacts to look at the fullest measure of welfare (the VfM assessment), knocks around one point off the average for road schemes; and
- even once such environmental costs and benefits have been factored in, some very high returns are available, with VfM BCRs of over 4.5.⁴⁴

⁴⁴ The analysis in Figure 9 is based on those schemes for which monetised environmental impacts are available - around one third of schemes in the database. For the types of schemes represented, namely road and bus, these results are likely to be representative of the impact across similar types of schemes in the database, i.e. there is no reason to expect systematic biases in the road and bus schemes on which we have full environmental monetisation.

Message 3: environmental and social impacts are location specific and vary considerably across projects

I.96 The other important feature of the social and environmental impacts of transport is that they are very location-specific – the averages in Figure 9 hide some important variations. Figure 10 shows what difference the addition of such impacts makes to the benefit: cost ratio, i.e. how much the VfM BCR goes up or down compared to the wider BCR.

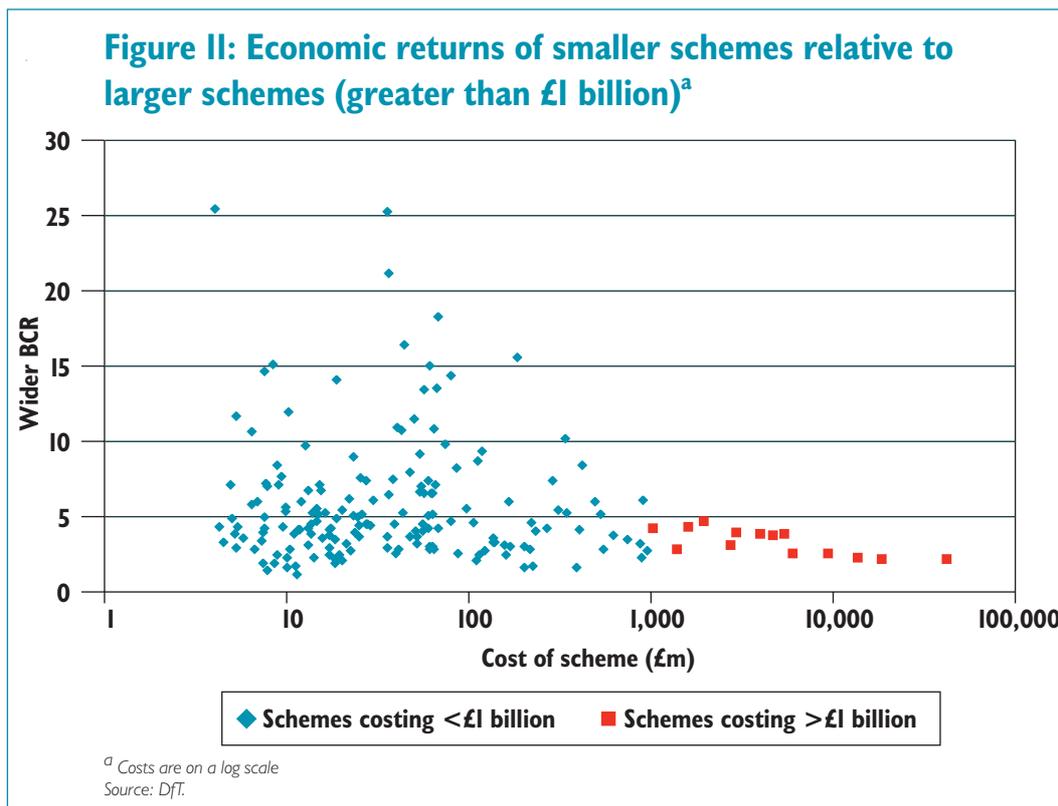


I.97 A wide spread of both negative and positive impacts can be seen, with several schemes in urban areas demonstrating positive environmental and social impacts. Well-targeted smaller-scale walking and cycling schemes also have a beneficial impact on the environment due to the mode shift from car to these non-polluting modes.

I.98 The impact on road schemes is more usually negative, although there is a very considerable variation in the scale of the impact, with the environmental effects of some inter-urban roads schemes reducing the benefit:cost ratio by 3.5 points, whilst many others have very small environmental disbenefits. Typically the most significant costs are landscape effects. The key message is that policy makers must be careful not to generalise about the impacts of such policies and to assess individual schemes on their merits.

Message 4: small-scale and better-use policies can offer very good returns

1.99 Figure 11 highlights that, typically, smaller projects offer the highest returns, since they can be targeted at specific bottlenecks on the transport system at relatively low cost. For example, small junction improvements often cost below £20m but show wider BCRs well in excess of 4 and some are between 8 and 10. Furthermore, such projects often have lower noise and landscape impacts, so their environmental impact can be considerably less than a new piece of infrastructure. Improving the attractiveness of walking and cycling, e.g. by creating or upgrading routes, can provide strong returns with wider BCRs sometimes over 10.⁴⁵



1.100 It is certainly clear that returns are lower on the very biggest projects. As a result, it can often be sensible to invest in a collection of smaller, high-return, projects rather than a single large one, although portfolios of smaller projects do need to be managed carefully to deliver large-scale aggregate benefits in this way. However, it is unlikely that a series of small-scale projects will be able to alleviate major transport pressures over the long term in all places. Once some of the smaller projects have been exhausted, a small number of larger-scale projects are likely to be justified by the economic benefits.⁴⁶

1.101 It is also clear that ‘better use’ measures can offer economic benefits, including schemes to manage traffic flow and enhance the use of existing capacity on the strategic and urban road network, e.g. through high-occupancy vehicle lanes and urban traffic control centres. Although the quantified evidence available to the study is limited, the schemes that have been analysed do suggest considerable potential, with wider BCRs above 5:1. Smart measures also have the potential to offer high returns, although worked-up BCR evidence is not available.

⁴⁵ Summary note on the economic appraisal of links to schools, Sustrans, 2006.

⁴⁶ The case for large scale infrastructure investment is considered later in this volume.

I.102 Furthermore, well-designed better use measures, are likely to have minimal adverse – and can even have beneficial – impacts on the environment.

I.103 'Mixed mode' operations at airports is another better use measure. It allows runways to be used for both take off and landing and can release capacity from existing runways. For instance, taking account of environmental costs, the net lifetime benefit of this proposal at Heathrow could be £1.7bn over the period to 2060.

FINDING THE RIGHT POLICY MIX

Getting the prices right

I.104 The UK has substantial transport assets, with strategic connections that are broadly in the right places. Therefore, making better use of existing transport assets is likely to be a highly cost-effective way to tackle transport problems and reduce the need for additional infrastructure.

I.105 I have long been persuaded of the importance of importance of internalising externalities – that is to say, the importance of making sure that users pay the full costs of their journeys. So I am in full agreement with Stern's analysis that prices are a key way to tackle externalities. This insight must be extended to congestion as well as to carbon. I am in no doubt that, by setting prices to reflect both the congestion and environmental costs of travel, the transport system will be used more efficiently, will support UK competitiveness, and will contribute to reduced emissions.

I.106 Differential pricing is fundamental to the efficient operation of all markets, and we are all used to paying a higher price for goods and services at a peak time, and to pay a cheaper price if we are prepared to wait for a less busy time: mobile phone tariffs; theatre or cinema tickets, and so on. Indeed, it is already very common in some parts of the transport sector, including air tickets; cheap day returns; the off-peak travel card; and port access charges.

I.107 Yet, on many other parts of the UK's transport infrastructure, such pricing does not occur. It costs the same to travel on roads regardless of time of day; bus tickets are mostly distance and not time-based; likewise commuter rail travel is often simply priced, with costs falling just once, after the morning rush hour. The result, unsurprisingly, is severe congestion at the times of highest demand, and much emptier roads, buses and trains at other times – a very inefficient use of the asset. In effect, congestion and overcrowding currently act to ration transport capacity, not prices, which is hugely wasteful of time and fuel.

