MDS Transmodal

Local and Global Transport and Logistics Research

UPDATE OF UK PORT DEMAND FORECASTS TO 2030 & ECONOMIC VALUE OF TRANSHIPMENT STUDY

FINAL REPORT

by

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EXECUTIVE SUMMARY

1 Introduction

The Department for Transport (DfT) commissioned MDS Transmodal (MDST) to develop forecasts of UK port traffic to 2030 to assist it in its review of ports policy in 2006. This report provides the results of an exercise carried out by MDST in May 2007 to update the forecasts produced in 2005-06, based on the most up-to-date information.

The Terms of Reference for the update of the forecasts required:

- An update of forecasts for bulk fuels based on the latest available evidence and taking account of projections in the 2007 Energy White Paper;
- An update of trade car forecasts, taking account of the latest available evidence relating to UK automotive manufacturing and car ownership forecasts;
- Updating the tables showing the forecasts up to 2030 with official port traffic statistics that have subsequently been published for 2005;
- Updating the analyses of the impact of port traffic growth on inland networks.

The new forecasts for bulk fuels and trade cars in Great Britain have been developed by updating the market studies carried out in 2005-06 for coal, liquefied gas, oil and petroleum products. The forecasts for other commodity groups were excluded from the scope of the work and so have not been updated; for these commodity groups the base year has been changed to 2005 to use the most recent port traffic data published by the DfT.

2 Updated Forecasts for Non-Unitised Port Traffic to 2030

The 2007 White Paper on Energy, entitled 'Meeting the Energy Challenge', was published in May 2007 and has a significant impact on the port traffic forecasts because of the potential impact on shipping movements of liquefied gas, coal, crude oil and oil products. The May 2007 White Paper highlighted the key challenges as being the need to work with other countries to tackle climate change by cutting greenhouse gas emissions and the need to ensure secure energy supplies.

The measures in the White Paper are intended to put the UK on track to cut carbon emissions by more than a quarter by 2020 compared to 1990 levels, as well as making significant cuts in gas consumption by saving energy, developing cleaner energy supplies and securing reliable energy supplies at prices set in competitive markets.

The White Paper contains a number of scenarios, but for the purposes of our forecasts we have used the "White Paper Proposals Central Carbon Saving" scenario (assuming a central price for carbon of €20/tonne of carbon dioxide in 2010 and €25/tonne of carbon dioxide from 2015-2020). There is some uncertainty about the future effectiveness of the White Paper policy proposals, as well as uncertainty about the future price of carbon, and these uncertainties are reflected in the range of different scenarios published by the DTI in May 2007.

The changes in the forecasts for coal, crude oil, oil products, liquefied gas, import/export vehicles, steel and ores between May 2006 and June 2007 are summarised in the following table.

GB Port Demand Forecasts to 2030: Comparison between May 2006 & June 2007

Million tonnes

Commodity	May 2006 Report		June 2007 Report	
	2030 Forecast	% CAGR 2004 -2030	2030 Forecast	% CAGR 2005-2030
Liquefied gas	37.2	+6.4%	45.4	+7.3%
Crude oil	128.9	-0.9%	133.4	-0.6%
Oil products	111.0	+1.1%	90.2	+0.2%
Coal	39.8	-	40.6	-0.8%
Trade cars	5.8	+0.5%	6.5	+0.8%
Iron & steel products	10.3	+0.2%	10.0	-0.1%
Ores	19.5	+0.3%	18.0	-

The change in the forecast for liquefied gas reflects greater projected LNG capacity at ports compared to pipeline capacity, leading to a significant increase in LNG traffic through ports. This is only partially offset by DTI projections of a lower level of overall UK demand for gas included in the May 2007 Energy White Paper.

The change in the forecast for oil products largely reflects lower demand projections from the DTI for oil products included in the May 2007 Energy White Paper (reflecting anticipated increases in transport energy efficiency) than were included in the May 2006 forecasts and slower growth in demand for diesel fuel, which results in lower levels of oil product imports.

The change in the forecast for crude oil is largely due to the inclusion of the latest DTI projections of UK oil production.

The change in the forecast for coal traffic through ports is affected by the change in base year for the forecasts (there was a significant increase in imports of coal between 2004 and 2005), plus slightly higher projections from the DTI of the demand for coal for electricity generation and lower projections of UK coal production up to 2030.

The change in the forecast for import/export vehicles is driven largely by new car ownership forecasts developed by the DfT, which suggest that car ownership will increase at a faster rate than was envisaged in May 2006. This has led to an increase in vehicle imports, in particular, up to 2030. The forecasts also reflect a slightly lower level of UK automotive manufacturing than in the May 2006 report, leading to a lower level of car exports.

The port traffic forecasts for steel and ores are due to the knock-on effect on the UK steel industry of a change in the level of UK automotive manufacturing output.

Chapter 3 sets out the forecasts for broad commodity groups that were excluded from the scope of the work and so have not been updated except that the base year has been changed to 2005 to use the most recent port traffic data published by the DfT. The split of unitised traffic between the port regions has also been updated to reflect DfT port statistics in 2005.

3 Unitised Port Traffic Forecasts & Container Transhipment

Excluding transhipment movements, between 2005 and 2030 containerised port traffic is forecast to increase by 183% as measured by TEU and Ro-ro traffic is forecast to increase by 101% in terms of HGV units. The forecasts for 2010 to 2030 are identical to those included in the May 2006 report; the only modification is to change the base year from 2004 to 2005.

In terms of the container transhipment aspects of this report, we have focused on the relationship between the availability of GB port capacity and a range of different outcomes, of which the ability to tranship and its economic benefit is only one aspect. These other outcomes included the overall level of revenue enjoyed by the GB freight industry, end user costs (costs of delivery) and the relative impact of different port construction strategies on the road and rail networks, including externalities.

These issues were tested through a number of scenarios assuming the normal behaviour of the shipping lines in delivering and collecting containers from end users of minimising through transport costs. In each case, the scope to tranship third country containers at a GB port was predicated upon the availability of GB port capacity at the current market rate. The transhipment of GB domestic containers at a Continental port was modelled as an outcome based on minimising through transport costs, taking into account the level of charges likely to be made at different ports.

Our principal conclusions were that:

- An absence of additional GB deep water container port capacity (Scenario 1) would raise user costs, reduce GB transport revenue, and add (relatively) to road freight and external costs. A need for a very extensive expansion in the number of feeder berths would emerge, for which plans do not exist. The overall impact on the economy was generally negative, raising end user costs.

- A ‘Greater South East plus Liverpool’ development approach (Scenario 2) succeeds in reducing user costs significantly over a ‘do nothing/feeder’ approach. This strategy is expected to be ‘free’ to the public purse except (perhaps) for the creation of some extra rail network capacity. This scenario reflects the planning consents recently granted for new container port development plus ABP's plans for expanding at Southampton, announced in 2006. Some more feeder berths would be required in the longer term. These conclusions do depend upon there being adequate capacity to accommodate a significant increase in train movements through the Greater South East to reach markets in the Midlands and the North.

- The development of further deep-water capacity beyond the Greater South East (Scenario 3) produces more or less identical results as far as public interest measurements are concerned as creating more feeder berths. Whether the ports involved proceed with these further developments is a matter for the private sector. The modelling suggests that this extra deep-water capacity will in practice accommodate a mix of direct deepsea and feeder (smaller ship) traffic.

- Extension of ports capacity under Scenario 3 does not add greatly to total deepsea port earnings, partly because an increase in port capacity (supply) would tend to reduce rates.

- A strategy (Scenario 4) which substituted extra capacity on the west coast and the North East for a similar amount of capacity in the Greater South East (a switch of around 15% of total deep water terminal capacity) would reduce external (non-user) costs by 6% (+ £25m per annum) and rail earnings by around 8%. However, overall user costs would rise by around £80m per annum.

- Where there is adequate deepsea capacity in south-east ports to address the market (effectively Scenario 2 in 2020), the only direct deepsea traffic won by ports outside the south-east is in Liverpool. As traffic builds up and south-east capacity is exhausted, the model suggest that some of the deepsea traffic will be attracted to 'regional' berths on a direct basis, and the balance will be attracted to feeder services.

We also considered a number of possible alternative routing strategies, which some lines may consider in order to address growing port congestion, the employment of larger vessels, deepening of East Coast North American ports and the widening of Panama Canal locks, and the opportunity that continually expanding markets might offer in terms of new services. The one that showed most potential was one in which lines diverted deep sea services between Asia East Coast and North America (via the Suez Canal) to also make a GB port call. Such a diversion of Post Panamax vessels to a GB west coast port en route between Asia and N. America did appear to be cost competitive, and may therefore have some modest potential for diverting cargo from south-east ports.

Our overall observation is that the availability of port capacity in Britain and that on the Continent are highly connected in their impact on both transport networks and on overall economic performance in the ports sector. There can be no doubt that adding to port capacity does convey economic and user benefits at no cost to public sector funds, provided that port expansion continues to be self funding.

4 Inland impacts of port traffic forecasts to 2030

Forecasts of inland impacts of unitised port traffic up to 2030 suggest that total Ro-ro unit kilometres (including Channel Shuttle traffic and assuming all Ro-ro traffic is transported by road) will increase by 98%, while total Lo-Lo unit kilometres will grow by 135%. Lo-Lo rail modal share is forecast to increase from about 7% in 2005 to 9% in 2030.

Our analysis of forecast inland impacts of non-unitised port traffic up to 2030 suggest that, while total non-unitised tonne kilometres will increase by 4%, rail tonne kilometres will fall by 10% due to a reduction in the demand for imported coal.

5 Overall forecasts of demand for UK ports to 2030

In 2005, GB ports plus the Channel Tunnel handled a total of 536 million tonnes of cargo. Non-unitised traffics are forecast to grow by 4% overall to 429 million tonnes, mainly driven by a forecast increase in LNG imports. Unitised tonnages are expected to grow by 112%.

Overall Forecast Growth in GB Port Traffic in Tonnes to 2030*

Million Tonnes

Mode of appearance	2005	2010	2015	2020	2025	2030	% CHANGE 2005-2030	% CAGR 2005-2030
BULK TRAFFIC GB "major" ports								
Liquid bulk	260	276	267	277	280	282	+9%	+0.3%
Dry bulk	120	109	98	105	110	111	-8%	-0.3%
Other general cargo (including import/export vehicles)	32	34	35	35	36	36	+16%	+0.6%
Total GB non unitised	**411**	**419**	**400**	**417**	**426**	**429**	**+4%**	**+0.2%**
Ro-ro	85	99	115	133	153	171	+ 101%	+ 2.8%
Lo-lo	40	51	61	71	81	94	+ 135%	+ 3.5%
Total GB unitised	**125**	**150**	**176**	**204**	**234**	**265**	**+ 112%**	**+ 3.1%**
Total GB	**536**	**569**	**576**	**621**	**660**	**694**	**+30%**	**+1.0%**

* including Channel Tunnel
Source: MDS Transmodal

Between 2005 and 2030 container traffic is expected to grow by 174% as measured by TEU and HGV units are expected to grow by 101%.

Overall forecast growth in GB unitised traffic to 2030

Million

	2005	2010	2015	2020	2025	2030	% CHANGE 2005-2030	% CAGR 2005-2030
LoLo TEU	7	10	12	14	17	20	+174%	+4.2%
RoRo units (including Channel Tunnel)	8	9	11	13	14	16	+101%	+2.8%

Forecasts of inland impacts of unitised port traffic up to 2030 suggest that total Ro-Ro unit kilometres (including Channel Shuttle traffic and assuming all Ro-ro traffic is transported by road) will increase by 98%, while total Lo-Lo unit kilometres will grow by 135%. Lo-Lo rail modal share is forecast to increase from about 7% in 2005 to 9% in 2030.

Forecasts of inland impacts of non-unitised port traffic up to 2030 suggest that, while total non-unitised tonne kilometres will increase by 4%, rail tonne kilometres will fall by 10% due to a reduction in the demand for imported coal.

1. INTRODUCTION

1.1 Background

The Department for Transport (DfT) commissioned MDS Transmodal (MDST) to both develop forecasts of UK port traffic to 2030 and to review the relationship between container transhipment, port capacity, user and non user benefits in the deepsea container field to assist it in its review of ports policy in 2006. The intention to review ports policy was originally expressed in *The Future of Transport* White Paper in 2004, with the objectives of reviewing the Government's policy framework to keep track of wider changes affecting ports and to ensure that the Government continues to provide the right basis for the sustainable development of ports.

This report provides the results of an exercise carried out by MDST in May 2007 to update the forecasts produced in 2005-06, based on the most up-to-date information and to revise its transhipment study in the light of further developments in planning for deepsea container terminals.

1.2 Terms of Reference

The Terms of Reference in 2005 required the development of national port demand forecasts, disaggregated by major traffic/commodity sector. This required a distinction to be made between traffics that are likely to grow significantly up to 2030 and lead to increased pressure on port capacity and inland surface access issues, and those that are unlikely to grow to a significant extent or not grow at all. The national forecasts were to be disaggregated by English government office regions, Scotland, Wales and Northern Ireland and the forecasts were to include explanations of how key trends in world trade and other factors determine changes in port demand.

The Terms of Reference for the update of the forecasts required:

- An update of forecasts for bulk fuels based on the latest available evidence and taking account of projections in the 2007 Energy White Paper;
- An update of trade car forecasts, taking account of the latest available evidence relating to UK automotive manufacturing and car ownership forecasts;
- Updating the tables showing the forecasts up to 2030 with official port traffic statistics that have subsequently been published for 2005;
- Updating the analyses of the impact of port traffic growth on inland networks.
- A revision of the transhipment study in the light of planning consents since granted and comments on the earlier report.

1.3 Outline methodology

The **new forecasts for bulk fuels and trade cars** in Great Britain have been developed by updating the market studies carried out in 2005-06 for coal, liquefied gas, oil and petroleum products. For each of these cargo categories secondary research was carried out to make judgments about future policy and market trends that are most likely to affect port traffics up to 2030.

Impacts on port hinterlands related to the **inland distribution of cargo** in Great Britain, using the above revised forecasts, have been modelled using the MDS Transmodal GBFM to calculate tonnes lifted and tonne kilometres of transport by inland mode (road or rail) between port regions and origin and destination regions.

The forecasts for other commodity groups were excluded from the scope of the work and so have not been updated. For these commodity groups the base year has been changed to 2005 to use the most recent port traffic data published by the DfT. This affects the compound average growth rates between 2005 and 2010, which were calculated from 2004 in the original May 2006 report.

The methodology adopted in the earlier report to review the impact of **transhipment and additional port capacity** in the deepsea container field has been retained, but inland distribution and transport costs assumptions have been updated.

1.4 Structure

Chapter 2 Updated Forecasts for Non-Unitised Port Traffic to 2030 provides updated analysis of the forecasts for trade cars, coal, gas, oil and petroleum products.

Chapter 3 Other Non-unitised Forecasts of Port Traffic to 2030 provides revised tables for other non-unitised commodities, following the addition of the most recent port traffic data for 2005.

Chapter 4 The Case for Further Container Port Capacity sets out the extent to which additional container port capacity in Great Britain can affect user and non user costs in the context of forecast growth in demand for unitised cargo capacity.

Chapter 5 Inland Impacts of Port Traffic to 2030 provides updated analysis of the impact of inland distribution of port traffic by road and rail for both unitised and non-unitised traffic.

Chapter 6 Overall Forecasts of Demand for GB Ports to 2030 provides updated conclusions to the study, setting out overall volumes of demand forecast to pass through GB ports up to 2030.

2. UPDATED FORECASTS FOR NON-UNITISED PORT TRAFFIC TO 2030

2.1 Introduction

This chapter includes a full update of the forecasts for coal, liquefied gas, crude oil and petroleum products to take account of the Government's 2007 Energy White Paper. It also includes a full update of the forecasts of import/export vehicles to take into account Government forecasts of car ownership and changes in UK automotive manufacturing capacity. For each of these cargo categories secondary research was carried out to make judgments about future policy and market trends that are most likely to affect port traffics up to 2030.

2.2 Energy Policy

Introduction

The UK is moving from being a major producer of oil and gas, as well as historically having significant domestic coal reserves, to a position where the UK imports much of its gas and coal for electricity generation and, in the future, a high proportion of the crude oil feedstock for refineries will also be imported. As a significant proportion of these energy imports will pass through UK ports, energy policy has a significant impact on our port forecasts.

The 2003 Energy White Paper

The Government's long-term energy strategy was set out in the 2003 Energy White Paper, *'Our Energy Future – Creating a Low Carbon Economy'*. The White Paper set out four main goals for UK energy policy:

- The reduction of carbon emissions by some 60% by about 2050, with real progress by 2020;
- The maintenance of reliable energy supplies;
- The promotion of competitive markets;
- Making energy affordable for the poorest.

The Government's overall commitment to sustainable development was also reinforced in the document.

Our Energy Challenge – Securing clean affordable energy for the long-term

Since the 2003 Energy White Paper was published a number of factors led to a further examination of energy policy:

- There was more evidence of the adverse impact of climate change reinforcing the case to cut emissions.

