MDS Transmodal

Local and Global Transport and Logistics Research

The impact of road pricing on freight transport in Great Britain

A study for Transport 2000

by

MDS Transmodal Limited

FINAL REPORT

Date: June 2007

Ref: 206093R final report 12.06.07

MDS Transmodal Ltd 5-6 Hunters Walk Canal Street Chester CH1 4EB UK t +44 (0)1244 348301 f +44 (0)1244 348471 www.mdst.co.uk

CONTENTS

1 INTRODUCTION

1.1 Background

This report for Transport 2000 examines the potential impact of a system of road pricing on freight movements in Great Britain. The analysis has been produced by developing a scenario that was tested using the *MDS Transmodal GB Freight Model (GBFM)*, a freight transport demand model. This scenario provides an objective view of the potential impact of a system of road pricing on modal split and routing of freight transport in Great Britain. GBFM forms the freight module of the DfT's National Transport Model.

The policy context for this study is the on-going debate in relation to whether and, if so, how a system of road pricing should be introduced in the United Kingdom to reduce environmental emissions and road congestion. Transport was responsible in 2004 for about 23% of the UK's total emissions of carbon dioxide, the major greenhouse gas, according to the Department for Transport's (DfT's) latest statistics. Within the transport sector, road freight accounted for some 7.6 billion tonnes of carbon in 2004, which represented about 5% of the total carbon emitted from all sources in the UK. Carbon emissions from road freight have increased from 6.3 billion tonnes of carbon in 1994, a 21% rise during the period 1994-2004 (source: DfT Transport Statistics Great Britain 2006).

This chapter sets out the policy background to the potential introduction of road pricing in the UK. Chapter 2 provides a description of the methodology used and results of the modelling, while Chapter 3 provides some conclusions to the study. There is also a Glossary of Terms.

1.2 Road Pricing

Road pricing is a system under which road users (both private cars and goods vehicles) are required to pay for the net external costs that they impose on society. That is, road users are charged for the environmental pollution and congestion they cause to the extent to which these costs are not covered by existing forms of taxation such as fuel duty and Vehicle Excise Duty (VED). The objective of road pricing is to use the pricing mechanism to change behaviour to reduce the negative impacts of road transport on the environment, society and the economy. Road users could change their behaviour by changing the route they take to avoid more congested (and more expensive) roads, they could travel at different times of the day or they could choose not to travel at all.

In 2003 the Government began the process of introducing a distance-based road haulage taxation system, called the Lorry Road User Charge (LRUC). The proposal was supported, in principle, by the Freight Transport Association and the Road Haulage Association, although its potential complexity caused detailed proposals to be opposed. The aim of the scheme was to equalise the fuel tax system between UK and foreign hauliers, but the scheme would have had many of the features of a road pricing scheme. The scheme would have been "revenue neutral" in that it would have redistributed tax already paid by road freight transport across all road freight movements, whether the trucks were registered in the UK or abroad, on the basis of distance, the type of road and the time of day. The Government subsequently ended development of the LRUC as it could be incorporated, in due course, into a wider road pricing scheme for all types of vehicle.

This policy of developing a more comprehensive road pricing scheme was discussed in the most recent transport White Paper entitled, *The Future of Transport* (July 2004):

The Government view is that the costs of inaction or unrestricted road-building are too high for society. The time has come seriously to consider the role that could be played by some form of road pricing policy.

In June 2005 the Government announced that it would actively examine the case for and practicality of road pricing based on the external costs their users impose on society. The Government has also made funding available for road pricing and congestion charging schemes at a local level through the Transport Investment Fund (TIF), based on existing legislation.

In July 2006 the Secretary of State for Transport, Douglas Alexander, argued in a letter to the Prime Minister,

We cannot simply build our way out of congestion, which is a key threat to economic growth, particularly in our towns and cities. That is why, in my first week as Secretary of State I made it clear that I am personally committed in the months ahead to advancing the debate on road pricing from the "why" to the "how".

As well as helping to reduce congestion, a system of road pricing would be designed to reduce environmental emissions of carbon, in particular, in an attempt to reduce the impact of road transport on climate change. The *Stern Review: the economics of climate change* (published by HM Treasury in November 2006) argued that a system of carbon pricing will be required to provide the correct economic signals to users; a system of road pricing could be designed to charge road users for the carbon they emit and such a system would therefore be an example of carbon pricing.

Road pricing, as a policy instrument to reduce congestion and emissions, has been given strong support by Sir Rod Eddington in *The Eddington Transport Study: the Case for Action*. In his Summary Report, Sir Rod argues that,

I have long been persuaded of the importance of internalising externalities – that is to say, the importance of making sure that users pay the full costs of their

journeys…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.

The Government is intending to legislate in the draft Road Transport Bill to enable local road pricing pilots to be introduced, but has made it clear that new legislation would be required to introduce a comprehensive system of road pricing on a nationwide basis. The Government appears to accept that public opinion is not yet prepared for the introduction of a national system, but the Government will gradually work towards that goal.

1.3 The experience of the MAUT in Germany

Experience from the introduction of the MAUT in Germany provides evidence of the potential impact of the introduction of a road pricing scheme for HGVs in the UK. The MAUT was introduced in 1 January 2005 and applies to all HGVs over 12 tonnes travelling on the 12,000km of the autobahn network; charges are not levied on other roads. The charge varies according to the distance travelled, the vehicle's emission class (to reflect environmental externalities) and the number of axles (to reflect the cost in terms of wear and tear on the roads). Early results suggest that the MAUT has been associated with the following impacts[1]:

- An improvement in average load per vehicle;
- A 6% reduction in empty running;
- 6% modal shift to rail freight;
- Diversion of some freight traffic onto secondary roads to avoid the MAUT.

Initial results from the experience of the limited road pricing system in Germany appear to indicate that the road freight industry will respond to fiscal incentives by seeking to minimise costs, without a significant reduction in the demand for freight transport in terms of tonnes lifted. These responses by the freight industry include seeking to increase vehicle payloads and backloads and shifting some traffic to more sustainable modes of transport. Varying charges by type of vehicle should encourage earlier take-up of lower emission technology. Unless the whole road network is included within the scope of the road pricing scheme, some traffic will divert onto secondary roads in order to avoid paying the charge.

1.4 Road pricing: the modelled scenario

It is not clear at this point exactly how road pricing might be introduced in the future, but for this study we have a developed a scenario based on a system of road pricing which would

[1] *Germany Delivers the Goods*, Anthony Vigor, Transport Times, 13 January 2006

seek to “internalise” all the theoretical net external costs that are currently imposed on society by road freight i.e. make road freight operators and their customers pay for all the costs that are not fully included in the current financial costs incurred. The system of road pricing that we have modelled uses the Government’s own valuations of net external costs to calculate the additional charges over and above existing taxation; the net external costs have therefore been assumed to be the same as the Sensitive Lorry Mile (SLM) monetary values per mile, which are used by the Department for Transport (DfT) to assess the potential monetary value of environmental benefits from schemes that transfer freight from road to rail or waterborne transport.

Road haulage taxation, including all net externalities, would therefore have a distance-based element and would vary according to the type of road and, in particular, its level of congestion. The level of the charges would be significantly higher on congested sections of the road network than the current level of taxation. For example, over and above tax paid through fuel tax and vehicle excise duty, the charge would be £0.69 per HGV mile on a highly congested motorway and £1.74 per mile on a minor road in a major city. However, the charge would only marginally increase user costs on a low congestion motorway, with an additional cost of £0.04 per mile.

The road pricing scenario we have developed would be geographically comprehensive in that it would include the whole GB road network, so that hauliers would not have an incentive to use secondary roads to avoid paying high charges. However, the scenario does not include varying the charge according to the emissions standard of the vehicle or according to the time of day.

2 THE RESULTS

2.1 Introduction

This chapter provides a description of the methodology used to test the potential impact of the introduction of a system of road pricing and sets out the assumptions made. It also provides the results of the modelling both in terms of transport impacts (measures such as freight tonnes lifted and tonne-kilometres of freight moved), environmental impacts (in terms of Sensitive Lorry Miles and carbon dioxide emissions) and the fiscal impact.

2.2 Methodology

GB Freight Model (GBFM)

GBFM is an integrated software/database system linking domestic and international GB freight data with simple economic models to explain freight demand to allow scenario-based forecasting.