National road pricing **I.108** Introducing markets (pricing) where none exist can have a very powerful and positive economic effect in any sector. The transport sector is no exception, and in particular the potential for benefits from a well-designed, large-scale road pricing scheme is unrivalled by any other intervention. Work for this study has extended work done by the Department for Transport for the Road Pricing Feasibility Study,⁴⁷ and looked at the impact of road pricing in 2025. The prices take account of both congestion and carbon impacts,⁴⁸ with a maximum charge of 80p/km to travel at the busiest of times.

⁴⁷ This explored the potential benefits of a national road pricing scheme implemented in 2010 using the National Transport Model.

⁴⁸ I am not arguing that road pricing is the best way to price carbon, but have included it in this way because it allows consideration of the impact of carbon pricing on transport demand, and hence on the case for infrastructure investment.

I.109 Provided it is well targeted, a national road pricing scheme of this type could reduce congestion by some 50 per cent below what it otherwise would be in 2025 (compare Figures 13 and 14) and reduce the economic case for additional strategic road infrastructure by some 80 per cent. Benefits could total £28 billion a year in 2025, including £15 billion worth of GDP benefits. While firm estimates of the costs of such a scheme are not developed at this stage, those costs would have to be extremely high to outweigh benefits on this scale.

I.110 It would also offer significant environmental benefits by reducing and reshaping infrastructure needs, as well as offering opportunities to price more appropriately for environmental costs and reduce emissions (the scheme modelled provides some £500m of environmental benefits a year in terms of reduced emissions). Without road pricing, beyond 2015 there would be a case for significantly increasing the current rate of enhancement of the strategic road network.

I.111 Importantly, given the pace of economic change, pricing also offers considerable flexibility once in place. With pricing it becomes possible to respond to unanticipated change through changing prices much sooner – and at much lower cost – than bringing forward new infrastructure.

I.112 However, there are distributional effects, with some commuters being worse-off unless they can be flexible with travel times or good alternative travel options are available, and in implementing a road pricing scheme this needs to be considered. The case for road pricing is perhaps best illustrated by the alternatives: either greatly increased (and expensive) road build which would need to significantly increase the existing rate of expansion in the inter-urban road network, or very high levels of road congestion, both with resulting increases in emissions.

I.113 National and urban schemes would also increase demand for, and the cost-effectiveness of, public transport in some of the most congested areas and routes, especially at peak times. The precise implications for public transport investment will be locally specific, but in each situation the case for complementary public transport will need to be considered carefully, for instance to support agglomeration and to provide wider network benefits.

I.114 Given the scale of the congestion challenge, I believe that there is no attractive alternative to road pricing: without a widespread scheme by 2015, the UK will require very significantly more transport infrastructure. However, road pricing on this scale is new and at this stage has unknown implementation costs. There are very significant risks and uncertainties involved in delivering a pricing policy, particularly around the technology needed for its delivery: potential technologies exist but have never been used at a national level.

I.115 The challenge now is to unlock the vast potential of road pricing. My Study's work suggests that the pathway to widespread road pricing will involve early pilots, to inform a series of critical decision points (see Figure 12) as well as some early decisions on the overall approach to investment decisions in a world where road pricing may be approaching.

I.116 In addition, with the move to widespread road pricing, decisions will need to be taken on tax policy in order to ensure that it contributes to the overall aims of road pricing and does not impede its introduction. I would expect government decisions in this area to take account of the impact on the motorist, the requirement for a sound revenue base to fund essential public services and the need to protect the environment.

I.117 I am also acutely aware that for road pricing schemes to be introduced, the public needs to be convinced of its acceptability. The evidence set out in this study shows that the long-term choices facing the UK are: an extra £22 billion pounds' worth of wasted time from rising congestion, an expensive (and environmentally damaging) road build programme which would require a significant increase in the current rate of investment, or moving to a system of widespread congestion-targeted road pricing with a much smaller scale and reshaped investment programme.

I.118 In my view the right way forward is to accelerate progress towards a widespread road pricing scheme, and to deliver sustained infrastructure investment under that scenario. But government and society must guard against ending up with the worst of both worlds: developing investment plans in anticipation of road pricing and then delivering neither pricing nor the necessary levels of investment without road pricing.

Figure 12: Preparing the pathway to widespread congestion-targeted road pricing within the next 10 years – articulating the decision points:

The pathway requires early decisions on pilots:

- How the pilots should be framed to test different pricing structures and technologies, on both the urban and inter-urban networks, to inform the transition to widespread pricing.
- How to balance the benefits of early inter-operability of technology, with the benefits of testing different technologies.
- Publish an independent evaluation of the findings from the pilots.

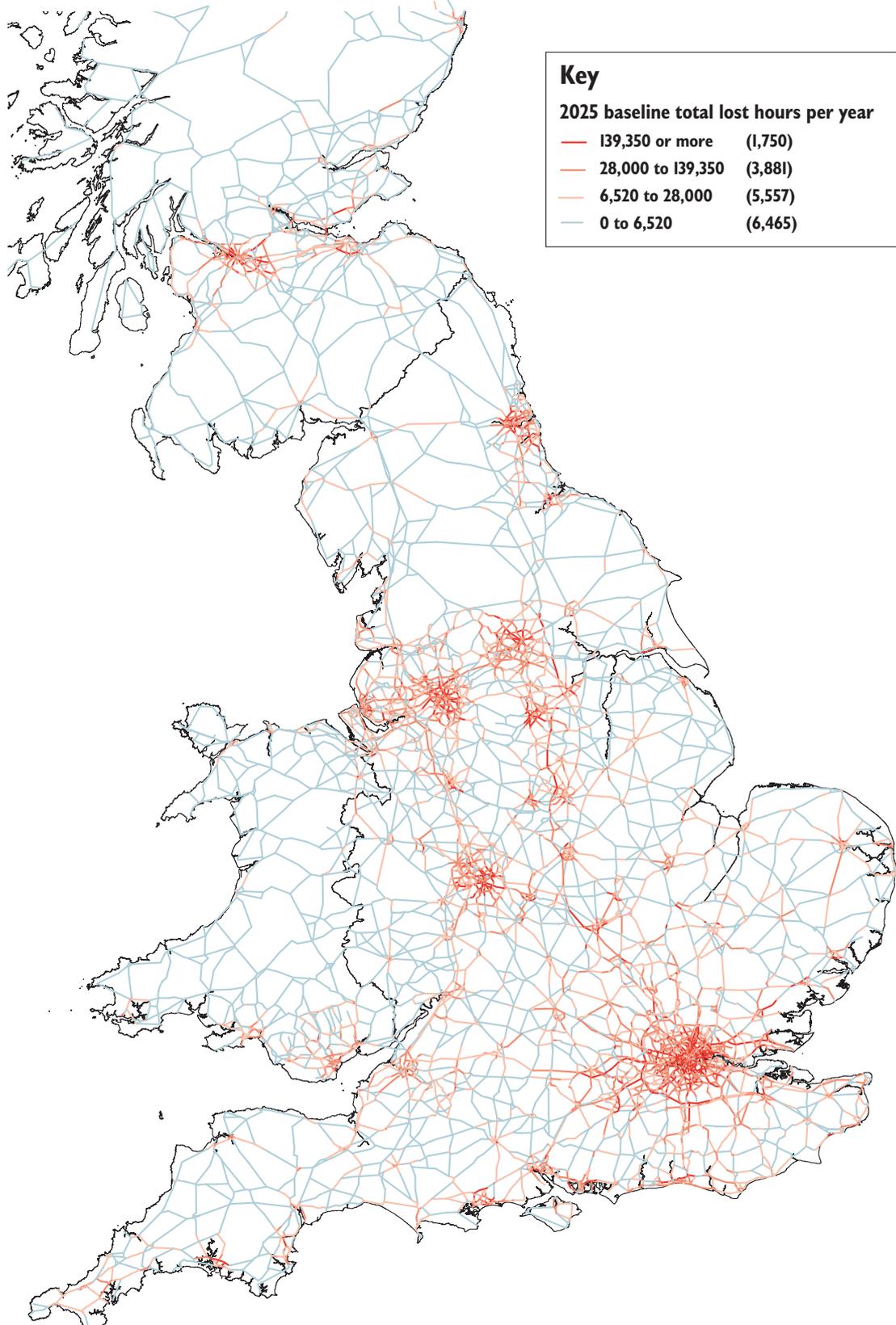
It also requires early decisions on the approach to transport investment:

- To confirm near-term investment plans in a world pre-road pricing.
- To test the case for long-term investments in an environment where pricing – localised or widespread – is approaching.
- To develop a framework for identifying and evaluating the case for complementary investment in, and pricing of, other modes and how that will change through time.