- The UK became a net importer of gas sooner than expected and there were heightened concerns about energy security.
- Energy prices rose sharply, which affected the results of measures taken to help people out of fuel poverty.
- Progress in developing truly open energy markets in the EU was slow.
- The pace of improvements in energy efficiency was slower than needed.

The Government therefore published a further consultation document called "Our Energy Challenge – Securing Clean Affordable Energy for the Long-term".

The consultation document made it clear that decisions on the fuel mix for power generation are not for the Government to make, but for the market to make within the right regulatory framework. However diverse sources of energy, fuel types and trading routes should be promoted to avoid over reliance on too few sources.

In the context of a fall in the proportion of electricity generation from nuclear power to around 7% by 2020 and estimates of a substantial reduction in coal powered generation, the consultation paper presented a scenario of gas providing about 60% of the country's power generation needs.

However, no single solution was identified and the document urged the need to consider a range of options to influence the way in which energy is produced and used. This included "looking again at nuclear power as well as other sources of energy". Most existing nuclear power stations are due to close in the next 20 years and the 2003 Energy White Paper recognised that replacement nuclear build might be necessary if carbon targets were to be achieved, but concluded that the economics of nuclear power at the time made it unattractive. The review of energy policy would examine whether rises in energy prices had changed that assessment, and would examine all the other issues that would be raised by building new nuclear plants, such as the creation of long-term liabilities related to nuclear waste and how these liabilities should be managed and funded. Examination of emerging low-carbon technologies was also urged, which would allow continued access to the world's ample coal reserves and other fossil fuels.

The document concluded by examining the implications of the continuation of current trends, and this provided the background against which the energy companies with interests in the UK would make their investment decisions regarding the replacement of existing coal and nuclear plant:

- The UK will become more reliant on gas for electricity generation and heating needs and will continue to rely on oil for transport;
- By 2020 around 75% of the UK's primary energy is likely to be imported, and much of the world's proven oil and gas reserves are in Russia, the rest of the former Soviet Union, the Middle East and North Africa;

- Maintaining the reliability of electricity supplies will require very substantial levels of new investment as existing coal and nuclear capacity is retired.

The Energy Challenge – Energy Review Report 2006

The Government responded to the Energy Review Consultation in July 2006 in ‘The Energy Challenge – Energy Review Report 2006’. The four long-term goals for energy policy (included in the 2003 Energy White Paper) were confirmed and re-emphasised and two major long-term energy challenges were identified:

- Tackling climate change, along with other nations, as global carbon emissions from human activity continue to grow; and;
- Delivering secure, clean energy at affordable prices, as we become increasingly dependent on imports for our energy needs.

The document went on to say that the scientific evidence for climate change continues to strengthen and without urgent action there will be a damaging rise in temperature. The UK will become increasingly dependent on imported oil and gas against a backdrop of rising global demand for energy as other countries grow their economies. Global demand for natural gas for instance is projected to double by 2030 with the main reserves in only a few regions of the world, with Russia and Iran accounting for nearly half of the world’s proven gas reserves. Growth of home grown energy resources therefore has to be promoted.

The report set out the next steps that need to be taken to respond to these energy challenges. Over the next 20 years around 25 gigawatts of new electricity generation capacity is likely to be needed as coal and nuclear power stations close, which equates to around one third of existing capacity.

The 20% target for electricity from renewable sources by 2020 was re-iterated and the market framework for investment will be improved by the following proposed measures:

- A strong commitment to carbon pricing through improving the operation of the EU emissions trading scheme;
- A strengthened commitment to the Renewables Obligation;
- Proposals for the reform of the planning regime for electricity projects;
- A clear statement of the Government position on new nuclear build;
- New arrangements for providing improved information about future trends in energy supply.

On nuclear power stations the conclusion was reached that new facilities would make a significant contribution to meeting energy policy, but it would be for the private sector to initiate, fund, construct and operate new facilities and finally fund the decommissioning necessary. However, the Government proposed that potential barriers to new build would be addressed; these measures would include an assessment of reactor designs prior to expenditure on planning and construction and a framework for considering the relevant issues and context in which planning enquiries should be held.

The Government also argued in its July 2006 document that coal-fired generation has a long-term role to play and Carbon Capture and Storage (CCS) is an emerging technology that the UK could benefit from. Alternative transport fuels were considered and a transport innovation strategy was proposed to help bring forward cleaner fuels and technology.

In order to address the securing of gas supplies three elements were thought to be required:

- Maximising economic recovery from the North Sea;
- Limiting dependence on gas;
- Managing the risks in higher gas import dependence.

These elements were regarded as being for the market to deliver but Government had identified actions that could boost the attractiveness of investment in UK oil and gas fields, which included reducing the amount of gas needed and the facilitation of the timely construction of sufficient storage and import infrastructure.

Meeting the Energy Challenge

The 2007 White Paper on Energy, entitled ‘Meeting the Energy Challenge’, was published in May 2007. It reiterated the challenges that the 2006 Energy Review highlighted namely:

- The need to work with other countries to tackle climate change by cutting greenhouse gas emissions;
- The need to ensure secure energy supplies.

The UK’s oil and gas reserves have been declining and the White Paper makes it clear that, as the economy grows, dependence on imports will increase from sources of energy where supplies are concentrated in less stable regions. Energy companies are also seen as having to make large investments to update and replace ageing power stations and other infrastructure, so Government needs to create the right conditions for this investment to ensure timely, and increasingly low-carbon, electricity.

The White Paper’s purpose therefore was to set out a framework and an international strategy for action to address these challenges and help to manage the risks. Actions at a European level included an agreement by the European Council to commit to competitive markets and cuts in greenhouse gas emissions and a central role for the EU emissions trading scheme as a potential basis for a global carbon market.

National measures included a limitation on emissions by larger organisations and encouragement for local energy generation. There will still, however, be a need for large-scale energy generation, so the Government’s aim is to ensure that a wide range of low carbon options is available to maintain a diverse energy mix. Support for renewables and the development of carbon capture and storage (CCS) technologies will be strengthened. Alongside the White Paper a consultation document on nuclear power is being published so that a decision can be taken before the end of 2007 on whether it is in the public interest for companies to have this option available when making their investment decisions. This is regarded as especially important on the basis that 30-35 GW of new electricity capacity will be required in the next 20 years and by 2024 there will only be one remaining nuclear power station still in operation. It is, however, the Government’s preliminary view that it is in the public interest to give the private sector the option of investing in new nuclear power stations, subject to the results of the consultation exercise that was launched alongside the White Paper.

The measures in the White Paper are intended to put the UK on track to cut carbon emissions by more than a quarter by 2020 compared to 1990 levels, as well as making significant cuts in gas consumption by saving energy, developing cleaner energy supplies and securing reliable energy supplies at prices set in competitive markets.

The White Paper contains a number of scenarios, but for the purposes of our forecasts we have used the “White Paper Proposals Central Carbon Saving” scenario (assuming a central price for carbon of €20/tonne of carbon dioxide in 2010 and €25/tonne of carbon dioxide from 2015-2020). There is some uncertainty about the future effectiveness of the White Paper policy proposals, as well as uncertainty about the future price of carbon, and these uncertainties are reflected in the different scenarios published by the DTI in May 2007.

2.3 Liquefied Gas

Introduction

We have developed forecasts for liquefied gas through UK ports up to 2030, based on our understanding of the key economic drivers behind trends in traffic. Forecasts have been produced using secondary sources, particularly analyses produced by the DTI for the May 2007 Energy White Paper, and analysis of port traffic data.

The main changes since May 2006 relate to:

- Revised Government projections of gas demand and UK gas reserves, based on the May 2007 Energy White Paper and supporting documents;
- An update of proposed LNG projects;
- Using 2005 as the base year, sourced from DfT Maritime Statistics.

The major movements of liquefied gas through UK ports have historically been of liquid petroleum gas (LPG). However, in the future there are likely to be significant volumes of liquefied natural gas (LNG) imported. LPG is mainly butane and propane and is produced as a by-product of the refining process; it is used for camping gas, for heating in areas that are not connected to the national gas distribution system and as a transport fuel. LNG is gas that is imported by sea in liquid form; the gas is cooled at source into a liquid so it can be transported safely by ship and then imported through specialised port terminals, before being turned into a gas again for transmission through the pipeline system.

This section of the report defines the port traffic market for liquefied gas and describes historic trends. It then describes the factors influencing demand for liquefied gas in the UK and the factors affecting supply followed by our Central Forecast for liquefied gas movements through ports up to 2030.

Market Definition

Table 2.1 provides an analysis of the UK port market for the handling of liquefied gas in 2005.

Table 2.1: GB Liquefied Gas Market Size, Major Ports, by Port Region, 2005

Thousand tonnes

	International				Domestic				
	Imports	**Exports**	**Total**	**% GB Port Traffic**	**In-wards**	**Out-wards**	**Total**	**% GB Port Traffic**	**Grand Total**
East Midlands	-	-	-	-	-	-	-	-	-
East of England	197	46	243	4.1%	151	2	153	7.9%	396
Gt. London	13	3	17	0.3%	9	-	9	0.5%	26
North East	339	949	1,288	21.9%	108	133	240	12.4%	1,528
North West	14	60	74	1.3%	9	4	14	0.7%	88
Scotland	42	2,546	2,587	44.0%	25	878	903	46.5%	3,490
South East	300	539	839	14.3%	26	50	75	3.9%	914
South West	-	-	-	-	-	-	-	-	-
Wales	208	156	364	6.2%	422	20	441	22.7%	805
Yorks & Humber	24	368	392	6.7%	36	56	92	4.7%	484
Other Islands	-	83	83	1.4%	-	13	13	0.7%	96
GB Total	**1,136**	**4,750**	**5,886**	**100%**	**786**	**1,155**	**1,941**	**100%**	**7,827**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Total movements through GB ports in 2005 amounted to some 7.8 million tonnes. Some 4.8 million tonnes (61%) of these total movements related to the export of gas, of which a large proportion is liquefied petroleum gas (LPG) derived from crude oil. The most important region for gas exports was Scotland with approximately 54% of all GB exports, which reflects the importance of the gas production facilities on the Forth and the liquefied gas export facility at Braefoot Bay. The North East was the next most important exporting region with about 16% of GB exports, which reflects the importance of the Tees as a centre for oil refining and gas production and processing.

In 2005 there was very little LNG import traffic as the first LNG terminal, at the Isle of Grain (East of England), only became operational in July 2005.

Historic Trends

Tables 2.2 and 2.3 provide an analysis of historic trends in liquid gas traffic during the period 2001-2005. Prior to 2001 DfT Maritime Statistics did not include liquefied gas as a separate category.

Table 2.2: Great Britain Liquefied Gas Market Size, Major Ports, 2001 - 2005

Thousand tonnes

International/Domestic	Direction	2001	2003	2004	2005
International	Imports	1,225	706	752	1,136
	Exports	4,500	4,767	4,004	4,750
International Total		**5,725**	**5,473**	**4,756**	**5,886**
Domestic	Inwards	890	815	1,092	786
	Outwards	1,366	1,188	1,493	1,155
Domestic Total		**2,256**	**2,003**	**2,585**	**1,941**
Grand Total	**Total**	**7,981**	**7,476**	**7,341**	**7,827**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Table 2.3: Great Britain Liquefied Gas Market Size, Major Ports, by Port Region, 2001-2005

Thousand Tonnes

Port Region	2001	2003	2004	2005
East Midlands	-	-	-	-
East of England	473	449	467	396
London	31	32	31	26
North East	1,456	1,446	1,592	1528
North West	149	121	104	88
Scotland	3,516	3,738	3,458	3490
South East	1,028	690	513	914
South West	33	25	6	-
Wales	742	642	819	805
Yorkshire & the Humber	488	249	273	484
Other islands	63	85	79	96
Total GB	**7,981**	**7,476**	**7,341**	**7,827**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Given the lack of a time series for data for liquefied gas, only limited conclusions can be drawn from the above tables. The data confirms the view that, during the period 2001-2005, the major flows were from the major refining locations and exports were the dominant flow.

Economic Drivers of Demand

Energy Policy Goals

A key driver of demand for liquefied gas in the future is likely to be Government energy policy. The Energy White Paper of 2003 had four key goals:

- To cut the UK's carbon dioxide emissions by some 60% by about 2050…with real progress by 2020;
- To maintain the reliability of energy supplies;
- To promote competitive markets in the UK and beyond, helping to raise productivity and the rate of sustainable economic growth;
- To ensure that every home is adequately and affordably heated.

Government energy policy states that where the market alone cannot create the required signals the Government will take steps that encourage business to innovate and develop new opportunities to deliver the required outcomes.

Energy policy has since been reviewed and the need for security of energy supply and concern about whether the UK can meet its targets for the reduction in carbon emissions has received greater emphasis than in the 2003 Energy White Paper. However, Government still sees its role as being to create the right environment within which the private sector can invest in energy infrastructure.

Energy demand

In 2005 total demand for gas was some 94.3 million tonnes of oil equivalent and UK Government statistics show that gas was the major source of energy for the generation of electricity, representing 39% of electricity generation, compared to coal (34%), nuclear (20%) and other sources such as renewables and oil (8%). It was also a major energy source in its own right. The key determinants of demand in the future are likely therefore to be demand for gas as a domestic and industrial power source and as an energy source for the generation of electricity.

As part of its review of energy policy in May 2007, the DTI produced the following projections for demand for gas under its "White Paper Proposals Central Carbon Saving" scenario. These projections suggest that gas demand will fall from 94.3 million tonnes of oil equivalent (Mtoe) to 92.5 Mtoe in 2010 and then rise to 95.7 Mtoe in 2020.

Economic Drivers of Supply

UK gas reserves & production

At the end of 2005 the UK had 481 billion cubic metres (bcm) of proven reserves, a 10% decline from the previous year. There was an additional 247 bcm of "probable" reserves and an estimated additional 278 bcm of "possible" reserves. However, production is likely to gradually fall in the future. The reserves are in three geographical areas:

1. Gas fields in the UK Continental Shelf (UKCS), associated with oil fields;
2. The Southern Gas Basin, located adjacent to the Dutch sector of the North Sea; this contains the largest concentration of reserves with five gas fields;

3. Gas fields in the Irish Sea.

The UK had been a net exporter of natural gas since 1997 but most natural gas fields have reached a high level of maturity and in 2004 the UK became a net importer of gas. As reserves are depleted, the UK is expected to become increasingly dependent on imports, which may represent some 80%-90% of UK gas consumption by 2020, according to the DTI.

In May 2007 the DTI published its best estimates of natural gas production from the UK Continental Shelf up to 2012 (Table 2.4 below).

Table 2.4: Natural Gas Production Projections to 2012

Billion bcm

Year	DTI Projection	High	Low
2007	75.2	85	65
2008	73.7	85	65
2009	70.5	80	60
2010	63.7	75	55
2011	57.7	70	45
2012	50.2	65	40

Source: DTI UK Continental Shelf Oil & Gas Production Projections (May 2007)

These projections suggest that compared to 2006 (with production of 76.6 bcm) production will decline by 34% up to 2012.

Transfer of gas ashore

The gas is transferred ashore by pipeline. There are four main gas pipeline systems:

- The Shearwater–Elgin line (SEAL) transports gas from the Southern Gas Basin to Bacton, on the Norfolk coast between Great Yarmouth and Cromer (annual capacity 17.3 bcm);
- The Scottish Area Gas Evacuation (SAGE) transports gas from UK oil fields to the landing terminal at St Fergus in Scotland, North of Peterhead (annual capacity 15.3 bcm);
- The Central Area Transmission System (CATS) transports gas from fields in the Graben area of the UKCS to Teesside (annual capacity 14.3 bcm);
- The Far North Liquid and Gas System (FLAGS), links gas deposits associated with oil fields in the Brent oil system with St Fergus; this system is also to be used as a connection to the Norwegian Statfjord gas field; (a 'late-life' gas project which is expected to come on stream in October 2007), it is likely to be major source of gas imports in the future (annual capacity 7.8 bcm).

Once the gas is ashore National Grid Transco (NGT) has responsibility for transporting natural gas throughout GB via its 4,200 miles of transmission lines. There is therefore currently no use of shipping or ports for the transfer of gas ashore from UK gas fields.

International Pipelines

Security of supply is a major concern for Government, but the focus has been on ensuring that markets are liberalised and that a diversity of supply will deliver security to end users. Although increasing quantities of natural gas will be imported from North Africa and the Gulf States by sea as LNG, a large proportion of the UK's needs are likely to be sourced from Norway and Holland with the possibility of increasing supplies from Russia.

There are a number of pipelines between Great Britain and the Continental mainland either in existence, under construction or proposed. Existing pipelines are currently mainly used for exports of natural gas, but will increasingly also be used for imports in the future. Pipelines both planned and under construction will be designed to handle imports of natural gas from the Near Continent and Norway, without any requirement for maritime transport. These pipelines are as follows:

- Bacton-Zeebrugge: This pipeline came on stream in 1998 and export capacity is 53.2 million cubic metres per day, although it will also be capable of importing natural gas to the UK. Import capacity has been upgraded to an annual 16.5 bcm and is planned to reach 23.5 bcm of capacity by 2006-2007.