The model has been developed independently by MDS Transmodal, originally as an in-house system to make good use of available transport data. GBFM has since been expanded, in partnership with various organisations including the UK Department for Transport (ITEA Division), Leeds University Institute for Transport Studies, the Strategic Rail Authority and HM Revenue and Customs. The model has been fully audited for the Department for Transport, which uses the model within its National Transport Model. The model was used in 2005-06 to develop port traffic forecasts for the DfT and to produce freight forecasts on behalf of the Freight Transport Association and the Rail Freight Group. The GB Freight Model has also been used extensively by developers of rail freight distribution parks in the context of planning applications and by both regional assemblies and Regional Development Agencies to inform regional strategies. Regional freight demand forecasts produced using the GB Freight Model have been published by MDS Transmodal in its *GB Freight Report 2006*.

Scenarios

Two scenarios were developed for the study and modelled using the GBFM:

- A “Policy Neutral Scenario 2015” to provide a comparator;
- A “Road Pricing Scenario 2015” to test the potential impact of the system of road pricing described above.

The base year for modelling was 2005 and both scenarios were modelled to 2015, which is probably the earliest that a full system of road pricing could be implemented.

The assumptions for each scenario were as follows:

Policy Neutral Scenario 2015	**Road Pricing Scenario 2015**
• No changes to existing taxation of road haulage • Operating grants available for rail freight • Network of rail-connected distribution parks developed in all regions • Handling costs at intermodal terminals fall by 20% • HGV drivers' wages increase by 2% per annum • Charges for rail freight through the Channel Tunnel are halved • No capacity constraints	As for Policy Neutral Scenario 2015 except: • As well as existing taxation of road haulage, HGVs are charged the full value of the SLM for the relevant sections of the road network • Operating freight grants are no longer available from the DfT

The **Policy Neutral 2015 Scenario** assumes that the Government will continue to provide operating subsidy to rail freight schemes through the Sustainable Distribution Fund. This uses the SLM values described above to justify operating subsidy because road freight is not paying for its full net external costs. This scenario also assumes that the planning process will allow the development of a network of rail-connected distribution parks, with associated intermodal terminals; this would provide rail-connected origins and/or destinations for freight movements and helps rail freight to be competitive with direct road haulage. It is assumed that tolls charged for access for rail freight to the Channel Tunnel are halved, whether through entirely independent action by Eurotunnel or by some form of public sector intervention. Otherwise, the assumptions in the Policy Neutral Scenario are internal to the freight market, with lower terminal handling costs and higher wages for HGV drivers. A key underlying assumption is that there is sufficient rail capacity to accommodate demand for growth in rail freight.

In order to test the impact of road pricing, the **Road Pricing Scenario 2015** differs from the Policy Neutral Scenario 2015 in only two respects:

- The SLM values are added to existing taxation so that charges for road haulage reflect the full net externalities;
- Freight grants are abolished, as they could not be justified under EU law if road haulage was paying for its full external costs.

This means that in the Road Pricing Scenario road haulage taxation would be in two forms:

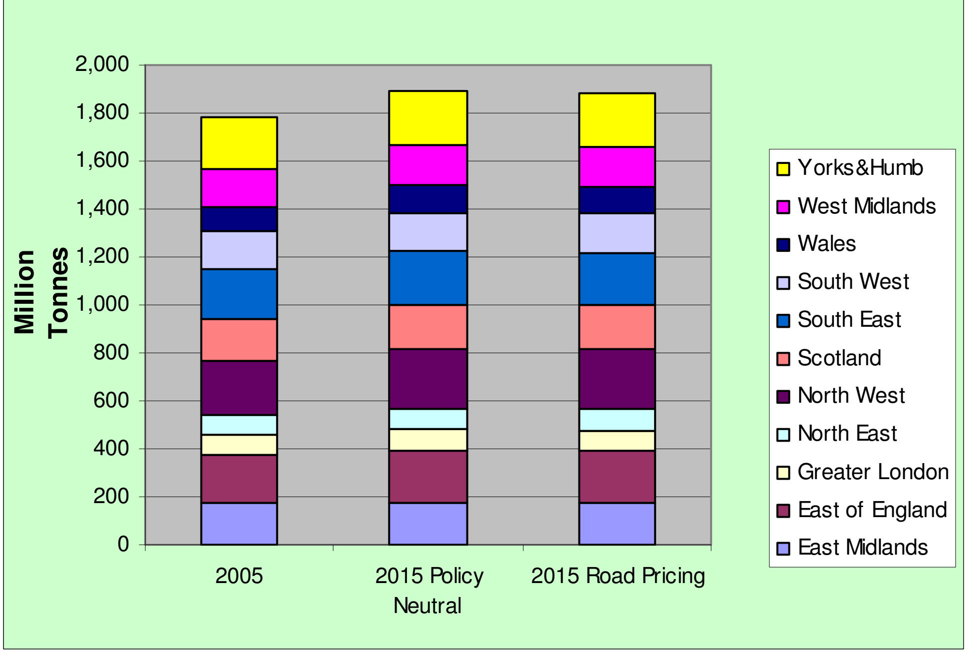
- Vehicle Excise Duty and fuel duty as currently levied;
- A distance-based charge, based on the type of road being used.

This may not be the optimal system of road pricing from an environmental point of view, but it is the only road pricing system that we believe can be tested at this point using charges per mile that have some degree of official recognition.

2.3 The results: demand for freight

Chart 1 provides the results of the modelling in terms of freight tonnes lifted, with a breakdown by region.

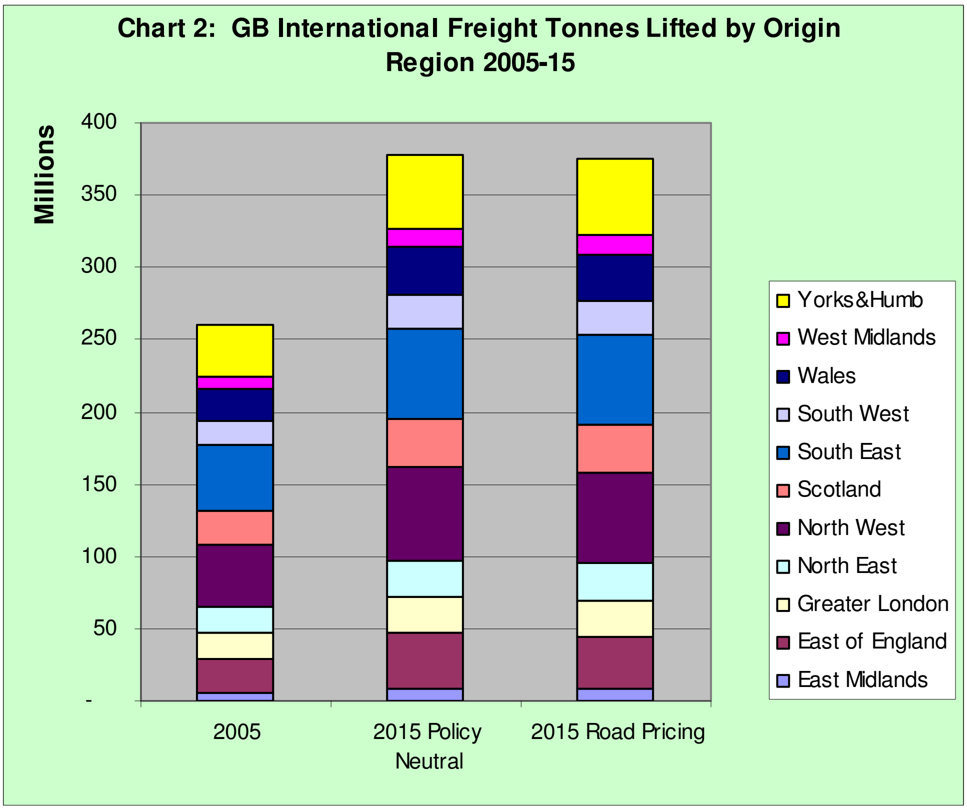
Chart 1: Total GB freight tonnes lifted by origin region



A total of 1.79 billion tonnes of freight were lifted in 2005. This includes both domestic freight (with origins and destinations in Great Britain) and international freight (with an origin or destination outside GB).

Total GB freight is forecast by GBFM to increase by 5-6% by 2015 under both scenarios, in line with historic trends. An increase in the cost of road freight as a result of the introduction of road pricing is unlikely to have a significant impact overall on the amount of freight lifted. In some circumstances transport costs can be a significant element of the total delivered price – for very low value products such as aggregates, for example. For most freight, however, even a significant increase in transport costs is unlikely to have much impact on the demand for the goods and their transport because the cost of the transport represents only a very small proportion of the value of the goods.