At the appropriate point along the pathway there will need to be decisions on:

- Publication of the government's strategy, informed by the pilots.
- Overall vision for the long-term design and coverage of a widespread pricing system in the UK: how far coverage of a widespread scheme needs to go to, and which technologies should be used, to deliver its benefits cost-effectively.
- When and for whom road charging will apply.
- Which bodies will hold powers to set charges and retain revenues.
- Legislative requirements to deliver widespread road pricing.
- Delivery arrangements and accountability for delivering widespread, congestion-targeted road pricing.

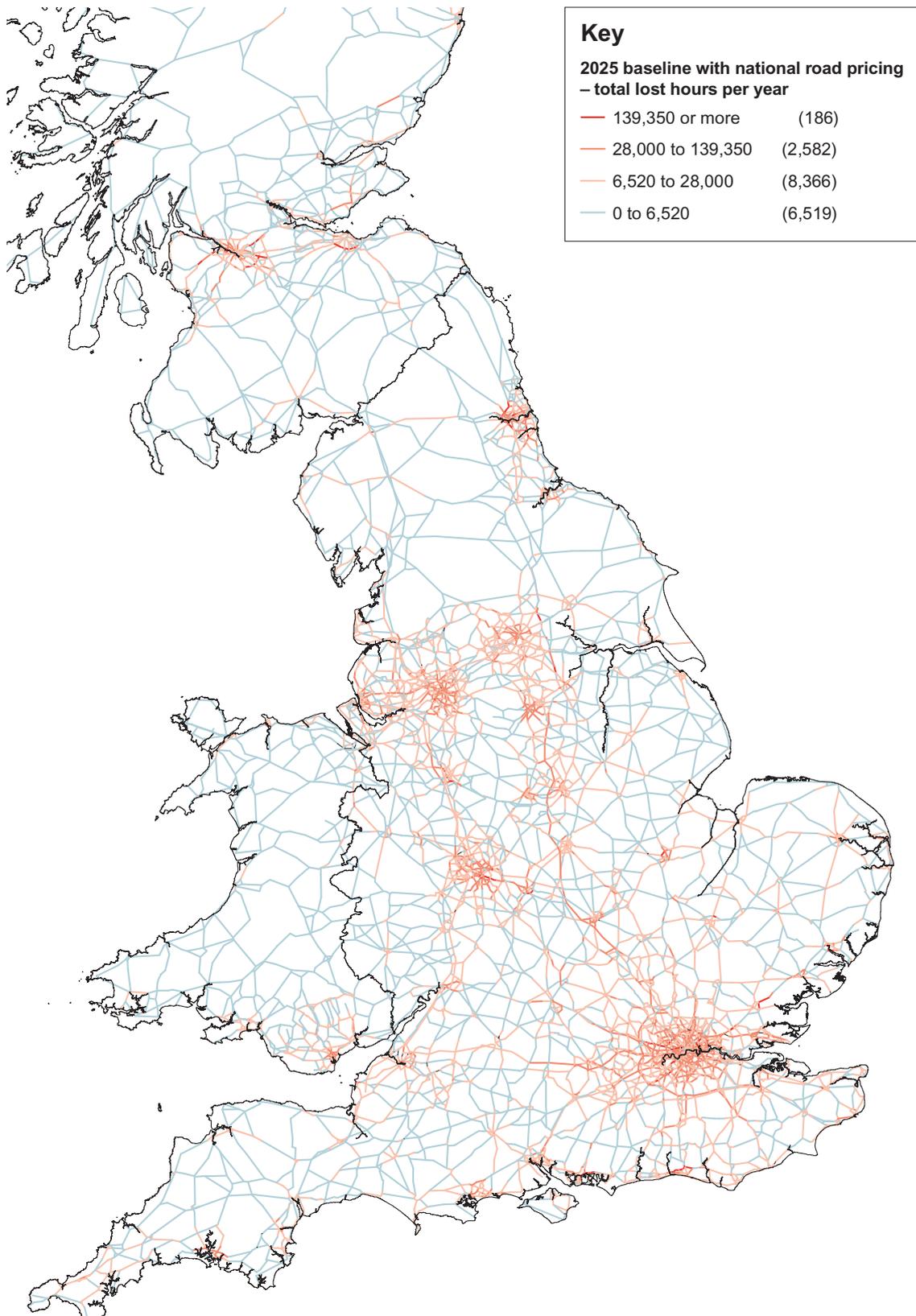
Figure 13: Congestion patterns on the Great Britain road network in 2025 with no road pricing



Source: DfT.

© Crown copyright. All rights reserved Department for Transport 100020237 2009 gjsu0607j052Map11.1

Figure 14: Congestion patterns on the Great Britain road network in 2025 with national road pricing



Source: DfT.

© Crown copyright. All rights reserved Department for Transport 100020237 2009 gisu0607j052Map11.2

I.119 While road pricing is the key intervention, the introduction of stronger price signals on other modes are also likely to be highly effective: for instance in spreading demand across the range of rail or bus services available; or introducing market mechanisms in the primary allocation of slots at major airports.

A series of targeted new infrastructure investments demonstrate very good returns

I.120 Despite the high returns, in some cases better use and pricing options are unlikely to be sufficient to tackle the true magnitude of the transport challenges facing the UK. Even with better use and pricing, there will remain a strong economic case for targeted infrastructure investment. At a strategic level, my analysis suggests that returns are likely to be highest when projects are targeted on improving the performance and capacity of the three strategic priority areas, where network performance threatens to affect the economy.

I.121 As might be expected, the economic case for action is strongest where there are competing demands on the transport system from a range of users, and where it is possible to relieve bottlenecks.

I.122 I now set out a series of detailed conclusions about the type of investment likely to be justified for each of the strategic priorities, with and without widespread road pricing.