- Langeled Pipeline: the southern section of this pipeline, between Sleipner Riser and Easington at the entrance to the Humber estuary, opened in October 2006 and the northern section between Norway's Ormen Lange natural gas field and Sleipner Riser via Nyhanna is due to open in October 2007. The pipeline has an annual capacity of 25 bcm.

- Balgzand-Bacton Line: This pipeline between Holland and Bacton was completed at the end of 2006 and saw its first commercial movement of gas in December 2006. Capacity is planned to be 15 bcm per year.

- North European Gas Pipeline (NEGP): This project was approved by the Russian Government in 2004. The pipeline will stretch for 1,100 miles from Vyborg in Russia across the Baltic Sea to Grieswald in Germany and ultimately the East Coast of the UK. Construction on the pipeline started in December 2005 and is expected to come on stream in 2010 with a maximum capacity of 81.2 million cubic metres per day. In September 2005 the Russian President and the German Chancellor signed an agreement for the use of this pipeline indicating strong political commitment to the project. This project is seen as particularly attractive for Russia as it avoids the movement of gas through former Soviet States.

Liquefied Natural Gas (LNG)

With the decline in indigenous gas production over the last few years, there has been a surge of activity in the LNG terminal sector.

Isle of Grain: In 2003 National Grid Transco (NGT) received approval for the conversion of an existing natural gas storage facility at the Isle of Grain into an LNG receiving terminal and the first shipment was received at the facility in mid-2005. The terminal has an initial annual capacity of 4.5 billion cubic metres (bcm) and there are plans to increase capacity to 10 bcm by 2008.

South Hook LNG terminal (Milford Haven): This will be operated by ExxonMobil and Qatar Petroleum and will receive LNG from the Qatargas II liquefaction project in Ras Laffin in Qatar. The terminal is expected to come on stream in 2007/2008 with an initial annual capacity of 10.5 bcm and an additional capacity of 10.5 bcm planned for the following year.

Dragon Project (Milford Haven): This project was approved in early 2005 and is a partnership between Petroplus (the Netherlands-based group), Petronas of Malaysia and British Gas (BG). The facility will be sited on an existing natural gas storage facility at Milford Haven. The proposal has been under investigation by the European Commission because the developers were granted a waiver from the requirement to allow third party access to the facility. The facility should be on-stream by the end of 2007, with an initial capacity of 6 bcm increasing to 12 bcm by 2010.

Teesport LNG/GasPort LNG: Excelerate Energy recently developed a facility on Teesside with a capacity of 4.1 bcm per year. The facility received its first shipment in February 2007. This facility differs from many of the others in that the LNG is re-gasified on board ship and can be fed direct into the grid.

There are also the following proposals for LNG facilities that have not yet received planning consent:

- **Canvey LNG:** There are proposals for LNG facilities at Canvey Island, on a site that imported LNG between 1964 and 1990 before UK-sourced natural gas became widely available; it was then converted into an LPG facility and terminal. Canvey LNG is a joint venture between Calor Centrica of the UK, LNG Japan Corporation and Osaka Gas of Japan. Planned capacity is 5.4 billion cubic metres of gas per year and construction is planned to start in 2007-08 with completion in winter 2010-11. However initial planning permission has been refused and in March 2007 Canvey LNG lodged an appeal with the Department for Communities and Local Government.
- **Amlwch LNG:** The project would be developed by Canataxx and would provide 15 bcm of import capacity from 2010. LNG would be received ashore from tankers and transferred via undersea pipeline to Fleetwood where it could be stored or fed into

the British pipeline network. As far as we are aware, no planning application has been made for the facility.

- **Norsea Oil Terminal LNG:** Conoco Phillips announced in February 2006 that it intends to seek planning permission for a second LNG plant on Teesside and this facility is proposed to become operational in 2013.
- **Stag Energy** are at the initial stages of a development in Barrow to be known as Gateway LNG; capacity is expected to be 7bcm per year and, subject to planning consent, the facility is expected to be operational after 2010.

In addition, the Energy White Paper 2007 set out the Government's intention, following recent public consultation, to legislate to put in place a new regulatory framework to simplify the consenting processes concerning the offshore storage of natural gas.

Given that in 2004 the UK became a net importer of gas, the availability of infrastructure to import gas will be a major factor in determining the volumes of gas imported through UK ports up to 2030. Table 2.5 summarises the major gas infrastructure projects (excluding offshore storage of natural gas) with planned capacities.

Table 2.5: Major Gas Infrastructure Projects, with Planned Annual Capacity

Project	**Type**	**Annual Capacity Billion cubic metres**	**Annual Capacity Million tonnes**	**Status**	**Completion date**
NG Isle of Grain	Marine LNG Terminal	10.0	7.3	Operational	07/2005
Petroplus, Milford Haven	Marine LNG Terminal	12.0	8.8	Under construction	07/2008
South Hook/Qatar Petroleum	Marine LNG Terminal	21.0	15.3	Under construction	2008
Teesport LNG, Teesside	Marine LNG Terminal	4.1	3.0	Operational	2/2007
Canvey LNG	Marine LNG Terminal	5.4	3.9	Planning permission refused; under appeal	2010/2011
Amlwch LNG, Anglesey	Marine LNG Terminal	15.0	11.0	Proposal	2010
Gateway LNG, Barrow	Marine LNG Terminal	7.0	5.1	Proposal	2010+
Norsea Oil Terminal LNG, Teeside	Marine LNG Terminal	Not known	Not known	Proposal	2013
Bacton-Zeebrugge	Pipeline upgrade	23.5	17.1	Operational	10/2006
Balgzand-Bacton (BBL)	Pipeline	15.0	11.0	Operational	12/2006
Langeled	Pipeline	25.0	18.3	Southern section operational	10/2006
Statfjord/Vesterled	Pipeline	4.0	2.9	Operational	2003
Total Capacity		142.0	103.7		

Source: DTI & OFGEM Update, Securing Britain's Gas Supply, Transporting Britain's Energy 2006: Development of NTS Investment Scenarios-national grid July 2006

Central Forecast

Our Central Forecast is based on the following assumptions:

UK demand for natural gas (source: *Updated Energy and Carbon Emissions Projections*, DTI May 2007)	UK demand for natural gas is 94.3 million tonnes of oil equivalent (MTOe) in 2005, 92.5 MTOe in 2010 & 95.7 MTOe in 2020; stable demand 2020-30.
UK gas production (source: DTI up to 2012, then *Updated Energy and Carbon Emissions Projections*, DTI May 2007 for 2013-202 and 8% p.a. reduction 2020-2030 (in line with average fall 2010-2020)	78 bcm in 2006, falling to 50 bcm in 2012; 38 bcm in 2015, 23 bcm in 2020, 15 bcm in 2020, 10 bcm in 2030
LNG Imports	Assumed to be in proportion to LNG capacity compared to total import capacity LESS any UK gas production Price per unit by pipeline is the same as the price per unit of LNG by sea LNG terminal capacity is available from operational terminals and terminals with planning permission
GB domestic movements	No domestic movements of LNG; domestic movements of LPG assumed to be in proportion to UK refinery consumption – i.e. stable, given that no additional refinery capacity is expected to be developed over the next 25 years.

Our forecasts therefore reflect a reduction in the demand for natural gas for domestic/industrial use and for electricity production between 2005 and 2010, but a gradual increase in demand up to 2020 (in line with the DTI's "White Paper Proposals Central Carbon Saving" Scenario) and stable demand from 2020 to 2030. The UK's own gas resources are projected by the DTI in May 2007 to fall from about 78bcm in 2006 to 50bcm in 2012.

Our forecast assumes that the price per unit of piped gas is the same as LNG and so the proportions of imported gas imported by pipeline and by sea in the form of LNG are related to the capacity available in import pipelines and LNG terminals respectively. The forecast assumes that the maximum amount of gas that can be handled through UK LNG terminals is related to the capacity available at terminals that are already operational or facilities that have already secured planning permission (i.e. the two terminals at Milford Haven, the terminal at the Isle of Grain and the Teesport LNG facility).

Given the number of proposals for additional LNG terminals, there is every prospect of additional LNG capacity becoming available over the forecast period, but this potential capacity has not been taken into account in the forecasts because of the uncertainty involved in the planning process.

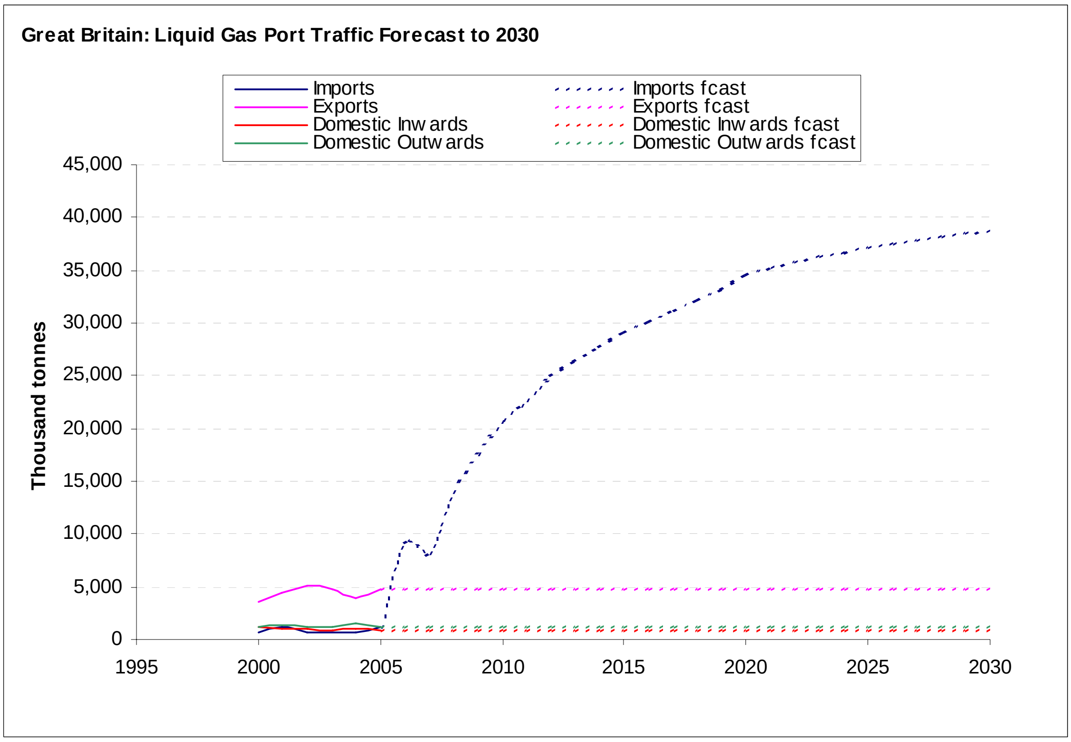
The much lower volumes of LPG imports are assumed to remain stable up to 2030 in the absence of any information on the key drivers. LPG exports and domestic movements are assumed to be directly related to the relative changes in consumption at UK refineries, as LPG is a by-product of the refining process.

Table 2.6: GB Liquefied Gas Port Forecast to 2030[1]

Million tonnes

Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% Annual Change
Great Britain								
Imports	1.1	20.7	29.2	34.6	37.1	38.7	+3,310%	+15.2%
Exports	4.8	4.8	4.8	4.8	4.8	4.8	-	-
Domestic Inwards	0.8	0.8	0.8	0.8	0.8	0.8	-	-
Domestic Outwards	1.2	1.2	1.2	1.2	1.2	1.2	-	-
Total	**7.8**	**27.4**	**35.9**	**41.3**	**43.8**	**45.4**	**+481%**	**+7.3%**
% Annual Change		*2005-10*	*2010-15*	*2015-20*	*2020-25*	*2025-30*		
		+28.5%	*+5.5%*	*+2.9%*	*+1.2%*	*+0.7%*		

Source: MDS Transmodal



[1] For comparison with previous forecast see Table 4.6 p.70 of May 2006 report.

Implications for Ports

The new LNG port facilities on the Isle of Grain, at Milford Haven and on the Tees are (or will be) handling significant LNG volumes in the future, while existing port capacity should be able to accommodate volumes of LPG up to 2030. Additional landside storage capacity may be required up to 2030, but, if required, it should be possible to develop this capacity at the existing LNG import facilities. There are likely to be an opportunities for ports to develop additional LNG import capacity at suitable locations, subject to securing planning permission.

2.4 Crude Oil & Oil Products

Introduction

We have developed forecasts for crude oil and oil products through GB ports up to 2030 based on our understanding of the key economic drivers behind trends in traffic. Forecasts have been produced using secondary sources, particularly analyses produced by the DTI for the May 2007 Energy White Paper, and analysis of port traffic data.

The main changes since May 2006 relate to:

- Revised Government projections of oil demand and UK oil reserves, based on the May 2007 Energy White Paper and supporting documents;
- Using 2005 as the base year, sourced from DfT Maritime Statistics.

While crude oil is the mineral oil extracted from oil fields prior to being refined, petroleum products or oil products cover the entire range of liquid derivatives of crude oil after refining and include gasoline, diesel, kerosene and aviation fuel. A proportion of refining capacity is also geared to the production of feedstock for the petrochemical industry and is used to manufacture products as diverse as synthetic rubber, plastics, greases, waxes and fibres.

Crude oil is transported in large quantities in bulk liquid form and is carried in specialist tankers from the oil fields to the major refineries. Ultra Large Crude Carriers (ULCCs) are generally employed for the carriage of crude oil from the Arabian Gulf to Europe, the USA and the Far East and have a carrying capacity of 300-550,000 tonnes, while the Very Large Crude Carriers (VLCCs) of 200-300,000 tonnes carrying capacity are more likely to be deployed in the Mediterranean, West Africa and the North Sea. In general once crude oil is refined into oil products it is carried in smaller ships, as smaller parcel sizes are required to feed tank storage and industrial processes at coastal locations.

Market Definition

Tables 2.7 and 2.8 provide an analysis of crude oil and oil products respectively through GB ports in 2005.

Table 2.7: Great Britain Crude Oil Market Size, Major Ports, by Port Region, 2005

Thousand tonnes

	International				Domestic				Grand Total
	Imports	Exports	Total	% GB Port Traffic	In-wards	Out-wards	Total	% GB Port Traffic	
East Midlands	-	-	-	0%	-	-	-	0%	-
East of England	2,691	-	2,691	3.1%	3,360	-	3,360	5.1%	6051
Gt. London	245	-	245	0.3%	306	-	306	0.5%	551
North East	1,158	12,473	13,631	15.5%	93	12,218	12,311	18.8%	25943
North West	5,696	-	5,696	6.5%	6,672	-	6,672	10.2%	12368
Scotland	2,424	14,323	16,748	19.0%	1,434	6,720	8,155	12.5%	24902
South East	10,288	1,090	11,378	12.9%	5,288	373	5,661	8.6%	17039
South West	-	-	-	0%	-	-	-	0%	-
Wales	6,934	141	7,074	8.0%	7,073	47	7,121	10.9%	14195
Yorks. & Humber	10,256	-	10,256	11.6%	7,456	-	7,456	11.4%	17712
Other Islands	570	19,761	20,332	23.1%	8,551	5,855	14,407	22.0%	34738
Grand Total	**40,263**	**47,789**	**88,051**	**100%**	**40,233**	**25,214**	**65,448**	**100%**	**153,499**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Table 2.8: Great Britain Oil Products Market Size, Major Ports, by Port Region, 2005

Thousand tonnes

	International				Domestic				Grand Total
	Imports	Exports	Total	% GB Port Traffic	In-wards	Out-wards	Total	% GB Port Traffic	
East Midlands	-	-	-	0%	-	-	-	0%	-
East of England	7,895	1,632	9,527	16.0%	1,654	435	2,089	7.9%	11,616
Gt. London	1,033	208	1,241	2.1%	155	51	206	0.8%	1,447
North East	1,787	2,038	3,825	6.4%	785	1,079	1,864	7.0%	5,690
North West	652	2,188	2,840	4.8%	339	877	1,216	4.6%	4,057
Scotland	1,352	2,379	3,732	6.3%	2,455	3,479	5,934	22.4%	9,665
South East	5,647	6,104	11,751	19.8%	507	887	1,394	5.3%	13,145
South West	1,514	-	1,514	2.5%	2,443	-	2,443	9.2%	3,957
Wales	5,225	9,807	15,032	25.3%	1,959	5,555	7,514	28.4%	22,545
Yorks. & Humber	3,226	6,684	9,910	16.7%	952	2,857	3,809	14.4%	13,719
Other Islands	3	-	3	0%	32	-	32	0.1%	34
GB Total	**28,333**	**31,041**	**59,374**	**100%**	**11,281**	**15,221**	**26,502**	**100%**	**85,876**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

154 million tonnes of crude oil and 86 million tonnes of oil products were handled at GB port facilities in 2005. While the majority of the crude oil volumes relate to movements of UK-sourced crude oil, some 24 million tonnes of Norwegian crude was transported ashore by pipeline in the North East and then exported by sea (i.e. a British port providing a transit facility for a 3rd country cargo).