Chart 2 provides the results of the modelling in terms of international freight tonnes lifted by GB origin region and shows freight lifted by the region in which the port of entry is located. Traffic that arrives in GB at the Port of Dover or the Channel Tunnel, for example, is defined as having an origin in the South East.



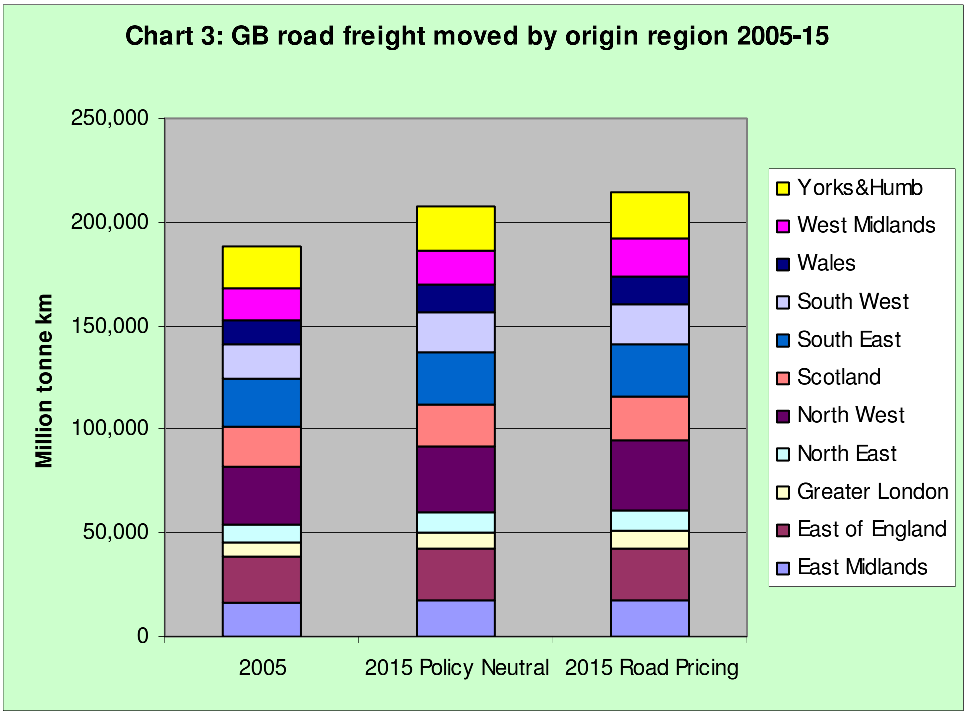
In 2005 international freight accounted for 260 million tonnes of freight, which represented some 15% of total freight carried. This is forecast to increase to 377 million tonnes by 2015 in the Policy Neutral Scenario and 375 million tonnes in the Road Pricing Scenario, which means that international freight will increase to about 20% of total GB freight. The growth rates forecast for international freight are therefore much higher than for total freight, increasing by about 45% over the ten-year period. This is due to an expected increase in unit load trade, in particular, as global trade barriers are removed and as the economies of Member States of the European Union become more integrated. Domestic freight in terms of tonnes lifted is forecast to remain essentially stable between 2005 and 2015.

The regional analysis shown in Chart 2 suggests that the introduction of road pricing may have some impact on the routing of international cargo, with a switch of traffic from ferry ports in the South East and the East of England to the longer distance ferry routes and container services between the Continent and the Humber.

An increase in the cost of road freight as a result of introduction of road pricing is unlikely to have any significant impact on the amount of goods traded, as the mean value of goods in an import container is around £20,000 while the transport costs of delivering that container within GB will probably amount to about £3-400. The cost of inland transport therefore represents between 1.5% and 2% of the value of the goods.

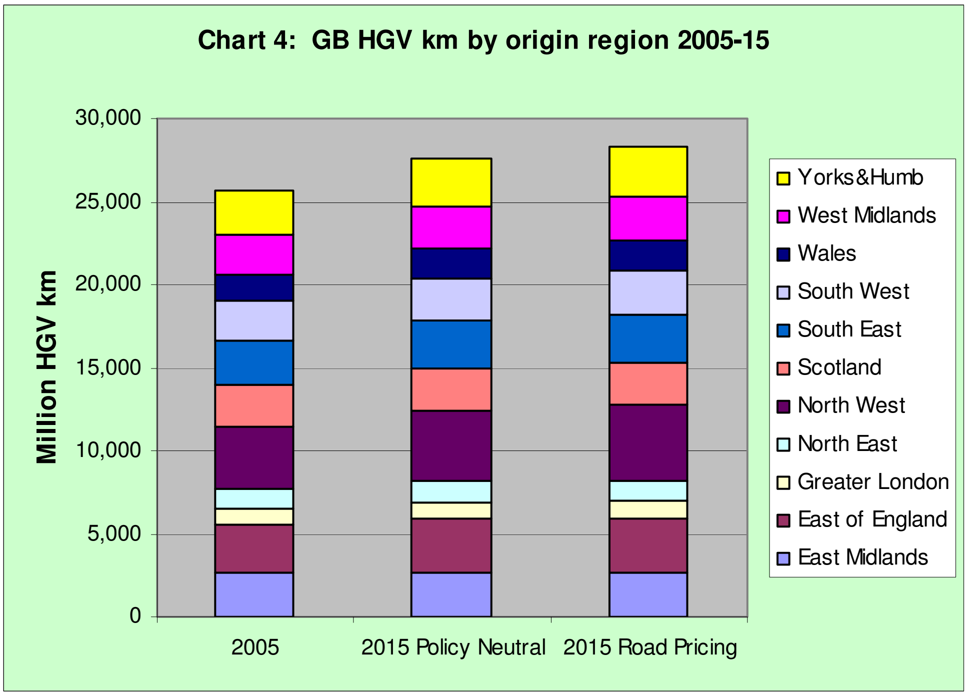
2.4 The results: demand for road freight transport

Chart 3 provides the results of the modelling in terms of GB road freight moved in tonne kilometres (tkm). This is the standard measure of freight transport and is the product of freight tonnes lifted and the distance the freight is moved in kilometres.



A total of 188 billion tkm of freight transport were required in 2005. GB road freight transport is forecast by GBFM to increase by 11% by 2015 to 207 billion tkm under the Policy Neutral Scenario and by 14% to 214 billion tkm under the Road Pricing Scenario. That growth in HGV tonne km is despite a parallel switch to rail freight and is explained by the fact that HGV traffic is diverted along marginally longer but less environmentally damaging routes as a consequence of the introduction of road pricing. This is discussed in more detail below.

Chart 4 provides the results of the modelling in terms of HGV kilometres, a key measure of demand for road freight transport.