Urban infrastructure

I.123 Urban transport networks are particularly complex systems, with a high degree of interaction between policies and modes. In order to identify the best policies, decision-makers need therefore to understand all the characteristics of the local economy, and an area's physical environment and urban geography. One solution will not fit all urban areas, and in my view there is scope for a significantly improved understanding of the types of policies which will most effectively support urban economies. However, the database contains evidence on the returns from over 40 recent and prospective schemes, and is supplemented by other evidence, from which it has been possible to draw some conclusions:

- walking and cycling options offer very high welfare returns relative to their costs but on their own will be insufficient to tackle the scale of the transport challenges facing growing and congested urban areas;
- the appropriate public transport solution will depend on the density of travel demand: improved bus services are sometimes able to offer a higher-return, more flexible and responsive solution to transport problems than more costly fixed infrastructure schemes such as trams;
- roads can, in some circumstances, offer a very high return solution to transport problems in urban areas (some over £4 per pound) – and although there are circumstances in which the environmental consequences will be prohibitive, policy makers should not be too quick to drop urban roads from the policy menu;
- targeted capacity on commuter rail corridors into major urban areas can offer high returns in situations where there is a high volume of travel, and users with competing demands (wider BCRs of 3:1). Congestion relief at stations also performs well;
- strategic roads around major urban areas and agglomerations offer wider BCRs of between 4 and 11, offering some of the very highest returns available;

- road pricing could make a significant impact on urban congestion, but where there are high prices and continuing congestion, this should act as a signal to consider the case for further investment as well. Pricing will yield considerable benefits, but in places further action will be needed;
- the impact of road pricing on urban infrastructure needs are not yet well understood. Transport for London estimate that the London congestion charge reduced car travel by 15 per cent within the charging zone, and that 50 – 60 per cent of traffic was displaced to public transport;
- preliminary evidence developed for this study is suggestive of a role for public transport through providing travel alternatives to commuters especially where there are agglomeration effects. Of course, such public transport services could become more commercially viable with the introduction of road pricing; and
- I have not examined land use policies in any detail given the scope of my study. Where there is significant new development, then it will be important for transport and land use to be developed together.

I.124 Urban schemes offer an average return of around 3, while there are many surface access and inter-urban schemes with much higher returns. Looking at a GDP measure alone suggests a much starker differential. Even taking account of the higher costs of delivering in urban areas, these relatively low returns are surprising, given that urban areas are home to the majority of the UK's road congestion and public transport overcrowding problems, and are key drivers of economic growth.

I.125 The schemes in the database are by definition those that are available to the study for analysis and may not include the full range of possible returns. Similarly, such schemes were not necessarily developed with a full understanding of how transport can support growth, nor the types of modes that are most suited to meeting different demand conditions. However, I believe that another part of the explanation may be the barriers that current governance arrangements seem to pose to good quality option generation, which I go on to discuss in Volume 4.

International gateway infrastructure

I.126 The evidence on future challenges demonstrated looming capacity problems at our international gateways, and there are significant measured and important unmeasured benefits to facilitating investments in ports and airports and their surface access routes. Of course, many of these investments are a matter for the private sector, since most of the UK's ports and airports are privately owned. However, given the very significant national economic impact of such projects, and since Government policy support is often necessary to deliver major infrastructure developments, it is right that national government assesses the case for investment and can judge whether to support a proposal.⁴⁹

Ports

I.127 Adding deep-sea port capacity in line with projected demands could reduce international delivery costs by up to £140 million per annum by 2030, with additional feeder port capacity also likely to deliver significant benefits. Expanding roll-on roll-off capacity, particularly in the South East, would also offer economic benefits. Such expansions can involve adverse environmental impacts on coastal habitats, air quality and emissions. However, recent port capacity planning approvals demonstrate that cases with net overall benefits are possible, even after accounting for environmental impacts.

⁴⁹ Surface access routes to nationally important ports and airports are often the responsibility of local or regional authorities. Government might consider whether the national importance of these links suggests that national government should assume this responsibility in future – see Volume 4.

Aviation I.128 This Study identifies key international gateways as a strategic economic priority for the future and the vital role of aviation in supporting the international competitiveness of the UK's high-tech manufacturing and financial services sectors. This is in line with the analysis from the Air Transport White Paper (ATWP), which demonstrated that the potential benefits from further expansion of aviation capacity are significant. The White Paper analysis of proposals to expand South East airport capacity suggests direct economic benefits of £24 billion over the period to 2060, with construction costs of over £7 billion. Disbenefits include the cost of carbon emissions valued at £3-5 billion and, at a lower order of magnitude, noise and air quality impacts, leaving very substantial net benefits.

I.129 Any growth in aviation needs to be sustainable, and must take full account of its environmental costs. One of the most effective mechanisms for achieving this is by ensuring that air travellers pay the full environmental costs of their journey. The principle of ensuring that users pay their full external costs was supported by the Government in the Air Transport White Paper and was strongly supported by the Stern Review of the economics of climate change.

I.130 The ATWP passenger demand forecasts assumed the introduction of some form of pricing mechanism to ensure that air travellers faced the full external costs of their climate change emissions. This was based on the Defra central cost of carbon estimate of £70 per tonne of carbon (in 2000 prices). With this pricing mechanism in place, the analysis demonstrated that demand would continue to grow and that there would therefore be significant economic benefits from some additional runway expansion. However, it is important to understand the impact of a range of carbon pricing scenarios on the case for aviation expansion and the forthcoming ATWP Progress Report will test a wider range of carbon price scenarios. Provided economic analysis shows that there is a net benefit from increased airport capacity, even once users pay the full environmental costs of their journeys, there will remain a strong economic case for additional runway capacity.

Surface access I.131 In keeping with a 'whole journey' approach, additional surface access capacity would allow the benefits of ports and airports capacity to be realised. Indeed, evidence from the database suggests that surface access schemes in their own right can provide among the highest welfare and growth returns available: BCRs are often in excess of 3 and even around 15, in some circumstances. Environmental impacts will be location specific. On the basis of the Study's evidence they may reduce these returns by up to a point on a VFM basis though it could be more in some cases. Again, these returns are partly driven by the relatively low costs of addressing many of these bottlenecks. Information on surface access improvements on strategic roads suggests that many improvements cost in the range of £20m-170m. The returns are so high it seems likely that the investment case will stack up in a world with road pricing.

Infrastructure on key inter-urban corridors I.132 The most significant long-term problems for UK inter-urban travel that policy needs to tackle are the rising levels of road congestion and overcrowding on the rail network, particularly where inter-urban and commuting journeys compete to use the same networks. On the railways, it is important to note that this overcrowding and congestion is not a feature of all parts of the intercity network: indeed it is principally on the approaches to major urban areas, where significant commuter flows compete for line space with inter-urban flows, that congestion and overcrowding is found.

I.133 Existing business cases show that investment in infrastructure on the strategic road network can, if targeted on pinch points and bottlenecks, deliver some of the highest returns for growth. Without road pricing, the economic case for additional strategic road capacity is strong: beyond 2015 there is an economic case for investing at a rate some 50 per cent higher than is assumed up to 2015, at a cost of some £30 billion. The highest returns are around major urban areas and on port and airport surface access links, where there are competing demands from a range of users.

I.134 This conclusion holds having accounted for environmental effects.⁵⁰ Whilst strategic assessments of this kind can never offer absolute precision, the numbers presented are broadly indicative of the scale of investment justified in a world without road pricing.

I.135 Even assuming the introduction of carbon pricing and the modelled form of national distance-based road pricing, there is still a case for additional infrastructure. But the case beyond 2015 would be reduced substantially, by around 80 per cent. This is such a significant difference that it raises considerable challenges for strategy, as there will be some uncertainty around the scale, scope and timing of any road pricing scheme for some time to come, which reinforces the need for a clear pathway for decisions on road pricing.

Inter-urban rail I.136 The future scenarios work in Volume 2 shows that inter-urban rail services will face increasingly severe capacity pressures, under the current fares policy. They are found around the approaches to cities, especially when commuters make up a high proportion of travellers on inter-urban services. Such pressures could be higher in a world of widespread road pricing, but lower if rail pricing is used to help manage demand.