The movements of crude oil show the importance of the refining locations at Coryton (East of England), Stanlow (North West), Fawley (South East), Milford Haven (Wales), Immingham (Yorkshire and the Humber) and Grangemouth (Scotland). The North East and Scotland (including the Northern Isles, shown as "other islands") dominate crude oil exports, accounting for 97% of the 48 million tonnes exported, and reflect the locations of the crude oil shore storage terminals at Sullom Voe, Grangemouth and the Tees, where oil is stored on receipt by pipeline from the North Sea oil fields. Grangemouth, the Northern Isles and the Tees also dominate outward domestic movements of crude oil from the shore storage facilities to coastal refineries. Inward domestic movements of crude oil, amounting to some 40 million tonnes in 2005, relate to "one port" movements by sea from the North Sea oil fields to crude oil storage terminals in the Northern Isles and on the Tees and to coastal refineries that are not connected directly to the pipeline network from the North Sea oil fields.

28 million tonnes of oil products were imported through GB ports in 2005, while 31 million tonnes were exported from the refinery locations. 15 million tonnes of oil products were distributed coastwise from refineries to coastal tank farms.

Historic Trends

Tables 2.9-2.12 provide an analysis of historic trends in crude oil and oil products traffic during the period 1993-2005.

Table 2.9: Great Britain Crude Oil Market Size, Major Ports, 1993-2005

Thousand tonnes

Direction	1993	1995	1997	1999	2001	2003	2004	2005	**% Change 1993-05**
Imports	42,493	34,120	37,229	28,910	40,989	35,054	43,925	40,263	-5%
Exports	65,536	81,590	70,883	76,395	73,567	64,681	57,059	47,789	-27%
International Total	108,030	115,711	108,112	105,305	114,556	99,734	100,984	88,051	-19%
Domestic Inwards	29,871	38,368	37,842	49,401	36,745	42,279	39,645	40,233	+35%
Domestic Outwards	20,137	29,206	32,147	31,308	17,256	18,306	20,967	25,214	+25%
Domestic Total	50,008	67,574	69,989	80,710	54,001	60,585	60,611	65,448	+31%
Total	**158,038**	**183,285**	**178,101**	**186,014**	**168,557**	**160,319**	**161,595**	**153,499**	**-3%**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

With a decline in crude oil exports since 1995, and the decline in domestic movements of crude oil since about 1999, Table 2.9 reflects the start of the anticipated decline in North Sea oil production. The rise in domestic flows both inwards and outwards in 2005 compared to 2004 may indicate the trend towards the exploitation of oil fields that are not connected to the pipeline network.

Table 2.10: GB Oil Products Market Size, Major Ports, 1993-2005

Thousand tonnes

Direction	1993	1995	1997	1999	2001	2003	2004	2005	% Change 1993-05
Imports	19,730	16,297	15,956	19,992	24,061	23,893	24,083	28,333	+44%
Exports	27,017	25,942	29,554	28,605	27,958	27,278	30,691	31,041	+15%
International Total	46,747	42,240	45,510	48,597	52,019	51,171	54,774	59,374	+27%
Domestic Inwards	20,642	15,080	13,899	14,448	14,679	13,735	12,726	11,281	-45%
Domestic Outwards	23,265	21,114	20,281	19,568	15,895	15,444	15,333	15,221	-35%
Domestic Total	43,907	36,193	34,180	34,016	30,573	29,180	28,060	26,502	-40%
Grand Total	**90,654**	**78,433**	**79,691**	**82,614**	**82,593**	**80,351**	**82,834**	**85,876**	**-5%**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Table 2.10 shows that, while imports of oil products have risen by some 44% over the period 1993-2005, exports have been more stable. This appears to indicate that refining capacity in Great Britain is close to being fully utilised, with rising demand for oil products being met mainly by increased volumes of imports. At the same time domestic movements of oil products have declined as regional tank farms can be fed by imported products rather than receiving supplies from UK refineries.

Table 2.11: Great Britain Crude Oil Market Size, Major Ports, by Port Region, 1993-2005

Thousand tonnes

Port Region	1993	1995	1997	1999	2001	2003	2004	2005	% Change 1993-05
East Midlands	-	-	-	-	-	-	-	-	-
East of England	10,099	10,706	10,894	9,628	6,852	6,711	7,019	6,051	-40%
London	919	975	992	877	624	611	639	551	-40%
North East	19,573	20,370	26,213	25,351	23,619	26,394	25,339	25,943	+33%
North West	12,806	13,674	12,658	11,953	11,247	11,406	11,406	12,368	-3%
Scotland	14,900	38,076	34,234	35,465	29,625	28,863	25,665	24,902	+67%
South East	16,967	17,336	18,013	16,027	15,712	15,241	16,709	17,039	0%
South West	-	-	-	-	-	-	-	-	-
Wales	18,337	17,180	18,135	14,713	14,509	12,843	15,574	14,195	-23%
Yorks & Humber	14,243	14,905	15,310	18,039	17,220	17,708	17,643	17,712	+24%
Other islands	50,193	50,063	41,651	53,963	49,151	40,452	41,602	37,738	-31%
Total GB	**158,038**	**183,285**	**178,101**	**186,014**	**168,557**	**160,319**	**161,595**	**153,499**	**-3%**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

The decline in crude oil extracted from the North Sea since 1999 is reflected in Table 2.11 in a reduction in volumes handled on the mainland of Scotland and in the Northern Isles of Scotland. Otherwise reductions in volumes since the peak of 1999 are mainly due to some rationalisation of refining capacity (on the Thames, for example).

Table 2.12: Great Britain Oil Products Market Size, Major Ports, by Port Region, 1993-2005

Thousand tonnes

Port Region	1993	1995	1997	1999	2001	2003	2004	2005	% Change 1993-05
East Midlands	-	-	-	-	-	-	-	-	-
East of England	12,653	10,458	11,546	11,269	10,166	10,912	10,718	11,616	-8%
London	1,539	1,249	1,411	1,379	1,209	1,322	1,349	1,447	-6%
North East	5,821	5,014	5,131	4,122	6,134	5,146	5,423	5,690	-2%
North West	8,060	6,916	5,735	5,008	4,417	3,152	3,671	4,057	-50%
Scotland	12,409	9,500	10,552	11,941	11,032	9,847	10,002	9,665	-22%
South East	9,219	7,986	6,991	9,381	8,639	9,841	11,198	13,145	+43%
South West	2,928	1,694	1,651	2,111	3,287	3,610	3,811	3,957	+35%
Wales	20,344	18,089	18,890	18,137	18,879	19,504	22,259	22,545	+11%
Yorks & Humber	12,950	14,031	14,434	16,033	15,701	13,854	14,369	14,719	+14%
Other islands	1,101	924	626	469	-	32	33	34	-97%
Total GB	**87,025**	**75,862**	**76,967**	**79,850**	**79,463**	**77,221**	**82,833**	**85,876**	**-1%**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Economic Drivers of Demand

Demand for crude oil is directly related to the demand for the oil products that can be produced in the refining process. In 2005, total demand for oil products in the UK was about 81 million tonnes and Table 2.13 provides a breakdown of UK demand consumption by product for the same year.

Table 2.13: Demand for Petroleum Products, 2005

Oil Product	% Total Consumption
Gasoline	23.1%
DERV	32.6%
Aviation Fuel	15.4%
Fuel Oils	4.4%
Naphtha	2.4%
Other energy uses	9.5%
Non-Energy Use	12.6%
Total	100.0%

Source: DTI, DUKES 2006

Transport Fuels

The transport fuel categories of gasoline, DERV and aviation fuel make up the bulk of consumption with 71.1% of the total.

The light sweet crude oil from the North Sea fields lends itself to the production of gasoline. However, recent years have seen an increase in the popularity of diesel-engined cars in the UK and petrol engines have also become more fuel-efficient so that UK consumption of gasoline decreased. An opportunity arose therefore for increases in exports and in 2005 4.6 million tonnes of gasoline produced by UK refineries was exported, almost exclusively to the USA (source: Review of Oil Refining Capacity, Wood Mackenzie, May 2007). Aviation fuel is increasingly being imported as not enough of this fuel can be manufactured in the UK to meet demand.

DTI data (DUKES 2006) shows that deliveries of diesel were 5% higher in 2005 than in 2004, while deliveries in 2004 were 9% higher than in 2003. At the same time gasoline deliveries declined by 4% between 2004 and 2005, while deliveries of gasoline in 2004 were 6% lower than 2003. Deliveries of diesel were actually higher than those for gasoline for the first time in 2005.

Demand for gasoline and DERV up to 2030 is likely to be driven by the demand for travel in the UK, which will be related to increases in car ownership and their use, which in turn is likely to be related to general increases in prosperity and the relative cost of travel by road. Increasing fuel economy would also have an impact and the DfT's National Transport Model includes the assumption that energy efficiency improvements of 1.5% can be achieved up to 2025. Demand for aviation fuel is likely to be driven largely by the demand for international travel, at a time when the number of air passengers in the UK is forecast to double between 2002 and 2020.

Non-energy uses

Naphtha and non-energy uses of oil products amounted to 15% of total consumption in 2005 and these products of the refining process supply the feedstock for the petrochemicals industry. The non-energy use of petrochemical products is characterised by its diversity and the fact that no single category or sub-category dominates use (for example, synthetic fibres for the textile industry, plastics for the car industry, synthetic rubber, sealing wax). Demand for the products themselves is likely to be driven by changes in relative prosperity and therefore changes in GDP.

Total consumption of petroleum products has fallen from a peak of 106 million tonnes in 1974 to around 81 million tonnes in 2005, although energy consumption in the transport sector has doubled over the same period. This has been mainly due to a decline in the use of fuel oil in industry, for heating and, especially, for electricity generation. Between the late 1960s and the early 1970s the use of oil for electricity generation grew at the expense of coal and peaked at 29% of total fuels used in 1972. This trend was reversed by the late 1970s, following the "oil shock" in 1973. By 2005, fuel oil accounted for only 4.4% of the total oil product demand and oil used for electricity generation now represents about 0.5 million tonnes. This sector comprises a very small proportion of overall demand and is unlikely to affect overall demand for crude oil and petroleum products to any significant extent for the foreseeable future.

Economic Drivers of Supply

UK Oil Reserves

The UK is the largest producer of oil and natural gas in the EU. However after years of being a net exporter of both fuels, production peaked in the late 1990s and has declined steadily as the discovery of new reserves has not kept pace with the maturation of existing fields. Much of the remaining reserves are held in small and remote fields that are more difficult to exploit. Although the oil fields become less profitable for the larger oil companies as they mature, smaller specialist companies are successfully taking their place, particularly as the price of oil has risen in recent years.

In May 2007 the DTI published its best estimates of oil production from the UK Continental Shelf up to 2012 (Table 2.14 below).

Table 2.14: Oil Production Projections to 2012

Million tonnes

Year	DTI Projection	High	Low
2007	78.6	90	70
2008	80.7	90	70
2009	79.2	90	65
2010	73.7	85	60
2011	69.4	80	55
2012	62.6	75	50

Source: DTI UK Continental Shelf Oil & Gas Production Projections (May 2007)

These projections suggest that compared to 2006 (with production of 76.6 million tonnes) production will decline by about 20% up to 2012.

Transfer and storage of crude oil

In 2006 the UK oil fields produced 77 million tonnes of crude oil, of which 16 million tonnes (21% of the total) was transported by sea from offshore production platforms to coastal terminals and the remaining 61 million tonnes (almost 80%) were transported by pipeline to intermediate storage at one of five crude oil shore terminals at Sullom Voe (Shetland Islands), Cruden Bay (near Peterhead), Flotta (Orkney Islands), Nigg Bay (Cromarty Firth) and Teesside. From these storage terminals the crude oil is transported by tanker to the main refineries in Britain or abroad. The total amount of crude oil produced from UK oil fields in 2006 was also about 77 million tonnes.

Location of refineries

The movement of crude oil from the UK's intermediate crude oil storage terminals and of imports from other oil producing regions of the world is to nine refineries on deepwater estuaries. These major oil refineries have a combined capacity of around 88 million tonnes per annum, as shown in Table 2.15.

Table 2.15: Major UK Oil Refineries

Refinery	Estuary	Operator	Estimated annual production capacity (million tonnes)*
Coryton, Essex	Thames	BP	8.8
Grangemouth, Stirlingshire	Forth	Ineos	10.0
Fawley, Southampton	Solent	Esso	16.3
Cleveland Petroplus	Tees	Petroplus	5.0
Stanlow, Cheshire	Mersey	Shell	11.5
Pembroke Plant, Pembrokeshire	Milford Haven	Texaco	10.1
Milford Haven, Pembrokeshire	Milford Haven	Total	5.3
Lindsay Oil Refinery, Immingham, North Lincolnshire	Humber	Total	10.9
Humber Refinery, North Lincolnshire	Humber	Conoco	10.2
Total			88.1

**At end of 2005*
Source: DUKES 2006

Further small specialist refineries are located at Harwich, Eastham and Dundee. There would appear to be no indication that these major or specialist refineries will lose any of their importance in the period under review and, as far as we are aware, there are no plans for further refining capacity in the UK.

With UK refineries apparently running at close to maximum capacity there is likely to be limited scope for substantial increases in UK production and therefore increases in demand for oil products are most likely to be satisfied mainly from abroad.

Exchange deals between the major oil companies and a delivery system for refined petroleum products by rail, pipeline, or coastal tankers link the refineries to major tank farms at coastal locations and inland storage terminals. There are seven main pipeline systems in the UK for the transport of petroleum products, some 4,800 km in length in total, linking the refineries to inland terminals and the major airports. All major grades of product such as gasoline, aviation fuel and diesel fuel can be handled in the same pipeline.

Central Forecast

Oil Products

Demand for crude oil is directly related to the demand for oil products and to the amount of refining capacity available in the UK. Demand forecasts for oil products are therefore considered first.

In 2004 the SRA published a consultancy report which contained forecasts of production, demand, imports and exports for oil products to 2020 and this document has provided useful background information for the port forecasts for this market sector. This has been supplemented in the forecast assumptions by more recent data contained in supporting documentation to the Energy White Paper (May 2007).

Our Central Forecast for oil products is based on the following assumptions:

UK demand for oil products (source: *Updated Energy and Carbon Emissions Projections*, DTI May 2007);	Total demand is 89.1 million tonnes in 2006, 90.2 million tonnes in 2010 and 93.0 million tonnes in 2020; assumed stable from 2020 up to 2030.
Non-LPG (source: Wood Mackenzie forecasts in *Review of UK Oil Refining Capacity* (for DTI, May 2007)	Diesel increasing from 40% of non-LPG oil products in 2005 to 43% in 2020, kerosene increasing from 22% of non-LPG oil products to 29% in 2020 & gasoline falling from 28% (2005) to 19% in 2020; assumed stable product mix 2020-30.
Refinery capacity/production	Constant at about 88 million tonnes per annum; production constant at 85 million tonnes per annum i.e. 97% capacity utilisation
Exports	Assumed to be constant at 31 million tonnes p.a. (actual traffic volume in Maritime Statistics in 2005) reflecting the UK refineries' specialisation in producing gasoline when demand for this fuel is declining.
Imports	UK demand PLUS exports LESS production
GB domestic movements	Related to change in UK demand for oil products

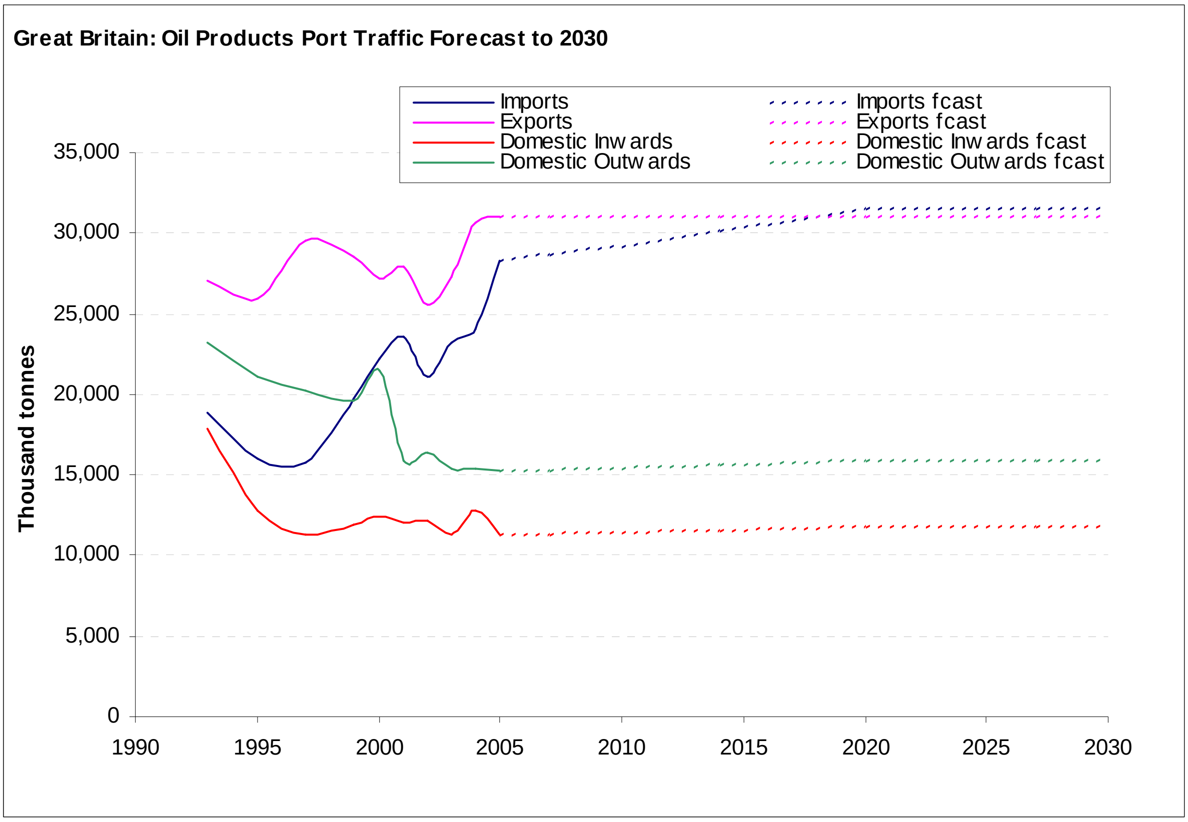
The Central Forecast for oil products, based on the above assumptions, is shown in Table 2.16.