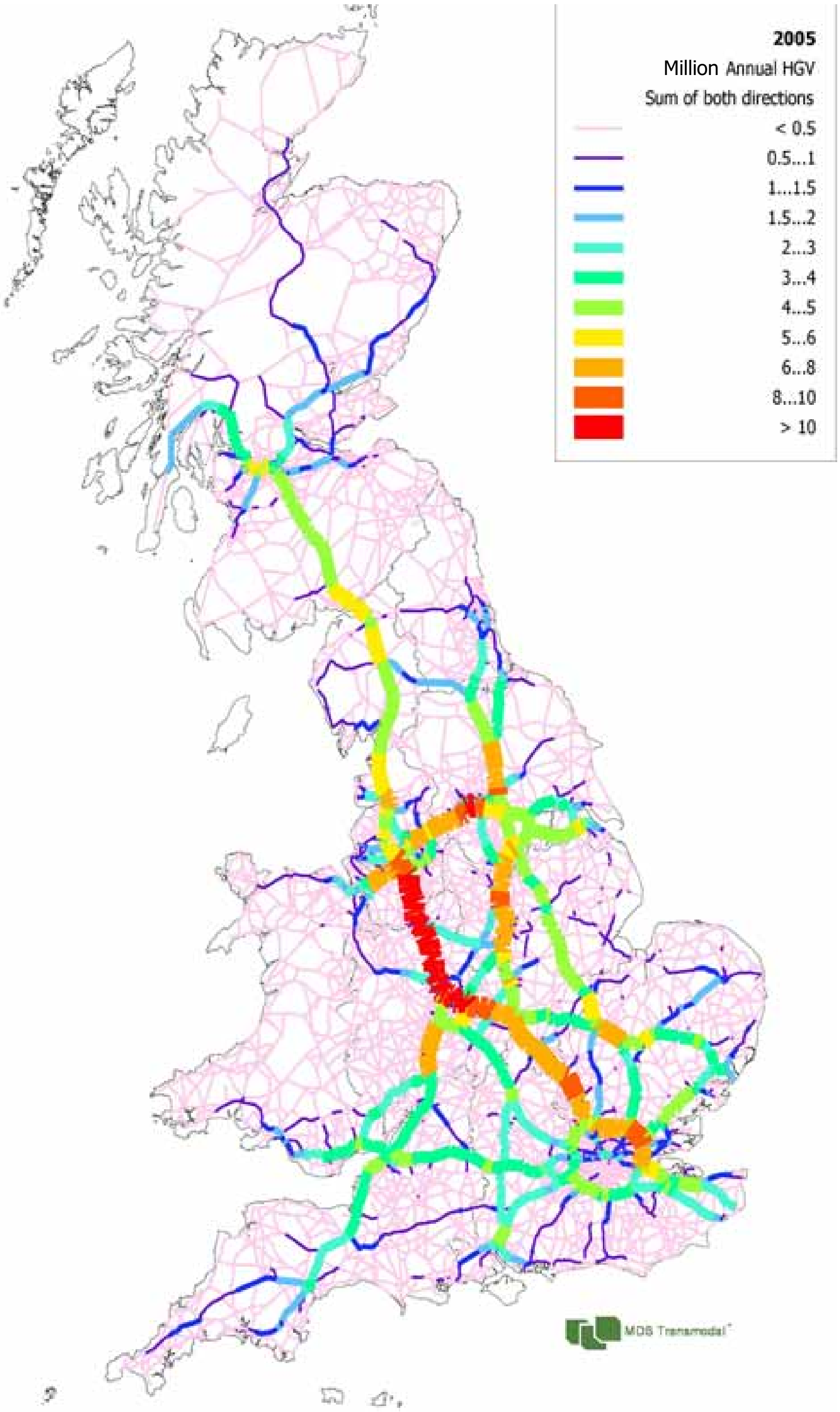


A total of 25.7 billion HGV km of road freight transport were required in 2005. HGV kilometres are forecast to increase by 7% to 27.6 billion HGV km by 2015 under the Policy Neutral Scenario and by 10% to 28.3 billion HGV km under the Road Pricing Scenario. Charts 3 and 4 show therefore that the amount of road transport required might increase marginally as a direct result of the introduction of road pricing. The modelling does not seek to take into account the potential for road pricing to improve journey time reliability if it leads to a reduction in congestion caused by cars. The reason for this increase can most easily be explained using maps showing the allocation of HGVs to the GB road network in 2005 and for both scenarios in 2015 (Maps 1,2, 3 and 4).

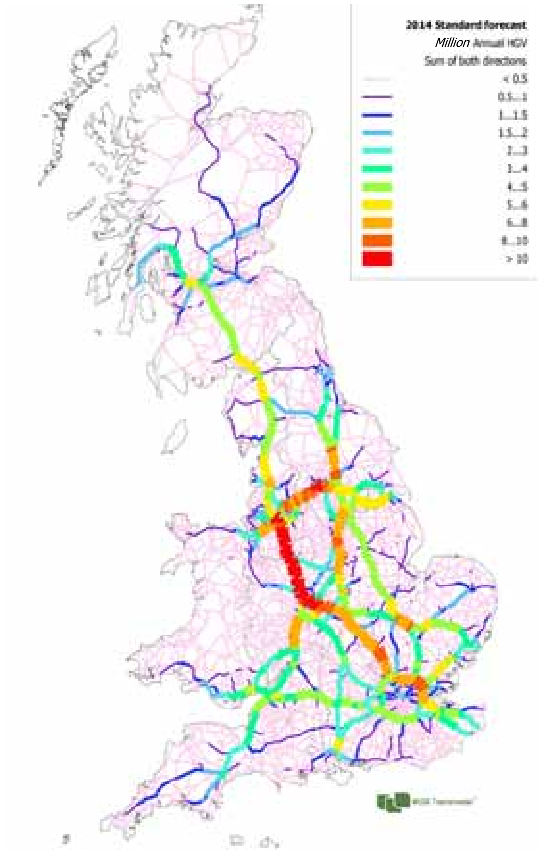
Map 1 below shows the geographic distribution of HGV traffic on the GB road network in 2005, by size of flow. The major concentrations of HGV traffic (over 8 million movements per annum), which do not necessarily correlate with the most congested sections of the network (generally caused by passenger traffic), are on the M6 between Birmingham and Manchester and on the M62 near Leeds. Other significant freight "hotspots" (6-8 million movements per annum) are:

- The north east sections of the M25;
- The M1 between London and Birmingham and between Nottingham and Sheffield;
- The M62 between Leeds and Manchester;
- The M56 between the M6 and Chester;
- The northern sections of the M5 to the south of Birmingham;
- The M6 near Preston;
- The A1 to the north of Leeds;
- The A14 between Cambridge and the A1.

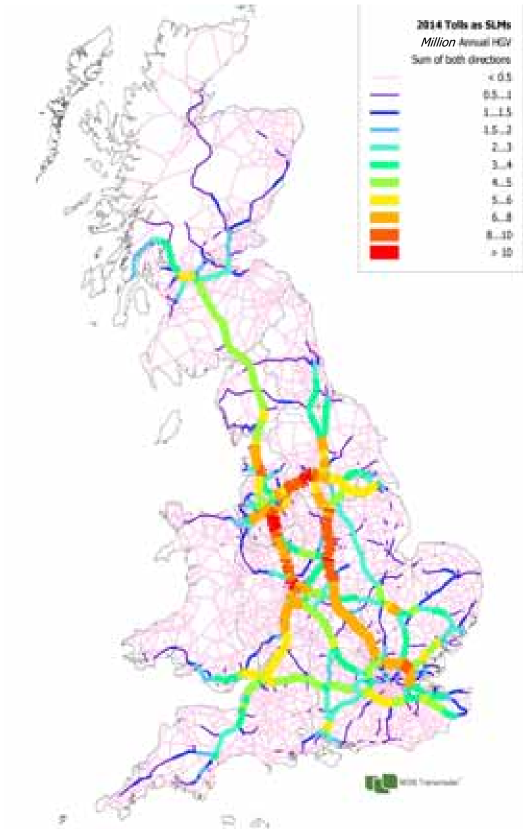
HGV movements are otherwise largely concentrated on the national trunk road network.