I.137 There are relatively few appraisals of long-term rail infrastructure options to tackle inter-urban constraints. The available examples (of well-targeted additional variable capacity – longer trains, longer platforms, new rolling stock etc) give wider BCRs typically ranging between 1 and 3 (costing between £50 and £500m), and occasionally some very high return schemes (the highest being a wider BCR of 13). The higher returns are largely driven by the ability to add variable capacity with minimal infrastructure requirements, on options that are targeted on those links used heavily by both long-distance inter-urban travellers and more local commuters into major urban areas. The growth benefits are essentially driven by the overcrowding relief, with positive effects on agglomeration and labour market flexibility, and provide evidence that these types of rail interventions could well have a role to play in supporting growth.⁵¹

The returns from projects designed to transform the UK economy are speculative

I.138 The importance of good option generation has already been discussed, and in particular I have argued for policymaking that starts with the policy goal or problem, and then assesses a range of solutions that could be adopted in order to address the situation.

⁵⁰ *Transport demand to 2025 and the economic case for road pricing and investment*, DfT, 2006.

⁵¹ Available evidence on smaller-scale rail capacity schemes is limited. This again reflects problems with option generation, and given the scale of returns, government should act to ensure larger numbers of such schemes are brought forward and appraised.

I.139 It is evident from my work that, in transport debates across the world, the opposite process can occur. We see situations where the solution develops first – perhaps driven by the prospect of an exciting new technology, aspirations of transforming the economic fortunes of a region, or even simply because a competitor city or country “has one”. The idea rapidly becomes a solution looking for a problem.

The pursuit of icons **I.140** The risk is that transport policy can become the pursuit of icons. Almost invariably such projects – ‘grands projets’ – develop real momentum, driven by strong lobbying. The momentum can make such projects difficult – and unpopular – to stop, even when the benefit:cost equation does not stack up, or the environmental and landscape impacts are unacceptable.

I.141 The resources absorbed by such projects could often be much better used elsewhere. The suggested benefit:cost ratios of such projects, although only estimates, are often lower than many other less-exciting transport projects. International evidence collated for this Study suggests that the claimed transformational impacts of such projects are rarely observed, and any speculative assessment of ‘macro-economic’ benefits would involve considerable risk, particularly in view of the large sunk cost investment that would be required.⁵² Furthermore, the projects are rarely assessed against other interventions that would achieve the same goals – it can often seem that, unless Government can somehow demonstrate that the project’s costs outweigh the benefits, the project should go ahead. In fact, the question should really be are there better ways to achieve the same goals, or are there better uses of the funds to achieve different, but more valuable goals, for the same cost?

I.142 In short, step change measures, such as a new nation-wide very high-speed train network, are not, in a world of constrained resources, likely to be a priority. That is why it is critical that the government enforces a strong, strategic approach to option generation, so that it can avoid momentum building up behind particular solutions and the UK can avoid costly mistakes which will not be the most effective way of delivering on its strategic priorities.

⁵² *Step-change Transport Improvements*, Mann 2006.

Figure 15: The case for new very High Speed Lines (HSLs)

Significant momentum has built behind the case for a new network of very high-speed rail lines in the UK. This is often associated with new technologies, such as magnetic levitation devices, currently in very limited use in China. The business case is often argued to rest on the transformational impact of such a network on the UK's economic geography.

However, new high-speed rail networks in the UK would not significantly change the level of economic connectivity between most parts of the UK, given existing aviation and rail links. Even if a transformation in connectivity could be achieved, the evidence is very quiet on the scale of resulting economic benefit, and in France business use of the high speed train network is low.

Faced with such arguments, supporters of HSLs point to the capacity increases such new lines would deliver in London and selected urban areas by removing some or all interurban trains from commuter and freight lines.

Such benefits are likely to be both real and substantial. Crucially though, these goals could be achieved by other solutions, and perhaps at much lower cost. The range of policy measures would include fares pricing policy, signal-based methods of achieving more capacity on the existing network, and conventional solutions to capacity problems e.g. longer trains. Indeed, in keeping with a non-modal approach, the measures assessed should include improvements to other modes that support these journeys (e.g. motorway, bus, and urban access improvements).

New lines – including new very high-speed lines – should take their place within this range of policy measures, and each should be assessed on their merits before selecting the option that offers the greatest returns on investment.

An alternative argument is sometimes made on environmental grounds because a very high speed line from London to Scotland could attract modal shift from air. Such arguments must be made with care given that total domestic aviation emissions, including flight between other cities, account for 1.2 per cent of the UK's annual carbon emissions (CO₂ equivalent), including allowance for the the climate change impacts of non-carbon emissions from aviation. Furthermore, rail's energy consumption and carbon emissions increase with speed and this would erode rail's environmental advantage and so it is important to consider the costs involved in reducing carbon emissions in this way.

A set of policies based on these principles would deliver greatly enhanced economic returns

I.143 What is clear from this analysis is that the economic case for transport is compelling but that there is no single answer to the UK's long term transport needs. To sustain the UK's productivity and competitiveness, whilst meeting the environmental challenge, demands a sophisticated policy mix, combining better pricing of transport, other better use measures and sustained infrastructure investment. Without such action the costs to the economy will be substantial. Having set out the challenge, and identified the key strategic priorities, option generation must now focus on bringing forward and comparing the full range of pricing and investment options in these areas so that resources can be focused on the schemes which will best sustain the UK's productivity and competitiveness, whilst respecting its environmental obligations.

Conclusions and recommendations

I.144 The overarching conclusions I draw from this chapter are:

- targeted transport policies offer the prospect of very high returns, even once environmental impacts have been factored in;
- to ensure that the UK transport system can support the long term productivity and competitiveness of the UK economy, there is much to be done now in anticipation of these looming challenges. Government will need to deploy a sophisticated policy mix of pricing, better use, and investment;
- policies that raise the performance of the current transport networks – particularly road pricing – stand out above other interventions in offering the potential to deliver for economic growth and minimise environmental and social impacts; but the challenges and risks must be well managed;
- the economic case for targeted new infrastructure is strong and offers high returns; and
- step change measures intended to transform economic performance are not, in a world of constrained resources, likely to be a priority. The UK is already well connected and the demands for new links are uncertain.

I.145 I therefore recommend:

- **That government needs to get the prices right across all modes – especially congestion pricing on the roads and environmental pricing across all modes; to make best use of existing networks; and, together with the private sector, to deliver sustained and targeted investment.**

VOLUME 4: TAKING ACTION – ENABLING THE SYSTEM TO DELIVER

I.146 Successfully identifying the challenges that transport has to meet and investing public funds on the best options to meet them will require structures and policy processes that can support such an approach. It will also require a delivery system that can implement policy decisions effectively on the ground, and in a way that maximises the impact of public and private investment.

I.147 The final volume of my report considers how government can ensure what might loosely be called the 'delivery system' for transport continues to support a rigorous and systematic approach to policymaking which effectively delivers policies on the ground. The scope of this stretches from central government policymaking, to sub-national decision making, through to the planning and financing process for transport projects.

I.148 It is clear that the UK system has some strong foundations to build on: transport policy is underpinned by a strong evidence base; using world-class analytical methodologies; that national bodies are well placed to take decisions over nationally significant projects; and that the UK has been at the forefront of understanding how to make appropriate risk transfer to the private sector via a number of mechanisms, leading the world in working cooperatively with private sector partners.

I.149 In what follows, I have not sought to provide a comprehensive assessment of all of the delivery challenges ahead. Instead I have focused on those issues which have arisen in the course of my Study which seem most likely to pose particular challenges, or will need to evolve to reflect changing circumstances.⁵³

I.150 In a changing world, it is right to consider if current structures and practices will remain appropriate for the future. In order to make the most of continued investment in the sector, I recommend that Government:

- Enshrines a systematic approach which starts by identifying clear objectives, takes a cross-modal approach to finding solutions, considers all types of interventions, assesses the full impacts of policies and prioritises those options which do most to deliver on Government's objectives;
- Considers the case for reform of sub-national decision making, so that sub-national bodies have the right geographical scope, powers and responsibilities to take such an approach;
- Legislates to enable local bodies to introduce bus franchising in urban areas, alongside bus priority measures and subsidy reform, to enable buses to fulfil their potential and become a substantial contributor to the success of urban areas;
- Continues to ensure that the UK remains at the forefront of engagement with the private sector, to maximise the positive impact that appropriate risk transfer can have on transport outcomes; and

⁵³ My discussion of road pricing in the previous section has already addressed the delivery challenges involved in widespread implementation.