Table 2.16: Great Britain Oil Products Forecast to 2030[2]

Million tonnes

Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
								Great Britain
Imports	28.3	29.2	30.3	31.5	31.5	31.5	+11%	+0.4%
Exports	31.0	31.0	31.0	31.0	31.0	31.0	-	-
Domestic Inwards	11.3	11.4	11.6	11.8	11.8	11.8	+4%	+0.2%
Domestic Outwards	15.2	15.4	15.6	15.9	15.9	15.9	+4%	+0.2%
Total	**85.9**	**87.1**	**88.6**	**90.2**	**90.2**	**90.2**	**+5%**	**+0.2%**
% Change		*2005-10*	*2010-15*	*2015-20*	*2020-25*	*2025-2030*		
		+0.3%	*+0.4%*	*+0.3%*	-	-		

Source: MDS Transmodal



[2] For comparison with previous forecasts see Table 4.16 p.80 of May 2006 report.

Tables 2.17 provides an analysis of oil products traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 2.17: Great Britain Oil Products Port Forecast by Port Region to 2030[3]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	-	-	-	-	-	-	-
East of England	13.5%	11.6	11.8	12.0	12.2	12.2	12.2
Gt. London	1.7%	1.5	1.5	1.5	1.5	1.5	1.5
North East	6.6%	5.7	5.8	5.9	6.0	6.0	6.0
North West	4.7%	4.1	4.1	4.2	4.3	4.3	4.3
Scotland	11.3%	9.7	9.8	10.0	10.2	10.2	10.2
South East	15.3	13.1	13.3	13.6	13.8	13.8	13.8
South West	4.6	4.0	4.0	4.1	4.2	4.2	4.2
Wales	26.3	22.5	22.9	23.3	23.7	23.7	23.7
Yorks & Humber	16.0	13.7	13.9	14.2	14.4	14.4	14.4
Other GB Islands	0.0%	-	-	-	-	-	-
Total	100%	85.9	87.1	88.6	90.2	90.2	90.2

Source: MDS Transmodal

Our forecasts therefore reflect an expected increase in the use of DERV, with gasoline continuing to lose market share and a significant increase in demand for aviation fuel. Total production from refineries is assumed to remain constant at 85 million tonnes of oil products per annum, which reflects the view that there will be no additional refinery capacity developed in the UK up to 2030. Total exports are assumed to remain constant at about 31 million tonnes per annum, given the finite refinery capacity available and UK refineries' specialisation in the production of gasoline, while the volume of imports is related to the requirement to meet UK demand, given available refinery capacity and the size of the UK's export market.

[3] For comparison with previous forecasts see Table 4.17 p.82 of May 2006 report.

Crude oil

Our Central Forecast for crude oil is based on the following assumptions:

Demand for crude oil from UK refineries	Constant at 85 million tonnes p.a.
Crude oil from North Sea	93 million tonnes in 2005, falling to 81 million tonnes in 2010, 52 million tonnes in 2015 & 32 million tonnes in 2020 (based on Table J2 of DTI Updated Energy & Carbon Emission Projections, May 2007); 4% reduction per annum 2020-30 ; 24 million tonnes of Norwegian crude in 2003 by pipeline, falling to about 5 million tonnes in 2018;4% reduction per annum 2018-30.
UK crude oil transported from oil fields by sea	21% in 2005, rising by 1% p.a. up to 2015 (31% in 2015 transported by sea); stable 31% transported by sea 2015-2030.
Exports	22% of UK North Sea oil production in each year PLUS Norwegian exports
Imports	UK refinery consumption LESS crude oil inwards PLUS crude oil exports
Domestic inwards movements	Movements from storage to refineries (assumed to be constant at 25 million tonnes per annum), plus movements direct to refineries from oil platforms by sea
Domestic outwards movements	Movements from storage to refineries, assumed to be constant at 25 million tonnes per annum

These assumptions reflect the most recent projections of UK oil production published by the DTI in May 2007, which suggest that oil production is likely to decline gradually up to 2020, with output in 2020 about one-third of that in 2005. As more peripheral fields that are not connected to the pipeline network become a more significant proportion of total production, the proportion transported ashore by sea will gradually increase.

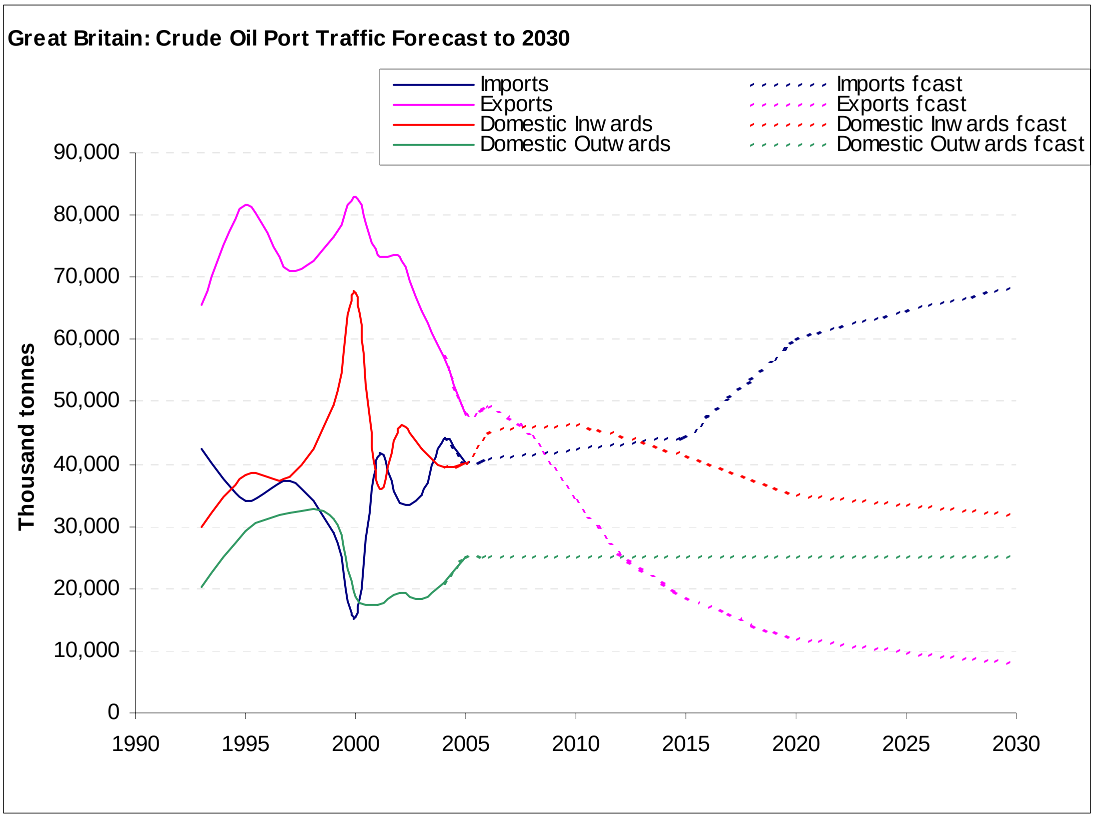
The forecast also reflects the view that, as North Sea oil is particularly suitable for the manufacture of gasoline, a proportion of production will be exported even though the reserves of UK crude oil are gradually declining and “exports” of Norwegian crude oil from Teesport will gradually decline in importance.

Table 2.18: Great Britain Crude Oil Forecast to 2030[4]

Million tonnes

Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
Imports	40.3	42.3	44.4	60.0	64.6	68.4	+70%	+2.1%
Exports	47.8	34.2	18.7	12.0	9.8	8.0	-83%	-6.9%
Domestic Inwards	40.2	46.3	41.3	35.1	33.3	31.8	-21%	-0.9%
Domestic Outwards	25.2	25.2	25.2	25.2	25.2	25.2	-	-
Total	153.5	148.0	129.7	132.4	132.9	133.4	-13%	-0.6%
% Change		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
		-0.7%	*-2.6%*	*-+0.4%*	*+0.1%*	*+0.1%*		

Source: MDS Transmodal



4 For comparison with previous forecasts see Table 4.18 p.83 of May 2006 report.

Table 2.19 provides an analysis of crude oil traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 2.19: Great Britain Crude Oil Port Forecast by Port Region to 2030[5]

Million tonnes

Port of Region	Market Share 2005-30	2005	2010	2015	2020	2025	2030
East Midlands	-	-	-	-	-	-	-
East of England	3.9%	6.1	5.8	5.1	5.2	5.2	5.3
Gt. London	0.4%	0.6	0.5	0.5	0.5	0.5	0.5
North East	16.9%	25.9	25.0	21.9	22.4	22.5	22.5
North West	8.1%	12.4	11.9	10.5	10.7	10.7	10.8
Scotland	16.2%	24.9	24.0	21.0	21.5	21.6	21.6
South East	11.1%	17.0	16.4	14.4	14.7	14.8	14.8
South West	-	-	-	-	-	-	-
Wales	9.2%	14.2	13.7	12.0	12.2	12.3	12.3
Yorkshire & the Humber	11.5%	17.7	17.1	15.0	15.3	15.3	15.4
Other GB Islands	22.6%	34.7	33.5	29.4	30.0	30.1	30.2
Total	100%	153.5	148.0	129.7	132.4	132.9	133.4

Source: MDS Transmodal

Implications for ports

Oil products

The implication from the forecasts is that only a marginal increase in storage capacity for oil products is likely to be required by 2030. There are no indications from the ports industry that this cannot be achieved and it is likely that the requirement will be met by a combination of reductions in 'dwell time' and increases in capacity at port terminals (i.e. additional tank storage), almost certainly without the need for additional berths.

Crude oil

Given that the UK refining industry is approaching capacity there is unlikely to be a need for further import facilities for crude oil unless further refining capacity is built and, although there is an apparent worldwide shortage of refining capacity, there are no indications at present that further investments in refineries are planned in the UK. Movements of crude oil are very unlikely to exceed the requirements of the UK's present refining capacity and so, although imports of crude oil may increase to feed the refineries that previously used UK-sourced crude, overall movements are unlikely to change significantly up to 2030.

As the UK fields reach maturity and yields fall the major intermediate storage locations will be receiving less crude oil by pipeline from the maturing offshore fields. There will, however, still remain ample storage capacity to receive imported crude oil by tanker from other oil producing regions of the world. This could see the terminals at Sullom Voe and Flotta acting as transhipment points for the holding of crude oil prior to the shipment of the imported crude

[5] For comparison with previous forecast see Table 4.19 p.84 of the May 2006 report.

oil to the main estuarial UK refineries. As the UK would no longer be major producer of oil, it would have to hold higher levels of stocks under European law and this would make tank storage on Orkney and Shetland more attractive. It is possible that some 20% of UK refinery input could pass through intermediate tank storage at these locations. Overall, we believe the present crude oil transport infrastructure should suffice for the period up to 2030.

2.5 Coal

Introduction

Forecasts for coal have been produced using secondary sources, the trade press and analysis of port traffic data and have also been informed by discussions with Corus, electricity generators and the DTI. The main changes since May 2006 relate to:

- Revised Government projections of electricity generation from coal-fired power stations;
- Using 2005 as the base year, using DfT Maritime Statistics.

The major coal traffic is imported steam coal for electricity generation (about 80% of the demand for coal in the UK), followed by coking coal, which is a key raw material for the manufacture of steel. While the UK has some reserves of coal for use in electricity generation, the UK's coal cannot in general be used for the manufacture of steel and so virtually all coking coal is imported.

This section of the report defines the port traffic market for coal and describes historic trends during the period 1993-2005; it then describes the factors influencing demand for coal in the UK and the factors affecting supply; it provides our Central Forecast for coal traffic movements through ports up to 2030.

Coal is generally low value and transport costs therefore make up a large proportion of the delivered price. The major coal producing areas of the world, such as Australia, Colombia, South Africa and the United States are relatively distant from some of the major consuming areas, such as Europe, and this has driven the demand for large ships to generate economies of scale. This, in turn, has led to the development of large bulk carriers of over 200,000 tonnes carrying capacity. The larger ships tend to be gearless (i.e. are unable to load and unload the cargo using their own on-board equipment) and therefore depend on the receiving and loading ports to provide specialist handling equipment. The major users of these ships, such as Corus and the major coal-fired electricity generators in the UK, use specialised discharging facilities at terminals at the major deep-water estuaries.

Market Definition

Table 2.20 provides an analysis of the UK port market for the handling of coal in 2005.

Table 2.20: Great Britain Coal Market Size, Major Ports, by Port Region, 2005

Thousand Tonnes

	International				Domestic				Grand Total
	Imports	**Exports**	**Total**	**% GB Port Traffic**	**In-wards**	**Out-wards**	**Total**	**% GB Port Traffic**	
East Midlands	-	-	-	-	-	-	-	-	-
East of England	2,271	-	2,271	4.8%	1	0	1	0.1%	2,272
Gt London	23	-	23	0.0%	-	-	-	-	23
North East	5,455	123	5,578	11.7%	-	-	-	-	5,578
North West	3,453	-	3,453	7.2%	361	-	361	14.0%	3,814
Scotland	8,802	39	8,841	18.6%	-	2,147	2,147	83.3%	10,987
South East	3,411	-	3,411	7.2%	63	-	63	2.4%	3,474
South West	4,235	-	4,235	8.9%	-	-	-	-	4,234
Wales	4,075	97	4,172	8.8%	-	4	4	0.2%	4,176
Yorks & Humber	14,907	731	15,637	32.8%	-	1	1	0.0%	15,638
Other Islands	4	-	4	0.0%	-	-	-	-	4
GB Total	**46,636**	**990**	**47,626**	**100%**	**425**	**2,152**	**2,577**	**100%**	**50,202**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Total coal traffic handled through UK ports in 2005 amounted to some 50 million tonnes, of which 47 million tonnes were imports. The largest coal import flows in 2005 were through ports in the Yorkshire and Humber region (14.9 million tonnes in 2005) and were largely accounted for by the port of Immingham, where coking coal is imported for the nearby Corus steelworks at Scunthorpe and steam coal is imported to feed coal fired power stations in the Aire and Trent Valleys. Further deep sea coal facilities at Immingham were opened in May 2006. Scotland handled 8.8 million tonnes of steam coal through the Hunterston facility in Ayrshire, about 25% of which is transhipped to Northern Ireland.

The North East handled around 5.5 million tonnes of imports in 2005, both steam coal for the power generators and coking coal for the Corus steelworks via their terminal at Redcar on the Tees. The South West region handled about 4.2 million tonnes, as Bristol can accommodate cape-size vessels and imports coal for the major electricity generating companies. The South East region also handled about 3.4 million tonnes of imports, mainly for local power stations on the Thames and Medway. Wales (mainly through Port Talbot) handled 4.1 million tonnes of coking coal for the Corus works. The North West handled 3.5 million tonnes of coal per year through Liverpool at its Powergen/E.ON facility, mainly steam coal for Fiddlers Ferry power station.

Historic Trends

Table 2.21 provides an analysis of historic trends in coal traffic during the period 1993-2005.

Table 2.21: Great Britain Coal Market Size, Major Ports, 1993-2005

Thousand tonnes

	1993	1995	1997	1999	2001	2003	2005	% Change 1993-2005
Imports	18,988	16,714	21,285	20,548	35,685	33,515	46,636	+145%
Exports	1,109	911	1,168	623	1,061	1,121	990	-11%
International Total	20,096	17,624	22,453	21,171	36,746	34,635	47,626	+137%
Domestic Inwards	2,707	2,865	371	53	1,535	1,324	425	-84%
Domestic Outwards	2,440	3,771	1,368	1,194	1,639	1,321	2,152	-12%
Domestic Total	5,147	6,636	1,740	1,248	3,174	2,645	2,577	-50%
Grand Total	**22,991**	**23,012**	**23,322**	**21,768**	**37,470**	**35,595**	**50,202**	**+118%**

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Growth in coal imports of 145% over the period 1993-2005 has been due to the decline of the British coal mining industry, in combination with growth in the use of coal for electricity generation as the price of gas has risen in recent years.