Map 1: Distribution of HGV traffic on the GB road network, 2005



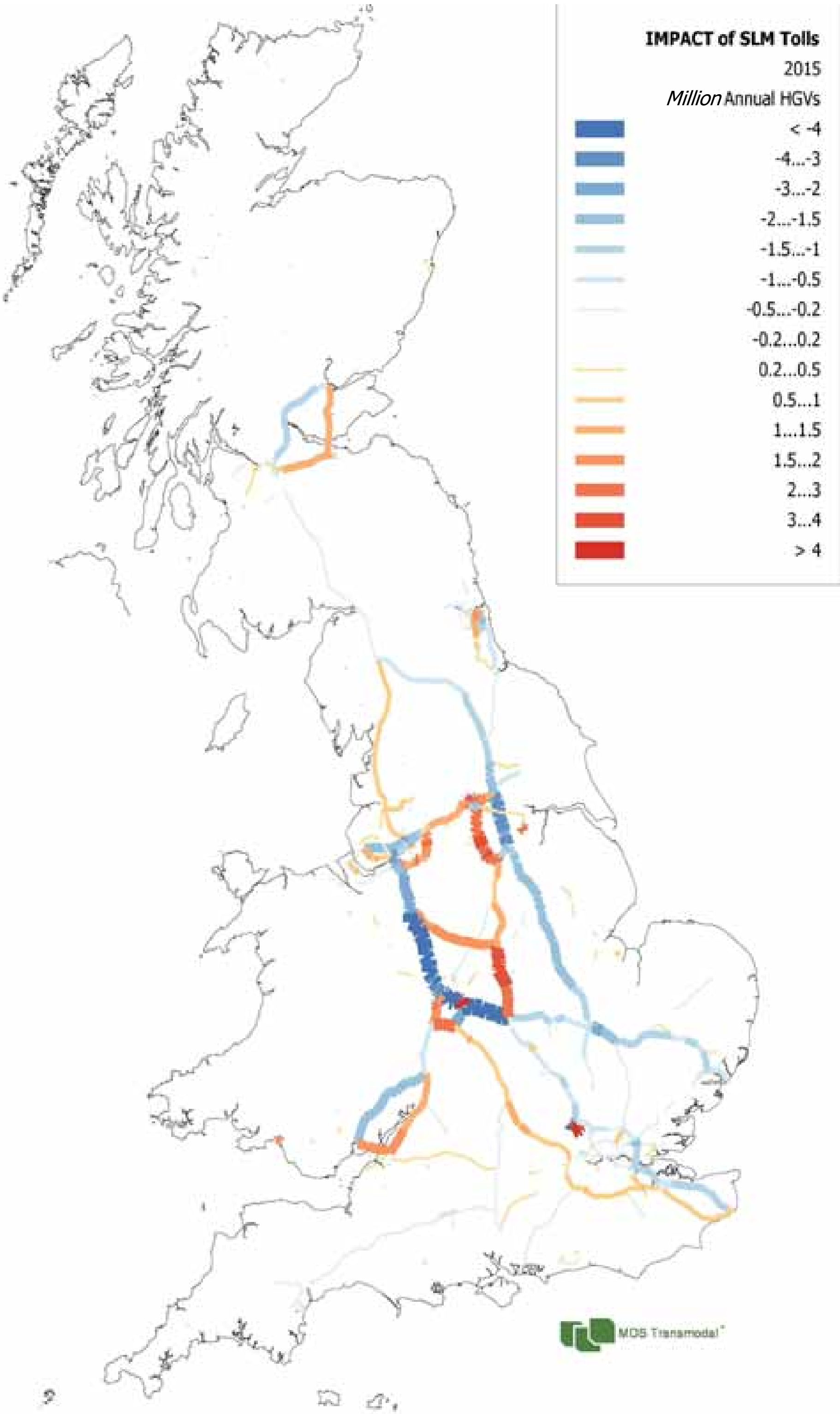
Map 2: Distribution of HGV traffic, Policy Neutral Scenario 2015



Map 3: Distribution of HGV traffic, Road Pricing Scenario 2015

Maps 2 and 3 help to show how the introduction of road pricing is likely to lead to a diversion of HGV traffic from congested sections of the road network to less congested sections. The clearest example is the switch of traffic on routes between the West Midlands and the North West.

Map 4 shows the changes in the annual HGV movements, showing net gains and losses, and provides a clearer picture of the diversion of HGV traffic from congested sections of the trunk road network to less congested sections.



Map 4: Net impact of introduction of a system of road pricing on distribution of HGV traffic on the GB road network, 2015

The most significant switches of traffic are:

- From the A1 north of Huntingdon to the M1 north of J19;
- From the A20 to the M20;
- From the A40/A449 to the M5/M4;
- From the northerly route to the southerly route around the M25;
- From the M1 to the M40 between London and Birmingham;
- From the M80/A9 to the M8/M90 route between Strathclyde and Perth;
- From the M6 to the M1 and A50 between Birmingham and Manchester;
- From the A1/A66 to the M62/M6 north of Manchester;
- From the A1(M) to the A19 on Tyneside.

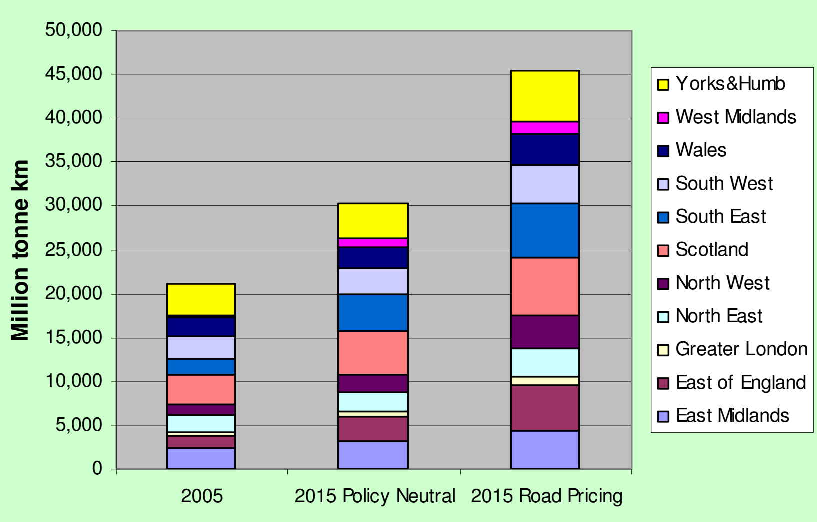
This diversion of traffic, as hauliers react to new price signals following the introduction of a system of road pricing, leads to HGVs travelling further (on average) on less congested sections of the GB road network. Thus, for example, there would be potential diversions from congested stretches of the M6, which leads to the increases in road freight transport described in Charts 3 and 4.

Given that road hauliers would seek to minimise costs to remain competitive, these results highlight the crucial importance of the level of charges on particular sections of the road network and how these charges are calculated. The existing SLM rates, upon which the Road Pricing Scenario is based, mainly reflect the costs of congestion.

2.5 The results: demand for rail freight

The introduction of road pricing is also likely to lead to an increase in the rail share of total freight transport. Chart 5 provides the results of the modelling in terms of rail freight tkm.

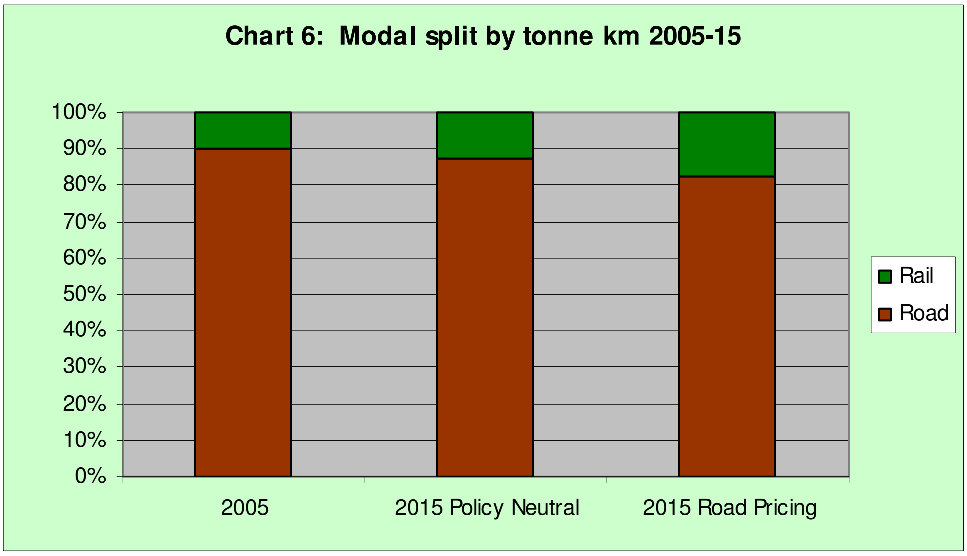
Chart 5: GB rail freight moved by origin region 2005-15



Demand for rail freight in 2005 was about 21 billion tonne kilometres. Rail freight demand is forecast to grow by 43% to 30 billion tonne kilometres in 2015 under the Policy Neutral Scenario, based on the assumptions that there will continue to be operating grants available for rail, the planning environment will be favourable to the development of rail freight distribution parks and increasing competition in the GB rail freight market will reduce costs compared to road transport. However, the results for the Road Pricing Scenario show that the introduction of a system of road pricing (despite the linked loss of rail freight operating grants) would lead to even higher growth in rail freight of 115% by 2015. Both scenarios are based on the assumption that sufficient paths are available on the rail network to accommodate the additional rail freight services. That impact is described in Maps 5-7 which compare forecast rail train flows on a with and without road pricing basis.

2.6 The results: modal split between rail and road

Chart 6 provides the modal split between road and rail for 2005 and the two scenarios for 2015.



Rail freight had a 10% modal share in 2005, with significant regional variations. Regions that load significant volumes of bulk rail freight such as coal tend to have the highest rail modal share. Rail freight is forecast to increase its modal share to 13% under the Policy Neutral Scenario. However, the modelling suggests that road pricing would lead to a modal share for rail freight of 18% in 2015. In all regions rail freight increases its share of the freight market, but the most significant increases would be in regions with deep sea container ports or major conurbations, as the main source of growth is likely to be in intermodal rail freight.