- Reforms the planning process for major infrastructure projects to provide greater clarity and certainty without compromising fairness and thoroughness, in particular by providing greater clarity about government policy through Strategic Statements of transport objectives, and introducing an Independent Planning Commission to take the final decision on specific applications.

National decision making

I.151 The Department for Transport is rightly committed to an evidence-based approach which assesses policies and projects thoroughly before committing to their implementation. This report has built on this approach and has been rigorous in identifying the challenge or objective at the outset before going on to assess a range of solutions, without favouring a particular mode or type of policy intervention, based on a rigorous assessment of the full costs and benefits of individual schemes.

I.152 Clearly, in a world of constrained resources, it is desirable that the Government's very significant annual investment in the transport sector is targeted at those policies that will make the biggest contribution to reaching the Government's objectives. Therefore, a rigorous process of identifying the best option to achieve objectives is important. I believe it would be valuable to enshrine this approach into the long-term option generation, decision-making and funding allocation processes. I therefore propose the following three principles:

- start with a clear articulation of the policy objectives, focusing where relevant on the needs of users and the 'whole journey' they make rather than on particular stages or modes;
- consider the full range of policy options for meeting the policy goal, including different modal options, and policies for making more efficient use of existing capacity, as well as small and larger scale capacity enhancements; and
- prioritise limited public resources on those policies that most cost-effectively deliver the Government's objectives, taking account of the full social, environmental and economic costs and benefits of policy options.

I.153 To ensure that these principles are embedded, Government should consider how to ensure that decision-making structures, including the system for allocation of resources, support such an approach. **In particular I recommend that:**

- **The potential for transport to make an effective contribution to productivity and competitiveness should be reflected in DfT and HM Treasury's objectives and performance indicators;**
- **DfT should put in place a cross-modal process to drive option generation and to ensure funds are allocated to the policies that most cost-effectively contribute to its objectives;**
- **DfT should develop a three-part strategic framework: a long-term outlook of economic, environmental and social pressures and challenges over the next 20-30 years; a 10-20 year strategy for delivering on each of its objectives and the policy options for delivering these outcomes, and a 5-10 year statement of commitments setting out details of committed schemes and timings of forthcoming decisions; and**
- **DfT should continue to develop and improve the evidence base to support these processes.**

Sub-national decision making

I.154 In light of the economic importance of the UK's cities and regions and the role that transport can play in supporting that economic success, I believe that effective governance at a sub-national level is a crucial issue for the future. Such governance arrangements need to provide for consideration of all relevant modes and all types of policy intervention. However, whilst much transport – local and regional roads, bus powers, light rail and some ports and airports – is in the hands of sub-national bodies, those bodies do not have the full range of powers or the financial incentives to consider a full range of options and often the powers are split across a number of different bodies.

I.155 For example, Passenger Transport Authorities in six of the largest urban areas can influence bus operations but do not have highways or traffic powers (to alter road space to cater for buses, for instance). Similarly, local authorities receive funding from a variety of sources and have considerable flexibility to decide how to spend funds. However, there can be implicit incentives to pursue capital-intensive options in the Local Authority finance system, and additional funding pots for dedicated purposes can risk distorting prioritisation.

I.156 It is not, therefore, clear that these sub-national bodies will always be able to deliver the outcomes needed using the most appropriate mode or the most appropriate type of intervention, for the simple reason that not all modes or interventions are within their gift. As a result, the clear risk is that less effective or lower value for money solutions are selected.

I.157 In addition, effective governance arrangements should be able to oversee the full journey undertaken by users, and where competing demands or spillovers exist, effective mechanisms need to be in place to manage those overlaps. However, such journey patterns are inherently complex and overlapping: commuters, business people and freight users all share the same networks, e.g. on the rail network, although they are making very different journeys. The patterns will also be dynamic: the patterns change over time as the pattern of economic activity changes within the UK. It is therefore sensible that the area over which sub-national bodies have an influence is flexible enough to respond to the realities of the UK's changing economic geography, and that there are clear and effective mechanisms to manage networks which service both local and national users.

I.158 Building on existing local government responsibilities and the greater sub-national influence over funding decisions through the Regional Funding Allocations (RFAs), the Department for Transport is currently looking at how best to support cities and regions to make effective transport decisions, and in the 2006 Queen's Speech announced its intention to reform some aspects of local transport governance. Furthermore, through the Department for Communities and Local Government's October 2006 Local Government White Paper – and the Review of Sub-National Economic Development and Regeneration, the Government is looking at this issue alongside the local and regional delivery of other areas of public investment, in particular housing and skills. The Lyons Inquiry is also considering similar issues.

I.159 Those are important workstreams and I do not wish to prejudge their outcomes. However, this Study makes a series of recommendations about the principles of governance of transport policy at the sub-national level. The practicalities of implementing these proposals are complex and it is important that the Government gives thorough consideration to the issues through the different workstreams, in particular through the Review of Sub-national economic development and regeneration; the Lyons Inquiry may also wish to consider these issues before publishing its final report.

I.160 I therefore recommend that the Government should consider:

- The case for ensuring that sub-national decision-making structures reflect, as much as possible, patterns of economic activity;
- Developing and implementing effective mechanisms between transport bodies to manage the shared and interlinked transport networks;
- What powers should be vested in sub-national decision-making bodies to support cross-modal decision-making and ensure both better use and infrastructure options are considered;
- Which funds should be allocated to such a body, and the appropriate level of flexibility between funding streams, so that funding flows incentivise a cross-modal approach to funding the highest value for money solutions; and
- How best to ensure that sub-national bodies have the capacity and accountability to take any such enhanced role.

The role of buses in supporting the economic success of growing and congested urban areas

I.161 Buses are an important part of many transport networks. However, it is in the UK's urban areas, where the scope for new road, heavy or light rail networks can be limited, that bus services have the potential to be a fundamental part of the transport network's contribution to the success of those places, whilst delivering on environmental and social objectives.

I.162 However, in patronage terms, the bus sector has been in long-term decline since its peak in the 1950s, driven primarily by the affordability of the motorcar and increased journey lengths. In recent years, though, the bus market has been expanding in some areas, especially London, but also other urban areas such as Oxford, Cambridge and York. Whilst it would not be in keeping with a non-modal approach to take action to increase bus use per se, buses can offer a very cost-effective way to reduce congestion and support productive urban labour markets. It is therefore worthwhile to consider if factors internal and external to the bus market might be addressed to allow buses to play a greater role in the success of urban areas.

I.163 In the UK, prior to 1986 buses were owned and controlled by government. In 1986 competition was introduced into the sector. Competition forces create on-going incentives for efficiency and responsiveness of provision to the needs of users. These arguments for securing delivery are robust, well rehearsed and backed up by evidence across a range of industries. This has clearly been evident in the bus market, which, since deregulation, has seen operating costs fall in some markets by 50 per cent. There has also been considerable innovation in the bus market following deregulation, including improvements in bus fleet, variable bus sizes, out-sourcing of maintenance, smart ticketing and the introduction of part-time working arrangements for employees in the sector.

I.164 However, service levels have been falling, fares have been rising, and patronage, with the exception of a few markets, continues to fall. I therefore believe there is a strong case for strengthening competition in the bus market to ensure that it delivers in the interests of users. There are three fundamental principles that should be applied to secure the successful

operation of buses in urban areas: 'competition' forces; 'coordination' of services – both with other bus services but also other public transport modes – this is critical in large urban areas where multi-trip journeys are more common; and effective 'cooperation' between operators and local authorities.