Table 2.22 provides an analysis of historic trends in coal traffic during the period 1993-2005 2005, by port region.

Table 2.22: Great Britain Coal Market Size, Major Ports, by Port Region, 1993-2005

Thousand tonnes

Port Region	1993	1995	1997	1999	2001	2003	2005	% Change 1993-2005
East Midlands	43	-	-	-	3	-	-	-
East of England	2,555	1,712	1,268	570	1,902	1,881	2,273	-11%
London	24	17	12	5	19	19	23	-4%
North East	6,075	5,406	4,135	3,389	4,872	4,646	5,578	-8%
North West	1,412	1,022	1,560	1,568	2,579	3,032	3,814	+170%
Scotland	765	2,753	2,712	4,728	6,689	4,989	10,987	+1,336%
South East	2,924	2,402	2,518	2,267	2,880	3,676	3,474	+19%
South West	300	1,527	1,854	1,317	4,691	4,524	4,235	+1,312%
Wales	4,471	3,939	4,741	3,845	4,382	3,102	4,176	-7%
Yorks. & Humber	4,402	4,225	4,517	4,076	9,445	9,721	15,638	+255%
Other islands	20	7	5	3	11	5	4	-80%
Total GB	**22,991**	**23,012**	**23,322**	**21,768**	**37,470**	**35,595**	**50,202**	

Source: DfT Maritime Statistics, analysis by MDS Transmodal

The trends in the regional distribution of coal handling largely reflect the competitive nature of the market for handling imported steam coal, with strong competition between ports located on deep-water estuaries. Up to about 2001, Hunterston benefited from a competitive advantage by capitalising on the economies of scale available from its deep water and rail link to serve power stations in England. However, with the development of new deep-water port facilities at Immingham, the Humber has begun to secure additional market share. Liverpool and Bristol have also been successful in attracting coal traffic to serve inland power stations. Some coal imported through Hunterston is now being distributed to English power stations by coastal shipping and rail via Ellesmere Port.

Economic Drivers of Demand

Introduction

Table 2.23 below shows the trends in coal usage from 1997 to 2005.

Electricity generation is the major user with just over 84% of coal demand in 2005. The demand for steam coal is therefore dependent on the demand for electricity generally and, in particular, from coal-fired power stations. This, in turn, is determined by the competitiveness of coal for electricity generation compared to other sources such as gas, nuclear and renewables. Coal's competitiveness for electricity generation is largely determined by its price compared to other sources and this is greatly influenced by Government energy policy, particularly through environmental regulation. The greater diversity in ownership of coal fired power stations and the changes in the relative prices of gas and coal in recent years have seen an increasing demand for coal-fired power generation. Following a dip in production prior to 2001 due to the popularity of gas, coal-powered power stations have increased their coal consumption to meet additional demand for electricity.

Coking coal accounted for 11% of UK consumption in 2005 and the volumes consumed are directly related to the amount of steel that is manufactured by Corus in their steelworks. Coking coal volumes consumed have fallen from 8.8 million tonnes to 6.6 million tonnes during the period 1997-2005, following rationalisation of Corus' operations i.e. the closure of the Llanwern blast furnaces.

Table 2.23: Trends in Coal Usage 1997-2005

Thousand tonnes

	1997	1998	1999	2000	2001	2002	2003	2004	2005	% Change 1997-2005
Electricity generation	47,333	48,588	41,827	46,912	51,680	48,460	53,086	50,920	52,536	11%
Coke Manufacture	8,750	8,728	8,413	8,685	7,896	6,533	6,611	6,382	6,603	-25%
Other Solid Fuel	864	635	646	540	496	436	396	327	266	-69%
Industry	2,993	2,414	2,040	702	1,826	1,809	1,857	1,846	1,791	-40%
Domestic	2,587	2,366	2,517	1,900	1,874	1,286	1,043	941	614	-76%
Other	545	416	271	83	68	20	25	24	33	-94%
Primary use (collieries)	8	5	10	12	10	9	6	8	6	-25%
Total Demand	63,080	63,152	55,724	58,834	63,850	58,553	63,024	60,448	61,849	-2%

Source: DUKES, DTI

Whereas demand for coal for electricity generation has risen by 11% over the period from 1997 to 2005, demand for coal in industrial processes has dropped by 40% and for domestic heating has fallen by three quarters during the period.

Energy Policy and the Demand for Coal

To accompany the Energy White Paper of May 2007 the DTI published an *Updated Energy and Carbon Emissions Projections* document (May 2007). This included projections of electricity supply by fuel and gave three scenarios assuming White Paper proposals at low, central and high policy estimates. We have taken the central proposals only for the purposes of this study. Fossil fuel prices were also calculated for three different scenarios and we have again taken the central case. A carbon price has also been assumed under the EU Emission trading scheme of €20 per tonne in 2010 and €25 per tonne in 2020.

Table 2.24: Forecast of Electricity Demand & Supply from Coal-fired Power Stations to 2020

Year	*Electricity Demand*	*Electricity from coal-fired power stations*	*% Coal-fired electricity*
2000	*346.3*	*111.9*	*32.3%*
2005	*361.0*	*125.0*	*34.6%*
2010	*360.0*	*113.0*	*31.4%*
2015	*363.5*	*75.0*	*20.6%*
2020	*367.0*	*71.0*	*19.3%*

Source: DTI, Updated Energy and Carbon Emissions Projections (May 2007)

The forecasts of electricity required from coal-fired powers station shown in Table 2.24, which reflect Government energy policy ("White Paper Proposals assuming Central Carbon Saving" scenario), show electricity demand rising by 1.6% between 2005 and 2020. The paper also included forecasts of electricity generation by fuel used, which showed electricity generation from coal declining from 125 terawatt hours in 2005 to 75 terawatt hours in 2015 and 71 terawatt hours in 2020. This decline would take coal's share of electricity generation from about 35% in 2005 to around 19% in 2020.

The decline in coal-fired power generation capacity is unlikely to be as rapid as expected by Government in its 2003 Energy White Paper because of an increase in the price of gas, which has led to significant investments by the electricity generating companies to fit flue gas desulphurisation (FGD) equipment to a number of power stations in response to the EU Large Combustion Plants Directive (LCPD) and investment in coal handling capacity at the Port of Immingham backed by term agreements with the power generating companies.

Using FGD equipment, some of the generators expect to reduce their sulphur dioxide emissions, while remaining cost competitive. Of the 18 coal-fired power stations in the UK, 12 are expected to comply fully with the LCPD by fitting flue gas desulphurisation equipment, and six are going to close in the period between 2008 and 2016, as shown in Table 2.25.

Table 2.25: Coal-fired Power Stations and Compliance with LCPD

Status	Power Station	Operator	GW of Capacity
Will comply	Aberthaw	RWE npower	1.5
	Cottam	EDF	2.0
	Drax	Drax Power	3.9
	Eggborough	British Energy	2.0
	Ferrybridge 1	SSE	1.0
	Fiddlers Ferry	SSE	2.0
	Kilroot	AES Kilroot	0.5
	Longannet	Scottish Power	2.3
	Ratcliffe	E.ON-UK	2.0
	Rugeley	International Power	1.0
	Uskmouth	Uskmouth Energy	0.5
	West Burton	EDF	2.0
	Sub-total		20.7
Will close	Kingsnorth	E.ON-UK	2.0
	Cockenzie	Scottish Power	1.2
	Tilbury	RWE npower	1.0
	Didcot	RWE npower	2.0
	Ferrybridge 2	SSE	1.0
	Ironbridge	E.ON-UK	1.0
	Sub-total		8.2
Total capacity			28.9

Source: DTI, updated by MDS Transmodal

Power stations that will not be compliant with the LCPD will have to close by January 2016 and will find it difficult to meet environmental restrictions by January 2008, so it is possible that the UK will lose some 8.2 GW of capacity (about 20% of existing capacity). LCPD standards will tighten again from 2016 and power stations that are currently compliant will have to decide whether to invest in new plant to meet new standards.

Demand for Coking Coal

Apart from the electricity-generating sector the next major user of coal is the steel industry, which uses coking coal for the manufacture of steel and pulverised coal for injection directly into blast furnaces. These coals are specialised in nature - they have to be low ash and low sulphur - which virtually eliminates UK coal from the market. Volumes of coking and pulverised coal used in the steel industry during the period 1998-2005 are shown in Table 2.26.

Table 2.26: Demand for Coking Coal 1998-2005

Thousand tonnes

	1998	1999	2000	2001	2002	2003	2004	2005
Coke Manufacture	8,169	7,919	8,229	7,132	5,808	5,732	5,487	5,564
Blast Furnaces	559	494	456	764	726	882	895	1,039
Total	8,728	8,413	8,685	7,896	6,534	6,614	6,372	6,603

Source: DUKES, DTI

Imported coking coal is used in the steel industry in basic oxygen furnaces (BOS), operated by Corus at Port Talbot, Scunthorpe and Teesside. Therefore the volume of imported coking coal and pulverised coal used in BOS furnaces is directly related to the amount of steel being produced in the UK. Corus estimates that some 7.2 million tonnes of coal will be required each year for steel making up to 2030.

Economic Drivers of Supply

The demand for steam coal in the UK is met by domestic mines (both deep mines and open-cast) and by imports. UK coal production is dominated by the companies that took over the assets of the previously nationalised British Coal, namely UK Coal, Scottish Coal and Celtic Energy. There are, however, a number of smaller producers who mainly concentrate on open cast production.

Table 2.27 provides the split between deep mined and open cast production for the period 1997-2006. Overall UK production fell by 60% between 1997 and 2006.

Table 2.27: UK Deep-mined and Open Cast Coal Production 1997-2006

Thousand tonnes

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Deep Mine	30,281	25,731	20,888	17,187	17,347	16,391	15,633	12,543	9,563	9,439
Open Cast	16,700	14,315	15,275	13,412	14,166	13,148	12,126	11,993	10,445	8,635
Total	46,981	40,046	36,163	30,600	31,513	29,539	27,759	24,536	20,498	18,588

Source: Energy Trends, DTI

Table 2.28 below shows the trend in coal production, imports and use between 1997 and 2005. Overall consumption has declined by some 2.6% over the period and UK production from all sources has declined steadily, due to the closure of many uneconomic and exhausted collieries and the difficulty in gaining planning permission for open cast production, from a total of 46.9 million tonnes in 1997 to 20.0 million tonnes in 2005, some 57%. Imports over the same period rose by 123%.

Table 2.28: Coal Supply and Consumption 1997-2005

Thousand tonnes

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Production (total)	46,981	40,046	36,163	30,600	31,513	29,539	27,759	24,535	20,008
Deep-mined	*30,281*	*25,731*	*20,888*	*17,188*	*17,347*	*16,391*	*15,633*	*12,542*	*9,563*
Opencast	*16,700*	*14,315*	*15,275*	*13,412*	*14,166*	*13,148*	*12,126*	*11,993*	*10,445*
Other sources	1,514	1,131	914	598	417	450	520	561	490
Imports	19,757	21,244	20,293	23,446	35,542	28,686	31,891	36,153	43,968
Exports	-1,146	-971	-761	-660	-550	-537	-542	-622	-536
Stock change	-3,683	+1,421	-1,164	+5,854	-3,392	+501	+3,237	-60	-2,129
Total supply	63,423	62,871	55,445	59,838	63,530	58,639	62,865	60,567	61,801

Source: DUKES, DTI

We assume that changes in stocks are largely related to the price of coal on the world market, so that power generators build up stocks when the price is relatively low and run down stocks when the price is relatively high.

UK Coal Supply – Production Forecasts to 2030

Table 2.29 provides estimates of coal reserves in deep mines and forecasts production to 2030, based on the results of a study for the DTI carried out by Mott Macdonald in association with McCloskey Coal in 2004, and DUKES 2006 supplemented by information from Coal UK and press reports.

Table 2.29: UK Deep Mine and Open Cast Coal Production Forecast

Millions of tonnes

				Expected production					
Colliery	**Reserves 2004**	**Reserves 2007**	**Expected production p.a.**	**2007**	**2010**	**2015**	**2020**	**2025**	**2030**
Daw Mill	75.5	21.5	3.0	3.4	3.0				
Kellingley	57.1	50.9	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Maltby	23.5	19.0	1.5	1.5	1.5	1.5	1.5		
Thoresby	27.1	22.7	1.5	1.5	1.5	1.5	1.5		
Welbeck	26.6	21.7	1.7	1.7	1.7	1.7	1.7		
Sub total				10.3	9.9	6.9	6.9	2.2	2.2
Others*				1.0	1.0	1.0			
Total deep				11.3	10.9	7.9	6.9	2.2	2.2
Open cast				10.7	10.3	6.4			
Grand total				22.0	21.2	14.3	6.9	2.2	2.2

Source: UK Coal Production Outlook 2004-2016 Mott MacDonald/McCloskey Coal, Coal UK, Press reports
**Includes Hatfield and Aberpergwm (reserves not known, production estimated)*

Based on this analysis of remaining reserves, there is very little scope for the continuation of significant supply of UK coal to the power generation industry beyond 2025. While there may be scope for some supply of opencast coal for power stations from 2015 (subject to planning approvals), we have assumed no production from this source from that year because of the planning uncertainty.

The estimates of UK coal production for the period 2005-2030 in Table 4.39 suggest that volumes will fall from about 22 million tonnes in 2005 to just over 2 million tonnes in 2030. This indicates that coal-fired power stations will therefore have to be fed, almost exclusively, by imported coal.

Central Forecast

Forecasts of coal required for electricity generation

We have allowed for a gradual reduction in coal fired generation capacity between 2005 and 2020 in line with the *Updated Energy and Carbon Emissions Projections* document published by the DTI in May 2007. As this document only provides forecasts of electricity demand and the amount of electricity generated from coal, the forecasts for 2025 and 2030 are based on the assumption that there is no change in the demand for coal for electricity generation, given the Government emphasis on improvements in energy efficiency and the potential of clean coal technology.

Table 2.30: Forecast of Power Generation from Coal 2000-2030

Terawatt hours

Year	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Total UK electricity demand	346.3	361	360.0	363.5	367.0	367.0	367.0
Electricity from coal	111.9	125.0	113.0	75.0	71.0	71.0	71.0
Coal generation as a percentage of total power generation	32.0%	34.6%	31.4%	20.6%	19.3%	19.3%	19.3%

Source: MDS Transmodal & Updated Energy and Carbon Emissions Projections (DTI, May 2007)

DTI figures show that in 2005 the major power producers used about 52.5 million tonnes of coal and Table 2.29 provides an analysis of the total quantity of coal required to generate the coal-fired electricity based on DTI projections to 2020. We have assumed that from 2020 to 2030 the amount of coal required for electricity generation remains constant at 27.4 million tonnes.

Table 2.31: Coal Demand Forecasts for Power Generation to 2030

Thousand tonnes

	2010	**2015**	**2020**	**2025**	**2030**
Forecast TWh produced from coal	113.0	75.0	71.0	71.0	71.0
Millions tonnes of coal required	45.8	29.8	27.4	27.4	27.4

Source: MDS Transmodal

Coal for Electricity Generation

Our Central Forecast for coal for electricity generation is based on the central forecasts for electricity generation produced by the DTI in May 2007 as a supporting document to the 2007 Energy White Paper. The forecasts reflect the view that there will be increasing demand for electricity up to 2020 and that the life of a sizeable proportion of existing power stations will be extended by the use of FGD equipment. They also reflect the view that other forms of electricity generation (principally gas) will take an increasing proportion of the market, but that the commissioning of new nuclear power stations is unlikely before 2020 and may well be later. Given the uncertainty about the future development of new nuclear power stations beyond 2020, we have assumed that the position in 2025 and 2030 is the same as in 2020 (i.e. no new nuclear power stations are developed).

We have assumed that domestic coal would be used in preference to imported coal, with the underlying assumption that it can be supplied at a cheaper rate per tonne than imported coal. However, as we have assumed that UK stocks of coal fall over the next 25 years, the UK will become increasingly reliant on imported coal for its coal-fired electricity.

The analysis of the requirement for imported coal for electricity generation is shown in Table 2.32. This shows how the requirement for imported coal would fall up to 2020 as the reduction in demand for electricity from coal falls faster than UK coal production. However, after 2020 imports start to rise again as UK coal production starts to fall faster than the fall in total demand for steam coal.

Table 2.32: Calculation of Steam Coal Requirement to 2030

	2010	2015	2020	2025	2030
Tonnes of steam coal required	45.8	29.8	27.4	27.4	27.4
UK coal production	21.2	14.3	6.9	2.2	2.2
Import requirement for power generation	24.7	15.5	20.5	25.2	25.2

Source: MDS Transmodal

Coal for Other Uses

Our forecast for coking coal imports is based on the assumption that imports are directly related to the forecast level of UK steel production, which is affected to some extent by changes to the forecasts for UK automotive manufacturing included in section 2.6 below.