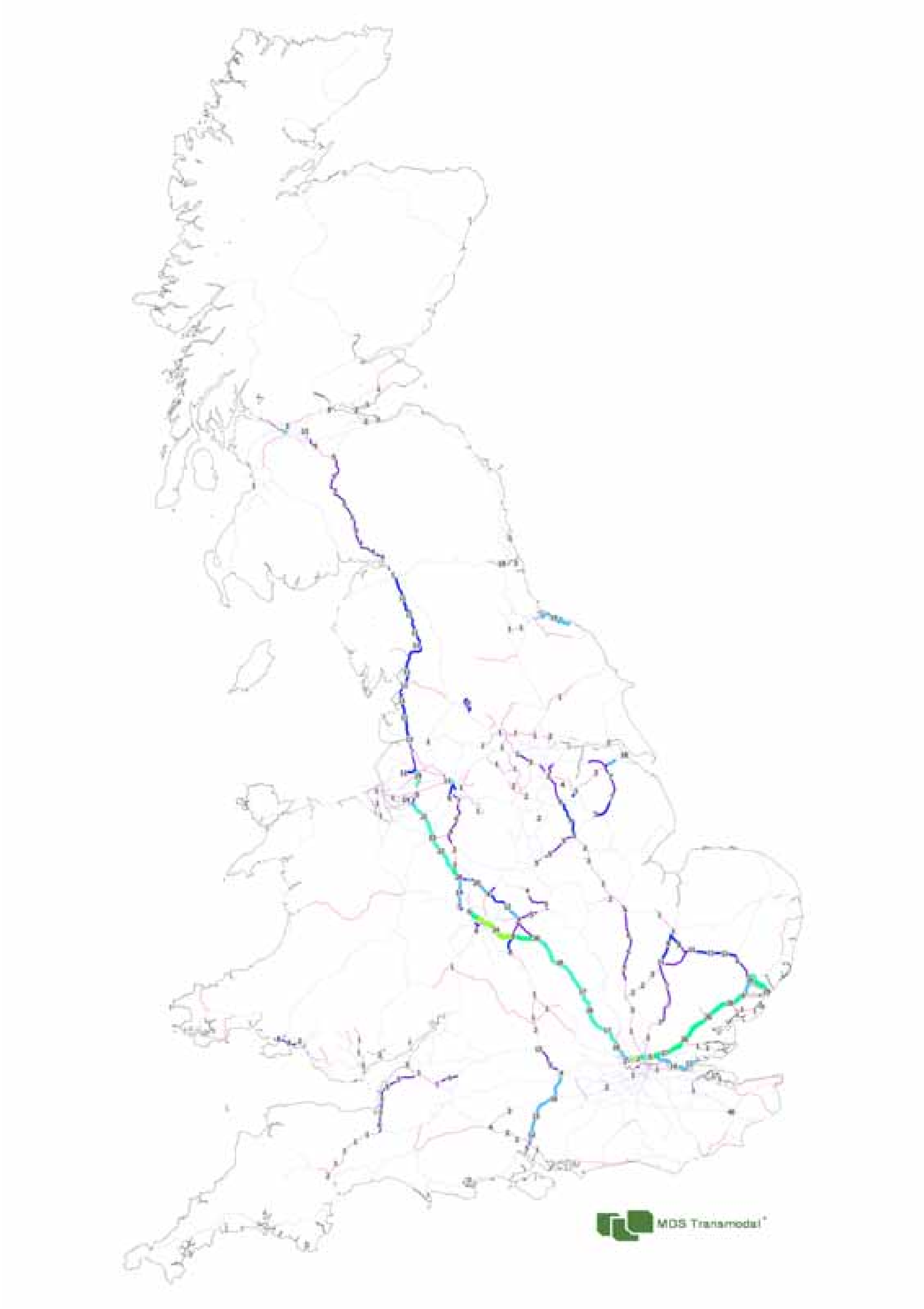
2.7 The results: demand for rail network capacity

The substantial growth in rail freight, which the model forecasts would be the consequence of road pricing, would require a corresponding increase in train paths being made available for freight. Map 5 describes actual rail freight capacity as defined by Network Rail in 2005, while Map 6 shows forecast demand for rail freight train paths in 2015 in the Policy Neutral Scenario.

Map 5: Rail freight capacity network capacity (train paths) in 2005

Map 6: Policy Neutral Scenario 2015, demand for rail freight capacity in train paths

Map 7 shows the net short fall in capacity in terms of train paths in the Policy Neutral Scenario 2015.



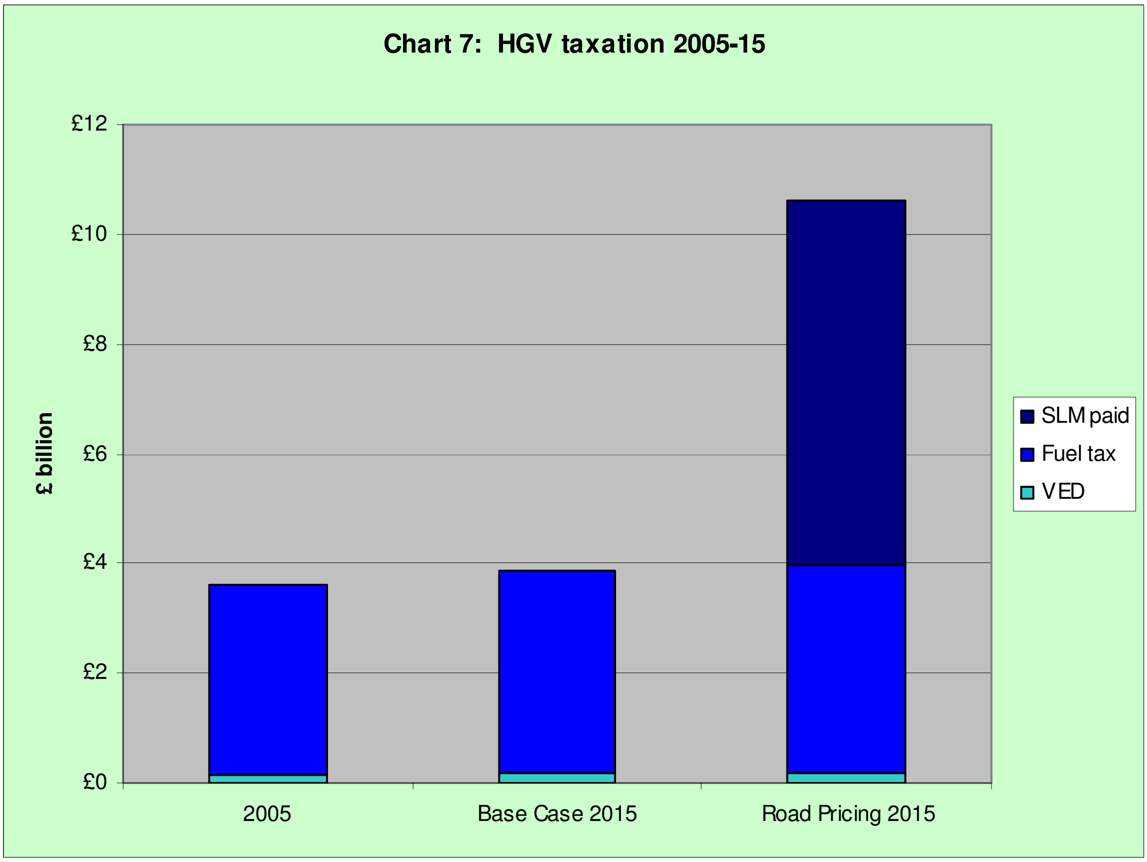
Map 7: Policy Neutral Scenario 2015, capacity short fall in train paths

The introduction of road pricing would have a very significant additional impact on the rail network compared to the Policy Neutral Scenario. We estimate that on the southern sections of the West Coast Main Line, for example, the demand for train paths could be as high as 236 trains under the Road Pricing Scenario in 2015, while the capacity shortfall could be as high as 136 paths compared to effective existing capacity (allowing for some network flexibility) of 103 paths.

There would need to be a corresponding expansion in rail terminal capacity and rail-connected distribution parks, to minimise the impact of road distribution from railheads on local road networks.

2.8 The results: fiscal impacts

Chart 7 shows the estimated fiscal impact of the introduction of road pricing for HGVs. In 2005 we estimate that HGVs using the road network paid £0.2 billion in VED and some £3.5 billion in fuel duty – a total of about £3.7 billion. With the forecast increase in demand for road freight by 2015, HGVs would pay some £3.9 billion in tax in 2015 under the Policy Neutral Scenario.