I.165 I therefore recommend that changes to the regulation of the bus market are made, to allow local bodies to cooperate more with bus operators; to allow greater coordination between bus operators; and to allow local bodies the option of introducing a bus franchising model where it can be demonstrated to offer a high value for money solution to the transport challenges facing the UK's urban areas.

Working in partnership with the private sector

I.166 The UK has a long history of private sector engagement in the transport sector. Railways in the nineteenth century were built through private sector entrepreneurship. Many of the major ports and airports in the UK are operating through successful private ownership. Of course in reality, transport projects and services across all modes are delivered through some level of coordination between the public and private sector. Very little can be achieved by government without drawing to some extent on private sector skills, capacity and ability to manage risks.

I.167 As I discussed earlier, being smarter about transport investment, through a combination of targeting, full appraisal and better use of existing resources can deliver considerable benefits for the UK economy and society. Equally, government also needs to consider how to make the most of the private sector to deliver to time and to cost transport investments that users value, while maintaining value for money.

I.168 The UK has been a world-leader in working in partnership with the private sector to deliver and operate transport projects, and in using appropriate risk transfer to maximise the returns from public investment. Through a variety of long-standing partnership approaches, the public sector makes good use of private sector expertise, placing risk in the hands of those best placed to manage it, including, when appropriate, transferring risk to the private sector. In common with governments around the world, the UK has learned about the types of involvement which can work effectively. In aggregate, the result has been that transport investments have been delivered at a lower cost – and with significantly fewer risks – to the public purse.

I.169 However, the context for this partnership has been changing rapidly. In particular, the private sector appetite for infrastructure assets that offer stable, low risk returns has been growing significantly.⁵⁴ This is in part driven by structural changes in the financial and infrastructure markets: the growth in pension funds seeking stable long-term returns⁵⁵ and the maturing of the market is narrowing the gap between the costs of borrowing for the public and private sectors. And the risks and rewards of such investments are increasingly well understood in light of international experience. The underlying appetite for risk and for the asset class has grown significantly.

I.170 The challenge now is for the UK to remain at the forefront of partnership working, and to consider if the maturing of the market offers new possibilities. Both HM Treasury and the Department of Transport continually assess the performance of such partnerships and assess how best to transfer and manage risk. Looking forwards, the UK will need to meet a series of challenges to maintain a strong performance in this area.

⁵⁴ Major deals in the UK have included Ferrerol's acquisition of BAA and the Goldman Sachs purchase of AB Ports.

⁵⁵ Australian and Canadian Funds have led the way but the process is mirrored in most OECD countries.

I.171 I do not believe a change in approach is needed. However, Government should continue to look for efficiency gains and secure value for money in the delivery of transport projects through the private sector by:

- Identifying a pipeline of transport projects and programmes, which is aligned with DfT's strategy framework and will be delivered in partnership with the private sector, delivering transparency and certainty for private companies competing in the market;
- Maintaining adequate capacity and skills within government to ensure efficient procurement and delivery of projects; and
- Recognising and responding to changes in financial and infrastructure markets to make the most of new opportunities for efficiencies through private sector delivery and for increased risk transfer.

Reforming the planning system for major transport projects

I.172 In a modern democracy, it is beyond question that, when considering whether to grant planning approval, the planning system should play an impartial and transparent role in finding an appropriate balance between national, regional and local costs and benefits; between economic, environmental, and social objectives; and between the rights of individuals and society as a whole.

I.173 There are many conflicting views as to whether the system achieves the right balance on each of these points. For my part, I am not convinced that the planning system gets the balance wrong: sensible judgements are made that allow the UK to grow and develop, but only where the schemes do not impose unjustified costs on individuals, the environment or society. This study is not the only piece of work that is concerned with the relationship between planning and the regimes for delivering major infrastructure. The Barker Review of Land Use Planning will also bring forward recommendations in this area.

Process uncertain and prone to delay

I.174 However, I am convinced – and having listened to stakeholders' views throughout the UK and read the responses to my call for evidence, it is clearly a view shared by many – that the system has evolved over several decades to the point at which it can impose unacceptable cost, uncertainty and delay on all participants and the UK more broadly. The current situation affects the UK's competitiveness by deterring investments and limiting the responsiveness of the transport sector; it hinders the ability of Local Government and other interested parties to engage properly in the process and can sometimes effectively preclude them from doing so; and in extending planning blight and uncertainty, it can severely affect the lives of individuals directly affected by proposals. Interestingly, in conducting this work my team found that many European countries now encounter similar issues with their own planning systems.

I.175 The causes of these problems are complex, interlinked, and will vary from application to application. There is no easy solution and, of course, a distinction should be made between necessary time spent considering serious matters and unnecessary delays. Furthermore, it is not always the system itself which is at fault – deficiencies in the detail of the application or the option selection process undertaken by the promoter can appropriately lead to delay or additional costs whilst these deficiencies are rectified, so that a fair decision can be made.

I.176 There are a number of causes of unnecessary cost and delay, which have developed over many decades. These include: (i) lack of clarity about national policy, so that the public inquiry needs to determine the policy context for, and assess the basic case for, the development; (ii) the adversarial nature of the inquiry process, which often involves the duplication of oral and written evidence and a lack of focus on the key issues, (iii) the existence of a second, separate phase of decision-making (the Ministerial decision stage, following an inspector's report), often examining issues that should have been covered at inquiry; (iv) a cumbersome process with overlapping statutory and formal processes, with different legislation for different modes and often different Ministers accountable for each; and finally (v) the scope for legal challenge from beginning to end.

I.177 I believe that the cost, uncertainty and delay of the planning process can be reduced, without compromising its fairness or thoroughness. I recommend a significant package of reform options that seeks to target the underlying causes.⁵⁶ The options fully respect the parameters of EC legislation and the Human Rights Act, and have been tested with leading planning lawyers. Many of the recommendations have drawn upon successful practices operated elsewhere in the UK domestic legal system or in the EU. Indeed, elements of the proposals have been advanced in previous proposals for reform in the UK, or have been reflected in recent reforms of the wider planning system. But, to date, such ideas and reforms have not been brought together into a coherent system for transport to capture the benefits in full.

I.178 I believe that they form a practical and deliverable package, which will have a very real impact on the problems I have identified, without restricting the ability of the process to make thoroughly assessed decisions. Together they help balance the economic benefits of transport infrastructure alongside social and environmental impacts. Together they create a system that retains Ministers at its heart, while delivering a fair and transparent system with increased certainty for all participants.

I.179 Full details of my suggested reforms, together with an assessment of the benefits and risks of each proposal, are set out in Volume 4. However, the key elements are to create a single system for strategic transport projects, which:

- Puts direction from ministers at the heart of the process: at the outset, the government should produce clear statements of strategic objectives which articulate the need for strategic transport capacity and development, balancing national economic, environmental and social considerations and the balance between national needs and possible local impacts;
- Introduces new statutory provisions to reinforce the requirement for full and wide-ranging public consultation when drawing up these national strategies, enshrining the role of individual members of the public and interested organisations in shaping the national priorities for the future;
- Establishes a new independent Planning Commission for strategic transport schemes comprised of well-respected experts of considerable standing to conduct major inquiries and decide the planning decision for strategic transport schemes; and
- Establishes clear and defined statutory rights of legal challenge at key stages of the process to form a complete framework for challenges to decision-making by these proposals.

⁵⁶ My proposals were developed in consultation with the Barker Review, which covers a wider range of planning policy issues.

RECOMMENDATIONS SUMMARY

I.180 My recommendations are presented below in a summarised form; they are set out in full detail in the volumes of the main report.