We have assumed that coal for other uses (mainly for domestic heating and industrial use) in 2005 is all imported and that demand will decline by 7% per annum up to 2010, by 3.5% per annum between 2010 and 2020 and then remain constant up to 2030.

Central Forecast to 2030

The forecasts for coal traffic through ports are largely driven by the balance between the likely increasing requirement for imported coal for electricity generation up to 2030 (as domestic coal production declines) and the projected gradual fall in the total demand for electricity generation from coal to 2020. This therefore assumes that more electricity will be generated from gas and renewables (but no allowance has been made for new nuclear power stations to be constructed) and that domestic coal supplies which remain available will be cheaper than imported coal for the period.

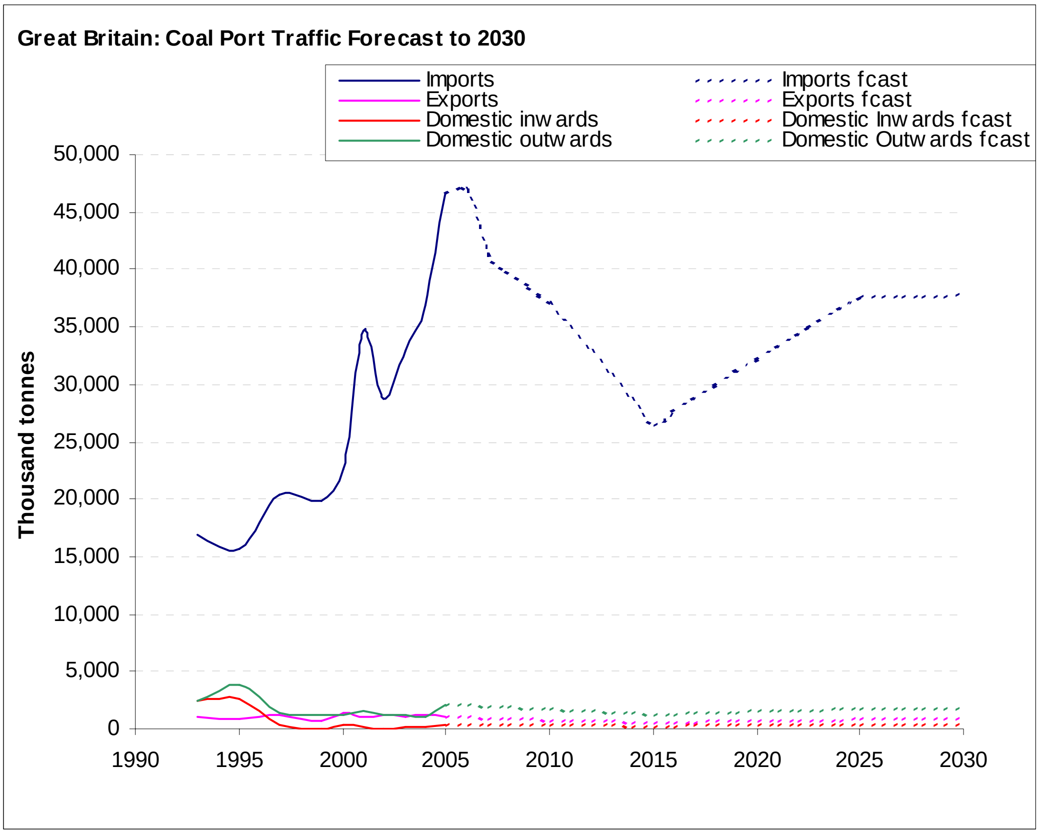
Given these assumptions, volumes of imported coal fall and then rise as domestic production of coal starts to fall, and the need for coal for power generation falls. As the demand for coal for electricity generation is assumed to be stable between 2020 and 2030, but domestic supplies of coal are continuing to fall, there is a requirement for increasing volumes of imported coal between 2020 and 2030.

Table 2.33: Great Britain Coal Port Forecast to 2030[6]

Million Tonnes

	Direction	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**% Change 2005-2030**	**% CAGR**
International	Imports	46.6	37.1	26.6	32.3	37.6	37.7	-19%	-0.8%
	Exports	1.0	0.8	0.6	0.7	0.8	0.8	-20%	-0.9%
Domestic	Inwards	0.4	0.3	0.2	0.3	0.3	0.3	-19%	-0.8%
	Outwards	2.2	1.7	1.2	1.5	1.7	1.7	-19%	-0.8%
Total	Total	50.2	40.0	28.6	34.7	40.5	40.6	-19%	-0.8%
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			-4.5%	*-6.5%*	*+4.0%*	*+3.1%*	*+0.1%*		

Source: MDS Transmodal



6 For comparison with previous forecast see Table 4.44 p.106 of May 2006 report.

Impact on ports

For coking coal, Corus has its own port facilities at Immingham (for Scunthorpe), at Port Talbot and on Teesside, which handle iron ore and coking coal for their local furnaces. These facilities have been able historically to handle the volumes that are forecast up to 2030 and also handle some third party power station coal.

The power generators have made arrangements at ports such as Immingham, Hunterston, Liverpool and Bristol to handle steam coal imports, but, based on our forecasts, there may be a requirement for additional deep-water capacity at specific locations to handle deepsea coal imports. Such a view is supported by the development of Humber International Terminal 2 at Immingham, which might also attract additional market share at the expense, in particular, of Hunterston.

Although the closure of particular power stations by 2008 may have an impact on some ports more than others, the major deep sea coal import facilities all enjoy deep water, specialist berths and rail connections (all sunk costs) and so the market to supply the remaining power stations is likely to be strongly contested between the relevant ports.

2.6 Import/Export Vehicles

Introduction

Import/export vehicles are passenger cars (or “trade cars” in shipping terminology) and commercial vehicles that are either imported or exported through UK ports. There are two main relevant markets in the context of this study:

- Exports of cars and commercial vehicles manufactured in the UK, both to short sea and deep sea countries;
- Imports of cars and commercial vehicles manufactured overseas, both from short sea and deep sea trade partners.

There are also relatively small domestic flows of trade cars and commercial vehicles between Great Britain and Northern Ireland and between GB and other islands within the British Isles.
The following analysis updates the forecasts of demand for import/export vehicles up to 2030 that were produced for the May 2006 report. The update reflects:

- Official DfT forecasts for car ownership in Great Britain, based on the Trip End Model Presentation Program (TEMPRO), which were not taken into account in the May 2006 report;
- Changes in GB car production capacity since May 2006;
- Maritime Statistics for 2005, published by the DfT in Autumn 2006.

Table 2.34 provides an analysis of the volume of import/export vehicles (in tonnes) passing through UK ports in 2005.

Table 2.34: Great Britain Import/Export Vehicle Port Market Size, by Port Region, 2005

Thousand tonnes

Port Region	International Trade				Domestic			
	Imports	Exports	Total	*% GB Port Traffic*	Inwards	Outwards	Total	*% GB Port Traffic*
East Midlands	-	-	-	-	-	-	-	-
East of England	524	199	723	*14.0%*	-	1	1	*0.5%*
London	91	33	124	*2.4%*	..	..	..	*0.1%*
North East	327	303	630	*12.2%*	-	2	2	*1.8%*
North West	5	18	22	*0.4%*	15	86	101	*74.9%*
Scotland	9	-	9	*0.2%*	1	2	3	*2.4%*
South East	686	1,084	1,771	*34.3%*	9	13	23	*16.7%*
South West	466	231	697	*13.5%*	-	-	-	-
Wales	-	5	5	*0.1%*	-	-	-	-
Yorks & Humber	871	309	1,180	*22.9%*	3	1	3	*2.6%*
GB Islands	-	-	-	-	1	-	1	*0.9%*
Total Great Britain	**2,978**	**2,182**	**5,160**	***100%***	**29**	**105**	**134**	***100%***

Source: DfT Maritime Statistics 2005

The major traffic flows of trade cars through GB ports relate to 3.0 million tonnes of vehicle imports and 2.2 million tonnes of exports. Domestic flows to and from GB are much less significant at 0.1 million tonnes and mainly relate to the distribution of vehicles from GB to Northern Ireland.

Historic trends 1993-2005

Tables 2.35 and 2.36 provide an analysis of historic trends in import/export vehicle traffics during the period 1993-2005.

Table 2.35: GB Import/Export Vehicle Market Size, Major Ports, 1993-2005

Thousand tonnes

Direction	**1993**	**1995**	**1997**	**1999**	**2001**	**2003**	**2004**	**2005**	**% Change 1993-2005**	**% CAGR**
Imports	1,241	1,422	1,743	2,004	2,334	2,725	3,011	2,978	+140%	+8.3%
Exports	950	1,209	1,479	1,679	1,327	1,885	2,036	2,182	+130%	+7.9%
International Total	2,191	2,630	3,222	3,683	3,661	4,611	5,046	5,160	+136%	+8.1%
Domestic inwards	33	31	19	31	76	31	23	29	-13%	-1.3%
Domestic outwards	101	102	113	126	143	102	88	105	+4%	+0.4%
Domestic Total	134	133	131	156	218	133	111	134	..	..
Grand Total	2,326	2,763	3,353	3,840	3,879	4,744	5,158	5,295	+128%	+7.8%

Source: DfT Maritime Statistics, analysis by MDS Transmodal

Table 2.36: GB Import/Export Vehicles Market Size, Major Ports, by Port Region, 1993-2005

Thousand tonnes

Port Region	1993	1995	1997	1999	2001	2003	2004	2005	% Change 1993-2005	% CAGR
East Midlands	-	-	-	-	-	-	-	-	-	-
East of England	487	566	594	769	748	718	747	724	+49%	+3.4%
London	23	67	90	122	128	126	132	124	+433%	+15.0%
North East	281	318	456	466	470	569	658	633	+126%	+7.0%
North West	92	110	98	135	153	116	111	123	+35%	+2.5%
Scotland	39	4	5	8	3	2	5	12	-69%	-9.3%
South East	896	977	1276	1,379	1,156	1,681	1,827	1,793	+100%	+6.0%
South West	212	262	351	416	495	653	739	697	+228%	+10.4%
Wales	27	10	24	28	15	7	6	5	-83%	-13.7%
Yorks & Humber	265	449	458	516	708	870	931	1,183	+346%	+13.3%
Other islands	4	1	1	2	2	1	1	1	-70%	-9.5%
Total UK	2,326	2,763	3,353	3,840	3,879	4,743	5,158	5,295	+128%	+7.1%

Source: DfT Maritime Statistics, analysis by MDS Transmodal

The tables show that there has been strong growth in international movements, demonstrating the extent to which GB is both a customer and a manufacturer in a global automotive industry.

Economic Drivers of Demand

Total demand for new cars (whether manufactured in the UK or imported) is affected by a number of factors, the most important of which are likely to be relative prosperity, demographic factors, the degree of market saturation, tastes and fashions and Government regulation. The Department for Transport has developed official forecasts of car ownership in using the Trip End Model Presentation Program (TEMPRO), based on Census data from 2001 when 25.7 million cars were owned in GB. The TEMPRO forecasts are set out in Table 2.36.

Table 2.37: TEMPRO forecasts of car ownership to 2030

Million cars

	DfT Forecast
2011	30.464
2021	34.395
2031	37.214

Source: DfT 2006, TEMPRO v5.3

TEMPRO forecasts that car ownership would increase by some 18% between 2001 and 2011 and by a further 22% between 2011 and 2031. These forecasts have been used as a proxy for changes in demand for new cars. A fundamental assumption has been made therefore that, on average, consumers will change their cars at roughly the same frequency in the future.

UK car manufacturing

Table 2.38: Car and Commercial Vehicle Production in the UK, 1995-2006

Thousands

	Passenger Cars				**Commercial vehicles**			
	Domestic	Export	Total	% Export	Domestic	Export	Total	% Export
1995	787	745	1,532	49%	141	92	233	39%
1996	778	908	1,686	54%	126	112	238	47%
1997	736	962	1,698	57%	134	103	238	43%
1998	728	1,021	1,748	58%	125	103	227	45%
1999	648	1,138	1,787	64%	111	75	186	40%
2000	578	1,063	1,641	65%	96	76	172	44%
2001	98	894	1,492	60%	97	96	193	50%
2002	582	1,048	1,630	64%	77	114	191	60%
2003	511	1,147	1,658	69%	97	103	189	54%
2004	467	1,180	1,647	72%	81	128	209	61%
2005	411	1,185	1,596	74%	77	130	207	63%
2006	336	1,106	1,442	77%	71	136	208	65%

Source: SMMT

Table 2.38 shows that, while total car production has fluctuated during the period 1995-2006 and has been falling since 2004, the proportion of exports has risen from about 50% to 75%. With GB car manufacturing being increasingly focused on exports and demand for new cars increasing during the 1990s, a higher proportion of cars were also imported, again demonstrating the extent to which the UK car industry is operating in a global market.

Many US and European volume car manufacturers have been making significant investments in car plants in Central and Eastern Europe and in Turkey in recent years while older cars plants in the UK have closed. Ford's Dagenham plant has closed (although a significant engine-manufacturing plant remains), as has Jaguar's facility in Coventry, MG Rover's factory at Longbridge and Peugeot's plant at Ryton. A significant risk factor for the UK car industry as a whole is that the UK is not within the euro-zone, leading to greater financial uncertainty for manufacturers. However, the UK is regarded as providing an attractive investment environment and more modern plants such as the Honda plant at Swindon, Nissan at Washington and Toyota at Burnaston have seen additional investment in recent years.

Since May 2006, events in the GB car industry have been more positive with both BMW and Vauxhall (General Motors) investing in production facilities in GB, alongside the Japanese manufacturers:

- Vauxhall has removed the third shift at Ellesmere Port (loss of capacity equivalent to 40,000 cars from 2007), but has since announced that the third shift will be reinstated from 2010 to manufacture a new generation Astra with an overall increase in production of 100,000 cars;

- Honda has announced that production at its Swindon plant will increase from 190,000 to 250,000 cars in 2007 due to the success of its Civic model;
- BMW has invested £200 million in facilities at Oxford and expects to be manufacturing 50,000 more cars at the plant in the near future.
- Nissan has expanded capacity at its Washington plant to manufacture its Qashqai model and the plant is expected to manufacture 400,000 units per annum from 2007.

These changes and their timing (as reported in May 2007) are summarised in Table 2.39 below.

Table 2.39: Expected changes in automotive manufacturing output (May 2007)

Vehicles

Manufacturer	**Plant**	**Change in production**	**Timing**
Peugeot	Ryton	-130k	2007
Vauxhall	Ellesmere Port	-60k	2007
Honda	Swindon	+60k	2007
Nissan	Washington	+50k	2007
BMW Mini	Oxford	+50k	2008
Vauxhall	Ellesmere Port	+100k	2010
Sum of above		+70k	

Source: BBC Website

Central Forecast 2005-2030

The Central Forecast for trade cars is based on our judgment of potential domestic demand for cars and an assumption that volume car manufacturing (particularly in modern plants owned by Japanese manufacturers) will remain located in the UK up to 2030, given the relatively capital intensive nature of the car industry and an attractive business environment. There are no published sources on the future prospects of the UK car industry that we are aware of, but there would appear to be some significant risks to the industry in the future: while manufacturing of cars for the European market may remain in Europe, car manufacturers are increasingly investing in new plants in Central and Eastern Europe and Turkey (where labour rates are significantly lower) from where the UK can be supplied by both sea and rail. As the UK is outside the euro zone, manufacturers located in the UK have to bear much of the exchange risk, while several Central and Eastern European Union countries are due to join the euro. However, Japanese manufacturers and producers of specialist high value cars continue to find the UK an attractive location to manufacture cars.

Assumptions

The Central Forecast is based on the following assumptions:

- Trends in all import/export vehicles will be in line with trends in the imports and exports of trade cars (rather than commercial vehicles), as the more significant sector in terms of volumes, value and importance to the ports industry;
- UK demand for cars increases in line with the TEMPRO forecasts for car ownership (Table 2.37);
- The number of cars manufactured in the UK reflects the forecasts for individual plants set out in Table 2.39 above and remains stable from 2012 up to 2030, based on the assumption that the UK car industry will retain its competitiveness;
- 75% of all UK car production is exported.

Estimates of UK demand, car production and imports/exports to 2030

These assumptions lead to the following estimates for UK demand, UK car production, exports and imports up to 2030 in terms of cars:

Table 2.40: Estimated UK Demand for Cars, Car Production, Imports and Exports, 2005-2030

Million Cars

	2005	2010	2015	2020	2025	2030
A) UK demand for new cars	2.6	2.8	3.0	3.2	3.4	3.5
B) Cars manufactured in UK	1.6	1.5	1.5	1.5	1.5	1.5
C) Production for domestic market	0.4	0.4	0.4	0.4	0.4	0.4
Export production (B-C)	1.2	1.1	1.2	1.2	1.2	1.2
Imports (A-C)	2.2	2.5	2.7	2.8	3.0	3.1

Source: MDS Transmodal, based on SMMT data

Central Forecast

The analysis in Table 2.40 above implies that our Central Forecast for GB import/export vehicles up to 2030 is for growth of some 22.8% over the 25-year period, mainly driven by imports of new cars.