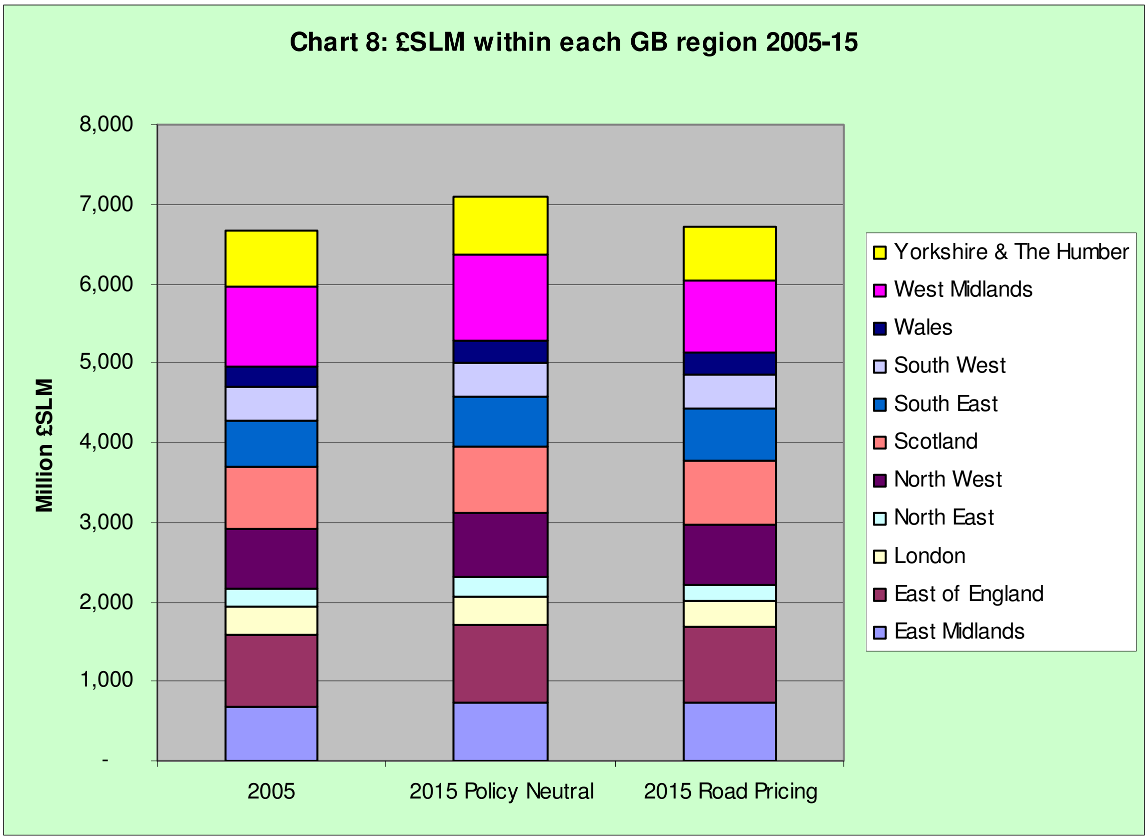


However, with the introduction of a system of road pricing the modelling suggests that total taxation would increase to some £10.6 billion at today's rates of fuel duty and VED and using the DfT's SLM rates, an increase in taxation of about 170% compared to the Policy Neutral Scenario. Based on the SLM rates for net externalities of road freight transport, HM Treasury would therefore secure £6.7 billion of additional tax revenue each year.

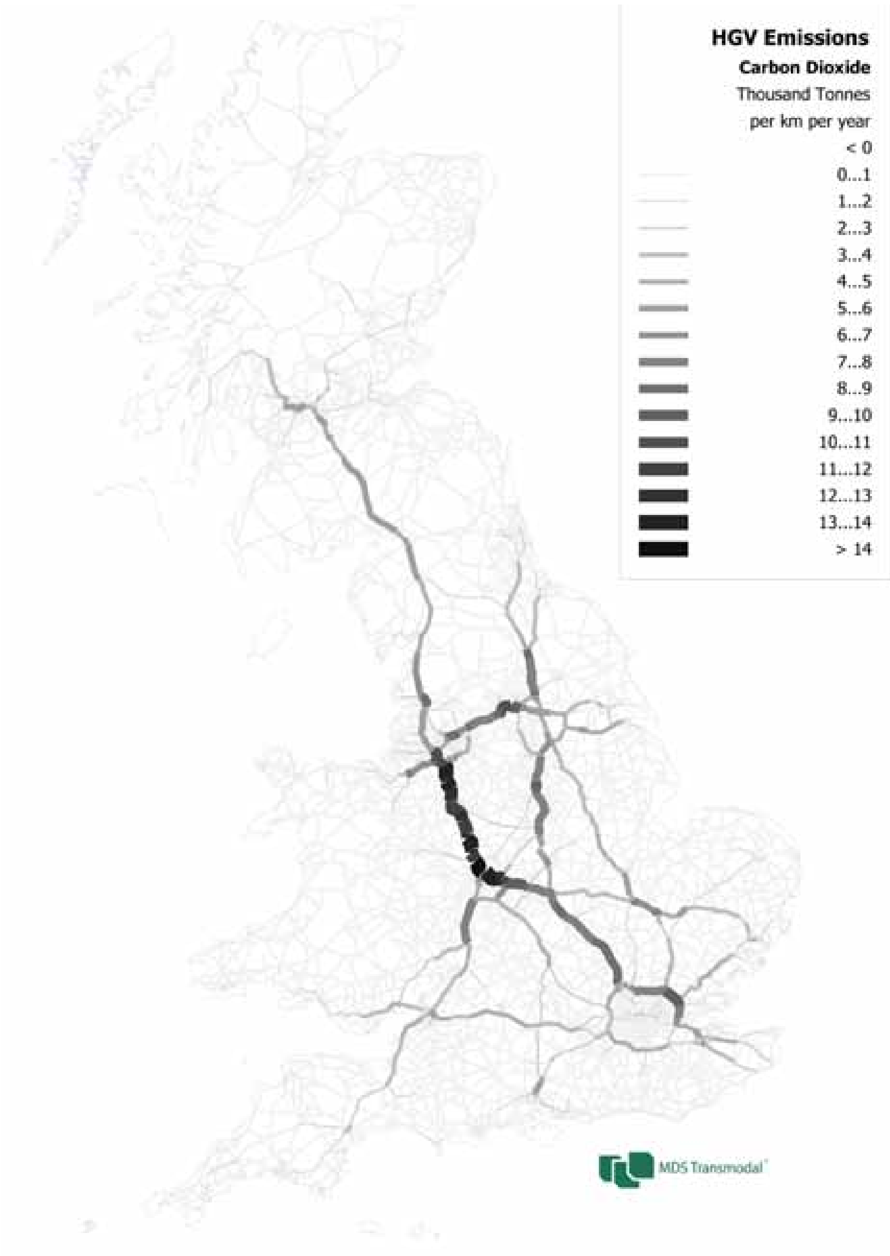
2.9 Environmental impacts

Chart 8 shows the estimated environmental impact of the introduction of road pricing for HGVs in terms of the DfT's SLM rates. In 2005 we estimate that the total (unpaid) environmental cost of road freight in 2005 was some £6.7 billion. This would rise to about £7.1 billion in 2015 under the Policy Neutral Scenario.

The modelling suggests that the introduction of road pricing would result in total (unpaid) environmental cost of road freight in 2015 of some £6.7 billion, so that the impact would reduce the external costs to roughly 2005 levels. This is despite the increase in HGV km under this scenario, which demonstrates once again that road freight operators would react to the introduction of road pricing by using less congested (and cheaper) routes.



Map 8 shows the carbon dioxide in tonnes emitted on each section of the GB road network in 2005. While the map is for 2005, our analysis suggests that a map for 2015 would be very similar.



Map 8: Intensity of carbon dioxide emissions on the GB road network, 2005

Map 8 shows how the greatest intensity of carbon dioxide emissions are mainly from HGVs on the core motorway network and, not surprisingly, the carbon dioxide intensity is closely related to the intensity of HGV traffic on the network (see Map 1), so that the M6 between Birmingham and Manchester has the highest number of tonnes of carbon dioxide emitted per km than any other section of the GB road network.