A. Policy recommendations

1. **To meet the changing needs of the UK economy, Government should focus on improving the performance of existing transport networks, in those places that are important to the UK's economic success:**
 - Government action needs to focus on tackling congestion, capacity constraints, and unreliability on existing networks.
 - In some limited circumstances, there may be opportunities to extend the network which offer good value for money, for example government may wish to explore the case for extending the reach of existing urban networks in order to deepen labour markets.
2. **Over the next 20 years, the three strategic economic priorities for transport policy should be congested and growing urban areas and their catchments; and the key inter-urban corridors and the key international gateways that are showing signs of increasing congestion and unreliability. These are the most heavily used and economically significant parts of the network:**
 - Look for signals of congestion, overcrowding and high productivity as high-level indicators that transport improvements may make a significant impact on economic growth and productivity.
 - Bring forward and assess a wide range of alternative options to address transport performance in these areas.
 - To achieve the greatest benefits from available funds, prioritise the options in these areas that offer the highest value for money, based on a full appraisal of their economic, environmental and social impacts.
3. **Government should adopt a sophisticated policy mix to meet both economic and environmental goals. Policy should get the prices right (especially congestion pricing on the roads and environmental pricing across all modes) and make best use of existing networks:**
 - In line with the Stern Review, prices across all modes should reflect the true cost to society, including congestion, overcrowding and environmental impacts – through appropriate fiscal, regulatory, pricing or trading instruments.
 - Use road pricing as the most appropriate way to tackle congestion: introduce widespread, congestion-targeted road pricing to deliver the potential benefits cost-effectively; setting out the key decisions (identified in Figure 12) needed to unlock the vast potential of road pricing.
 - Explore the potential for high value for money better use measures that encourage changes in travel choices or exploit the opportunities provided by new technologies.

...reflecting the high returns available from some transport investment, based on full appraisal of environmental and social costs and benefits, the Government, together with the private sector, should deliver sustained and targeted infrastructure investment in those schemes which demonstrate high returns, including smaller schemes tackling pinch points:

- After considering the potential for pricing and better use, deliver sustained infrastructure investment where it offers strong returns in the three strategic economic priority areas.
- Do not be seduced by 'grands projets' with speculative returns.
- Implement proposals for additional runway capacity where the case is robust, having accounted for the environmental costs of emissions.

B. Delivery recommendations

4. **In order to meet these transport challenges, the policy process needs to start with the strategic economic priorities, define the problems, consider the full range of modal options using appraisal techniques that include full environmental and social costs and benefits, and ensure that spending is focused on the best policies:**
 - DfT, and local and regional bodies should put in place a process to drive option generation which is both cross-modal and which encompasses both better use and investment options; and should ensure funds are allocated to the policies which most cost-effectively contribute to transport objectives.
 - Transport's contribution to productivity should be reflected in the DfT's objectives and in DfT's and HMT's performance indicators.
 - DfT should develop a three-part decision making cycle, a long term outlook of emerging challenges over the next 20-30 years; a medium term strategy for delivering on its objectives over 10-20 years; and published statement of commitments, setting out details of committed schemes and timing of forthcoming decisions over the next 5-10 years.
 - DfT should continue to develop and improve the evidence base to support these processes.
5. **Government needs to ensure the delivery system is ready to meet future challenges:**
 - Consider the case for reform of sub-national decision making, so that sub-national bodies have the right geographical scope, powers and responsibilities.
 - Legislate to enable local bodies to introduce bus franchising in urban areas, alongside bus priority measures and subsidy reform, to enable buses to fulfil their potential and become a substantial contributor to the success of urban areas.
 - Continue to ensure that the UK remains at the forefront of engagement with the private sector, to maximise the positive impact that appropriate risk transfer can have on transport outcomes.
 - Reform the planning process for major infrastructure projects to provide greater clarity and certainty without compromising fairness and thoroughness, in particular by providing greater clarity about government policy through Strategic Statements of transport objectives, and introducing an Independent Planning Commission to take the final decision on specific applications.

APPENDIX

Cost benefit analysis used in the Eddington study

I.181 The cost benefit analysis presented in this study has made two important innovations. Firstly, it has tried to use new evidence,⁵⁷ to assess the impact of the GDP impacts that are 'missing' from conventional appraisal, i.e. the microeconomic drivers from Volume 1 which are not currently captured in cost benefit analysis. It is the first time that any estimate of such impacts has been made and whilst the absolute magnitudes are inevitably tentative, given the innovative nature of the work, some interesting new insights are made possible.⁵⁸

I.182 The Study has also made use of emerging evidence on the costs of environmental damage.⁵⁹ The database and modelling work contain appraisal information on the full welfare impacts and, for around a third of projects, environmental and social impacts have been explicitly valued for inclusion in the benefit:cost ratio.

I.183 These issues are explored in more detail in Volume 3.5.

⁵⁷ *Transport, wider economic benefits and impacts on GDP*, DfT, 2005.

⁵⁸ At present there is insufficient evidence to estimate impacts from increased trade or the attraction of globally-mobile resources. The Study recommends that research is undertaken to develop a methodology for estimating such effects.

⁵⁹ DfT's appraisal guidance recently incorporated the monetisation of such effects. However, at the time of this analysis, they were not included in the conventional NATA Benefit: Cost Ratio. Where quantitative evidence is not available, qualitative evidence has been used.

Figure 16: Measuring the welfare impacts from government expenditure – the costs and benefits

To reflect the evolving nature of transport appraisal, four cost benefit measures are referred to throughout this study, all of which express estimated benefits of a proposal per pound of government expenditure. If the ratio is, say, 2.5 then £2.50 of benefit is achieved per £1 of public funds invested. An intervention with a ratio of 5:1 would offer double this welfare return.

The main difference between the metrics set out below is the extent to which benefits are counted and given monetary valuations (monetised). It is our view that the conventional BCR is the most certain measure, but that it is incomplete. The vfm assessment is the most complete 'single measure' of transport's impact on the UK, as it incorporates the fullest possible estimate of a proposal's economic and environmental impacts. However, those estimates are more uncertain than the conventional BCR because the evidence base is relatively new and some of the effects are inherently hard to monetise.

- **Conventional benefit:cost ratio (NATA BCR):** the benefit:cost ratio calculation set out in DfT's appraisal guidance (*New Approach to Appraisal*).^a The main effects which are monetised in this BCR are: the value of time saved; changes to the costs of travel; safety benefits; and the financial costs of doing the project. This does not yet include a number of GDP impacts and does not put a monetary valuation on most environmental benefits.^b Instead, the BCR sits within a broader assessment framework that uses qualitative estimates of environmental and social impacts.
- **GDP per pound:** the contribution to GDP that can be achieved per pound of government money spent on the intervention. It is a narrower metric than welfare because it only allows a focus on the impacts on the economy. It does not therefore include benefits for non-work travel, for example. This assessment includes impacts on the wider economy that are not currently estimated as part of conventional appraisals, such as agglomeration, labour market and competition effects. These are indicative estimates for this Study based on the developing DfT guidance on these impacts.
- **Wider benefit:cost ratio (wider BCR):** this adds the 'missing' GDP effects into the conventional BCR.
- **Value for money (VfM BCR):** the most complete metric used in this analysis, building in both missing GDP impacts and environmental valuations. For decision making, all impacts on society should be considered, although some impacts are inherently difficult to value in money terms. The value for money assessment goes broader than the two previous metrics by incorporating most significant environmental effects into the monetised assessment: carbon (using Defra guidance), noise and landscape (all from published academic and government research).

^a The DfT guidance, *New Approach to Appraisal*, can be seen at www.webtag.org.uk

^b Recent developments in appraisal guidance will lead to future appraisal valuing the change in carbon emissions and noise.