3 CONCLUSIONS

Road pricing is probably the most significant transport planning issue that the Government will address in the early 21st Century and is seen by many transport economists as a potentially effective policy instrument to reduce environmental pollution and congestion. Both the Stern and Eddington Reviews have produced recommendations that, directly or indirectly, strongly support the development of a national road pricing scheme. The exact system of national road pricing that might be introduced is as yet unknown, but this study has sought to consider what the impact might be on the freight market, based on an existing methodology (with a degree of official recognition) for calculating the relevant externalities.

It is unlikely that the introduction of any conceivable system of road pricing would have a significant impact on the demand for freight transport as a whole. In other words, road pricing is unlikely to lead to a reduction in trade or a significant reduction in the amount of goods transported. This is because freight transport generally represents only a small proportion of the total value of the goods being traded. While GB freight lifted is forecast to grow only slowly, almost all the growth in freight lifted over the next 10 years is likely to be in relatively high value unit load international traffic passing through GB ports and the Channel Tunnel.

The impact of a system of road pricing should have three favourable outcomes from an environmental point of view:

- A diversion of road haulage from congested sections of the road network to less congested sections as the cost of using the network more closely reflects the true cost to the environment, society and the economy. While the Road Pricing 2015 Scenario we have modelled suggests this would lead to an increase in HGV kilometres and therefore road tonne kilometres, the "environmental impacts" in 2015 (as measured in terms of SLMs) would fall to roughly the 2005 level, despite more freight being lifted and the increase in freight transport required.
- An increase in modal share for rail as it becomes more competitive with direct road haulage. This is based on the key assumption that sufficient rail capacity is available to meet demand for train paths. Our forecasts suggest that significant additional capacity would be required.
- Some switching of international traffic from the shorter distance ferry routes (such as across the Dover Straits) to longer distance routes providing a more direct link by sea between inland origins and destinations.

Tax revenue from the road freight industry for HM Treasury is forecast to increase by some 170% with the introduction of road pricing, generating an additional £6.7 billion a year. This increase in cost is likely to be passed onto customers by the road freight industry and so would have a wider impact on the national and regional economies.

The logistics industry is likely, over time, to adapt to the introduction of road pricing by changing the location of distribution activity, perhaps with distribution sheds being located at, or close to, ports or adjacent to regional intermodal rail terminals in order to reduce costs.

This study only considers the impact of road pricing on movements of HGVs. However, the introduction of road pricing for passenger cars should have two significant impacts on road freight movements:

- Road pricing for passenger cars should reduce congestion on the trunk road network, leading to improved journey time reliability and reduced costs for the freight industry;
- Road pricing for passenger car movements is likely to reduce the number of discretionary trips to shops (particularly supermarkets) as customers increasingly shop on-line. This would result in an increase in movements by freight vehicles (small vans) at the expense of car trips.

The results of the modelling and early lessons from the MAUT in Germany suggest that a system of road pricing for HGVs in GB should have the following features in order to achieve key environmental objectives as well as reducing congestion:

- The system should be comprehensive, including the entire GB road network to avoid diversion of traffic onto secondary roads;
- The system should follow the principles of the proposed Lorry Road User Charge, so that all HGVs on the GB road network (including HGVs registered abroad) should be within the scope of the scheme;
- Charges should vary according to the type of road and time of day;
- Charges should vary according to the emissions level of the vehicle to encourage early take-up of cleaner technology by the road freight industry;
- Government should consider the extent to which the tax revenue from road pricing of HGVs should be used to part-fund strategic rail and road schemes;
- Charges should fully reflect the costs of climate change, as well as the costs of congestion to the economy and other external costs.

Road pricing alone may not be sufficient to slow the growth in emissions of carbon dioxide from road freight, but giving the freight industry the right price signals through the fiscal system will make a significant contribution. A nationwide road pricing scheme for HGVs will need to be complemented by planning polices to encourage sustainable distribution, investment in rail freight capacity, rail terminals and rail-connected distribution parks to accommodate modal shift and technological advances to reduce emissions from road vehicles.

GLOSSARY OF TERMS

Channel Tunnel through rail freight services	Rail freight services using the Channel Tunnel en route between GB inland and Continental rail freight terminals; as opposed to the Eurotunnel Freight Shuttle, which is providing a short crossing of the Dover Straits.
Road pricing	Charging road users for the costs they impose on society but do not currently pay through Vehicle Excise Duty and fuel duty.
Domestic freight transport	The carriage of goods with both the first origin and final destination within the United Kingdom, although for the purposes of this report it has been defined as movements within GB only.
Freight transport	Carriage of goods between an origin and a destination.
Freight Transport Association (FTA)	Trade organisation for the UK freight transport industry.
Heavy Goods Vehicle (HGV)	Goods vehicles over 3.5 tonnes gross laden weight (i.e. weight of vehicle plus load).
Intermodal rail freight	Freight carried in units (e.g. a container) on special flat rail wagons for the “trunk” haul between two intermodal terminals; collection and delivery is by road to provide a door-to-door service.
Intermodal terminal	Facility designed to transfer units between rail and road and consists of sidings to accommodate trains, special cranes for loading and unloading the units and space for storage of units.
International freight transport	The carriage of goods with a first origin or final destination outside the United Kingdom. However, for the purposes of this report international freight transport has been defined as including movements between Great Britain and Northern Ireland.
Lorry Road User Charge (LRUC)	A distance-based system for the taxation of road haulage in the UK on all roads, using an electronic collection system so that charges can be varied according to the characteristics of the individual lorry, type of road and the time of day; implementation was planned for 2008, but the scheme has been discarded by DfT.
MAUT	Road pricing system for HGVs on the autobahn network in Germany, which was introduced in January 2005.
Mode of transport	The means by which freight is transported i.e. by road, rail, sea, inland waterway and pipeline.
Rail Freight Group (RFG)	UK rail freight industry trade organisation.
Rail-connected distribution park	Large distribution site, with an intermodal terminal serving on-site warehouses and the wider region.
Sensitive Lorry Miles (SLM)	Value of net environmental cost of road freight to society over and above Vehicle Excise Duty and fuel duty already paid by road haulage; used by the DfT to estimate the value of rail freight services to society for its grant schemes.
Strategic Rail Authority (SRA)	Organisation that had statutory duty to promote rail freight; abolished by the Railways Act 2005.
Sustainable Distribution Fund	Single source of public sector funding, administered by the DfT, to support sustainable distribution in England, covering rail, waterborne and road freight; incorporates all existing sources of funding for rail and waterborne freight from April 2007.
Tonne kilometres (tkm)	Tonnes lifted x length of haul.
Tonnes lifted	Weight of freight
Tonnes moved	The product of tonnes moved and the distance it is moved; usually expressed in tonne kilometres.
HGV kilometres (HGV km)	Tonne kilometres divided by average load per HGV.

ABOUT MDS TRANSMODAL

MDS Transmodal

MDS Transmodal provides specialist consultancy, data and modelling services to the transport industry, the public sector, financial institutions, property developers and other organisations with interests in transport-related issues. The company is based in Chester, North West England. MDS Transmodal's main activities are concentrated in the freight market and international passenger travel. The former includes logistics, rail freight, ports, deep sea and short sea shipping, intermodal movements, inland waterways and air freight.

MDS Transmodal has developed expertise in freight transport planning, analysing multi-modal freight and logistics issues at a strategic level, as well as in analysing the commercial feasibility of individual freight facilities, such as rail freight terminals. The company is represented on the boards of the Rail Freight Group and of Sea & Water, the trade association for waterborne freight.

The market studies carried out by MDS Transmodal generally concentrate on demand-side issues, determining market potential using statistical analysis, computer modelling and market research techniques. MDS Transmodal is the market leader in providing freight modelling expertise to assess the impact of public policy initiatives and market trends on road, rail and ferry services and networks using the *MDS Transmodal GB Freight Model (GBFM)*, which forms the freight module of the UK National Transport Model.

GB Freight Report 2006

MDS Transmodal has recently published the *GB Freight Report 2006,* which provides information on road and rail freight flows and freight trends in Great Britain (GB) and has been designed to be a reference source for those planning for freight transport and operating in the freight market. This report, which will be published on an annual basis, is intended for a wide readership: it provides freight data and insight into the GB freight industry for transport planners and policy-makers; it provides freight transport operators with insights into the planning, policy and market environment in which they operate.

The *GB Freight Report 2006* provides data at regional and GB levels and by broad commodity type from the GBFM. It also provides a forecast of freight movements to 2015 based on a scenario developed using the same computer model.