Table 2.41: Great Britain: Import/Export Vehicles, Central Forecast to 2030[7]

Million tonnes

Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
Imports	3.0	3.3	3.6	3.9	4.1	4.2	+42%	+1.4%
Exports	2.2	2.1	2.1	2.1	2.1	2.1	-4%	-0.2%
Domestic Inwards	-	-	-	-	-	-	+34%	+1.2%
Domestic Outwards	0.1	0.1	0.1	0.1	0.1	0.1	+34%	+1.2%
Total GB	5.3	5.6	5.8	6.1	6.3	6.5	+23%	+0.8%
% Change p.a.		*2005-2010*	*2010-15*	*2015-20*	*2020-25*	*2025-30*		
		+1.0%	*+1.0%*	*+0.9%*	*+0.7%*	*+0.6%*		

Source: MDS Transmodal

[7] For comparison with previous forecast see Table 4.96 p.158 of the May 2006 report

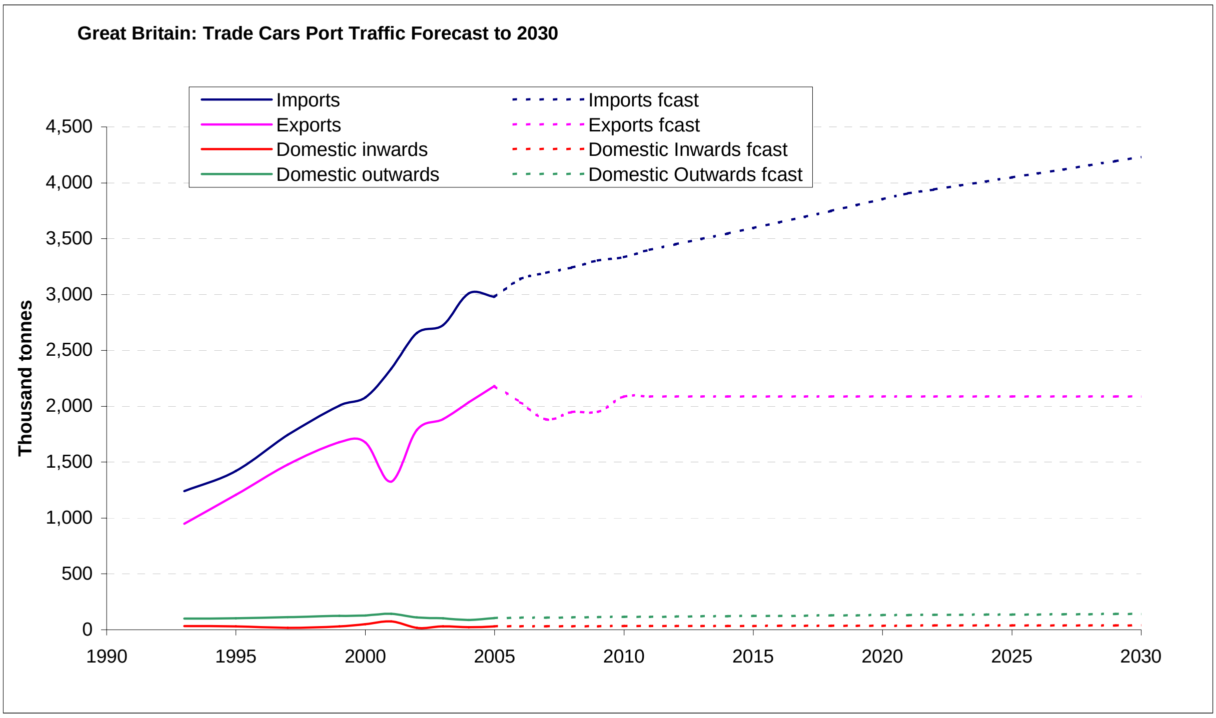


Table 2.42 provides an analysis of import/export vehicles traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 2.42: Great Britain Import/Export Vehicles Port Forecast, by Port Region, to 2030[8]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	-	-	-	-	-	-	-
East of England	13.7%	0.7	0.8	0.8	0.8	0.9	0.9
Gt. London	2.3%	0.1	0.1	0.1	0.1	0.1	0.1
North East	12.0%	0.6	0.7	0.7	0.7	0.8	0.8
North West	2.3%	0.1	0.1	0.1	0.1	0.1	0.1
Scotland	0.2%	..	..	..	..	..	..
South East	33.9%	1.8	1.9	2.0	2.1	2.1	2.1
South West	13.2%	0.7	0.7	0.8	0.8	0.8	0.8
Wales	0.1%	..	..	..	..	..	..
Yorks. & Humber	22.3%	1.2	1.2	1.3	1.4	1.4	1.5
GB Islands	0.0%	..	..	..	..	..	..
Total	100%	5.3	5.6	5.8	6.1	6.3	6.5

Source: MDS Transmodal

Implications for Ports

The Central Forecast implies that some additional capacity may be required to handle, in particular, increased volumes of imports. The impact on port capacity requirements related to increased imports may be significant because imports have a longer dwell time than exports.

Implications for other forecasts

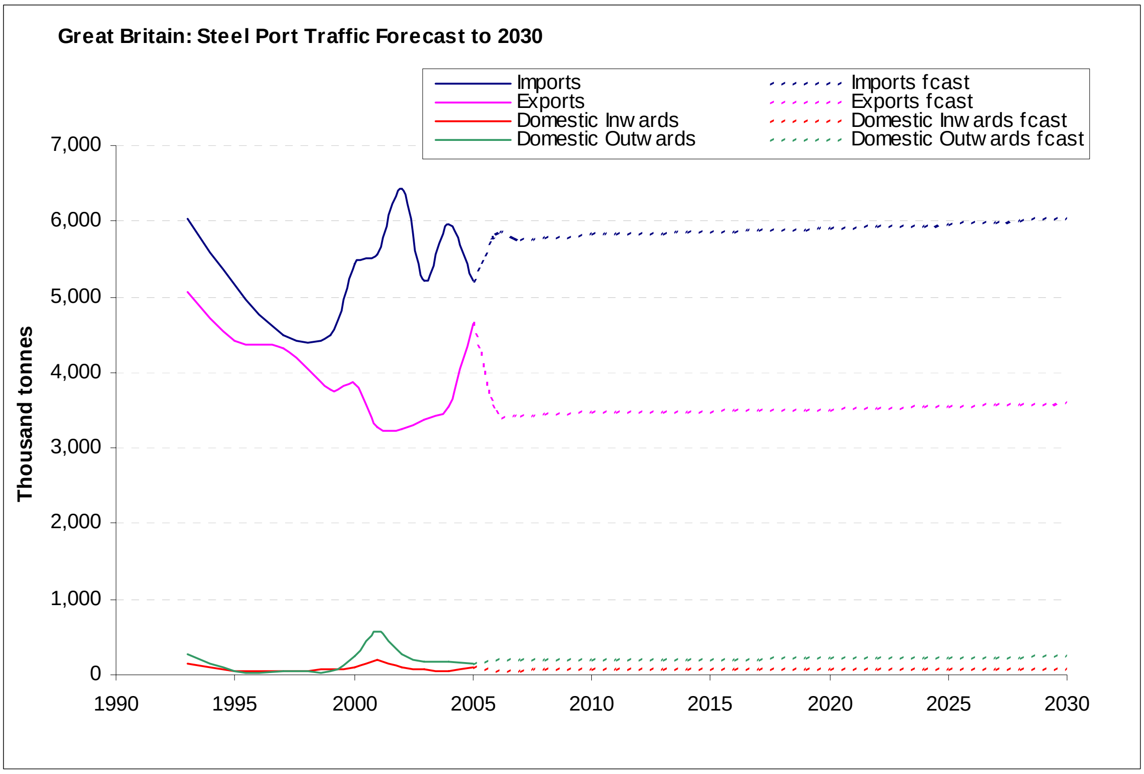
The updated forecasts for import/export vehicles and, specifically, the update of UK manufacturing output, has an impact on port traffic forecasts for steel and, therefore, for ores. These revised forecasts are shown in Tables 2.43–2.46.

Table 2.43: Great Britain Iron & Steel Products, Central Forecast to 2030[9]

Million tonnes

	Direction	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**% Change 2005-2030**	**% CAGR**
International	Imports	5.2	5.8	5.9	5.9	6.0	6.0	+16%	+0.6%
	Exports	4.6	3.5	3.5	3.5	3.5	3.6	-23%	-1.0%
Domestic	Inwards	0.1	0.1	0.1	0.1	0.1	0.1	-16%	-0.7%
	Outwards	0.1	0.2	0.2	0.2	0.2	0.2	+67%	+2.1%
Total	Total	10.1	9.6	9.6	9.7	9.8	10.0	-1%	-0.1%.
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			-1.1%	*+0.1%*	*+0.2%*	*+0.2%*	*+0.3%*		

Source: MDS Transmodal



[8] For a comparison with the previous forecast see Table 4.98 p.160 of the May 2006 report.
[9] For a comparison with the previous forecast see Table 4.97 p.142 of the May 2006 report.

Table 2.44 provides an analysis of GB iron and steel products traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 2.44: Great Britain Iron & Steel Products Port Forecast by Port Region to 2030[10]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	1.6%	0.2	0.2	0.2	0.2	0.2	0.2
East of England	0.7%	0.1	0.1	0.1	0.1	0.1	0.1
Gt. London	2.3%	0.2	0.2	0.2	0.2	0.2	0.2
North East	27.5%	2.7	2.6	2.6	2.7	2.7	2.7
North West	2.5%	0.2	0.2	0.2	0.2	0.2	0.2
Scotland	6.3%	0.6	0.6	0.6	0.6	0.6	0.6
South East	8.5%	0.8	0.8	0.8	0.8	0.8	0.8
South West	2.5%	0.2	0.2	0.2	0.2	0.2	0.3
Wales	22.4%	2.2	2.1	2.1	2.2	2.2	2.2
Yorkshire & Humber	25.9%	2.5	2.5	2.5	2.5	2.5	2.6
GB Islands	-	-	-	-	-	-	-
Total	100%	10.1	9.6	9.6	9.7	9.8	10.0

Source: MDS Transmodal

Table 2.45 provides the revised forecasts for GB ores traffic in tonnes to 2030.

Table 2.45: Great Britain Ores, Central Forecast to 2030[11]

Million tonnes

Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
Imports	17.5	16.9	16.9	17.0	17.2	17.4	-1%.	..
Exports	0.5	0.6	0.6	0.6	0.6	0.6	+38%	+1.3%
Domestic Inwards	-	-	-	-	-	-	-	-
Domestic Outwards	-	-	-	-	-	-	-	-
Total	18.0	17.4	17.5	17.6	17.8	18.0	-	-
% Change		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
		-0.6%	*+0.1%*	*+0.1%*	*+0.2%*	*+0.3%*		

Source: MDS Transmodal

[10] For a comparison with the previous forecast see Table 4.79 of the May 2006 report.
[11] For a comparison with the previous forecast see Table 4.28 p.92 of the May 2006 report.

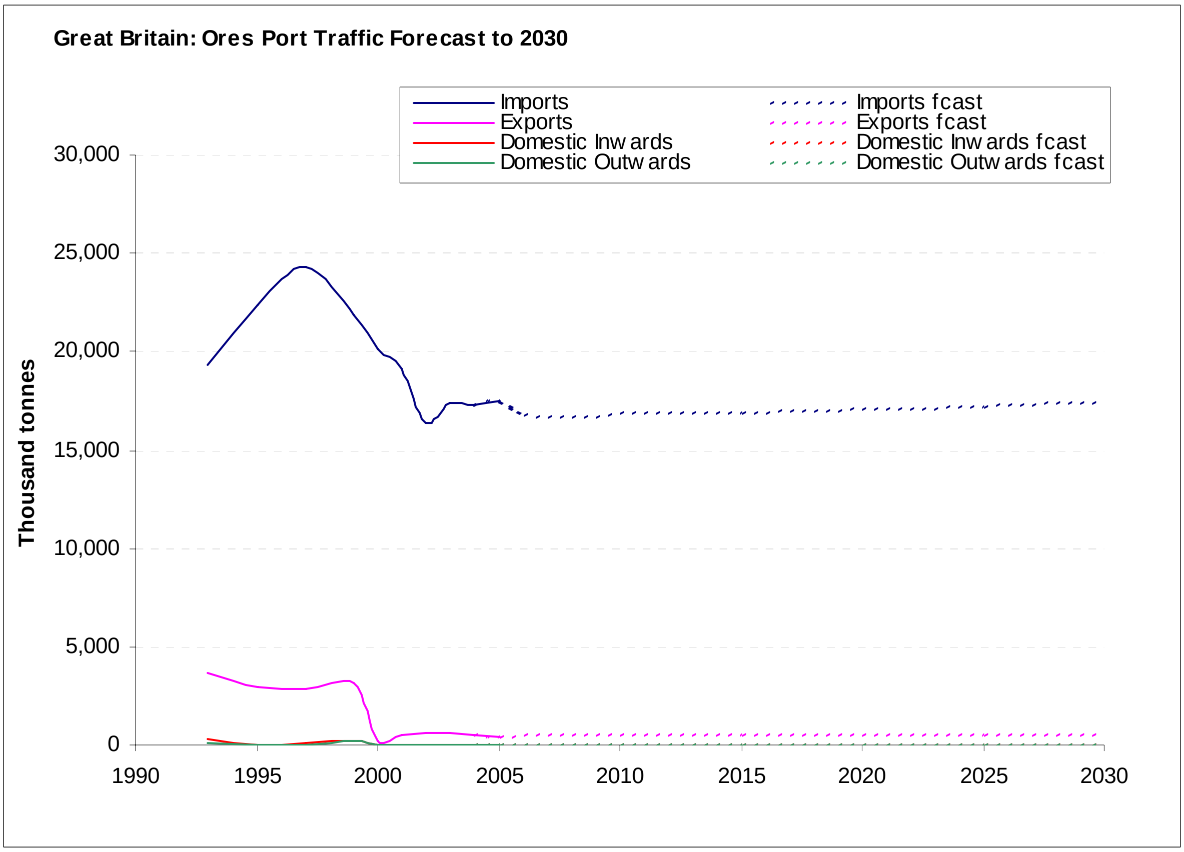


Table 2.46 provides an analysis of GB ores traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 2.46: Great Britain Ores Port Forecast by Port Region to 2030[12]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	-	-	-	-	-	-	-
East of England	-	-	-	-	-	-	-
Gt. London	-	-	-	-	-	-	-
North East	33.3%	6.0	5.8	5.8	5.9	5.9	6.0
North West	-	-	-	-	-	-	-
Scotland	1.6%	0.3	0.3	0.3	0.3	0.3	0.3
South East	-	-	-	-	-	-	-
South West	-	-	-	-	-	-	-
Wales	30.3%	5.4	5.3	5.3	5.3	5.4	5.5
Yorkshire & the Humber	34.8%	6.2	6.0	6.1	6.1	6.2	6.3
Other GB Islands	-	-	-	-	-	-	-
Total	100%	17.9	17.4	17.5	17.6	17.8	18.0

Source: MDS Transmodal

[12] For a comparison with the previous forecast see Table 4.29 p.94 of the May 2006 report.

3. FORECASTS OF OTHER NON-UNITISED PORT TRAFFIC TO 2030

3.1 Introduction

This chapter sets out the other non-unitised forecasts for broad commodity groups that were excluded from the scope of the work and so have not been updated except that the base year has been changed to 2005 to use the most recent port traffic data published by the DfT. This affects the compound average growth rates between 2005 and 2010, which were calculated from 2004 in the original May 2006 report.

The split of unitised traffic between the port regions has also been updated to reflect DfT port statistics in 2005.

3.2 Forecast of non-unitised traffics with 2005 base year

The following tables have been updated with DfT port statistics for 2005, which were published in Autumn 2006. These amendments affect the compound average growth rates up to 2010 and up to 2030, but the forecast tonnages for 2010, 2015, 2020, 2025 and 2030 remain unchanged from the May 2006 report. The assumption for the analysis of market shares by region is that the share in 2005 remains constant up to 2030.

Table 3.1 provides the forecasts for GB "other liquid bulk" traffic in tonnes to 2030 with a 2005 base year.

Table 3.1 Great Britain Other Liquid Bulk Port Forecast to 2030[13]

Million tonnes

Direction	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**% Change 2005-2030**	**% CAGR**
Imports	6.0	6.3	6.3	6.3	6.3	6.3	+5%	+0.2%
Exports	4.3	4.0	4.0	4.0	4.0	4.0	-7%	-0.3%
Domestic Inwards	1.1	1.2	1.2	1.2	1.2	1.2	+11%	+0.4%
Domestic Outwards	1.2	1.8	1.8	1.8	1.8	1.8	+45%	+1.5%
Total	**12.6**	**13.3**	**13.3**	**13.3**	**13.3**	**13.3**	**+6%**	**+0.2%**
% Change CAGR		*2005-10*	*2010-15*	*2015-20*	*2020-25*	*2025-30*		
		+0.2%	-	-	-	-		

Source: MDS Transmodal

[13] For a comparison with the previous forecast see Table 4.23 p.88 of the May 2006 report.

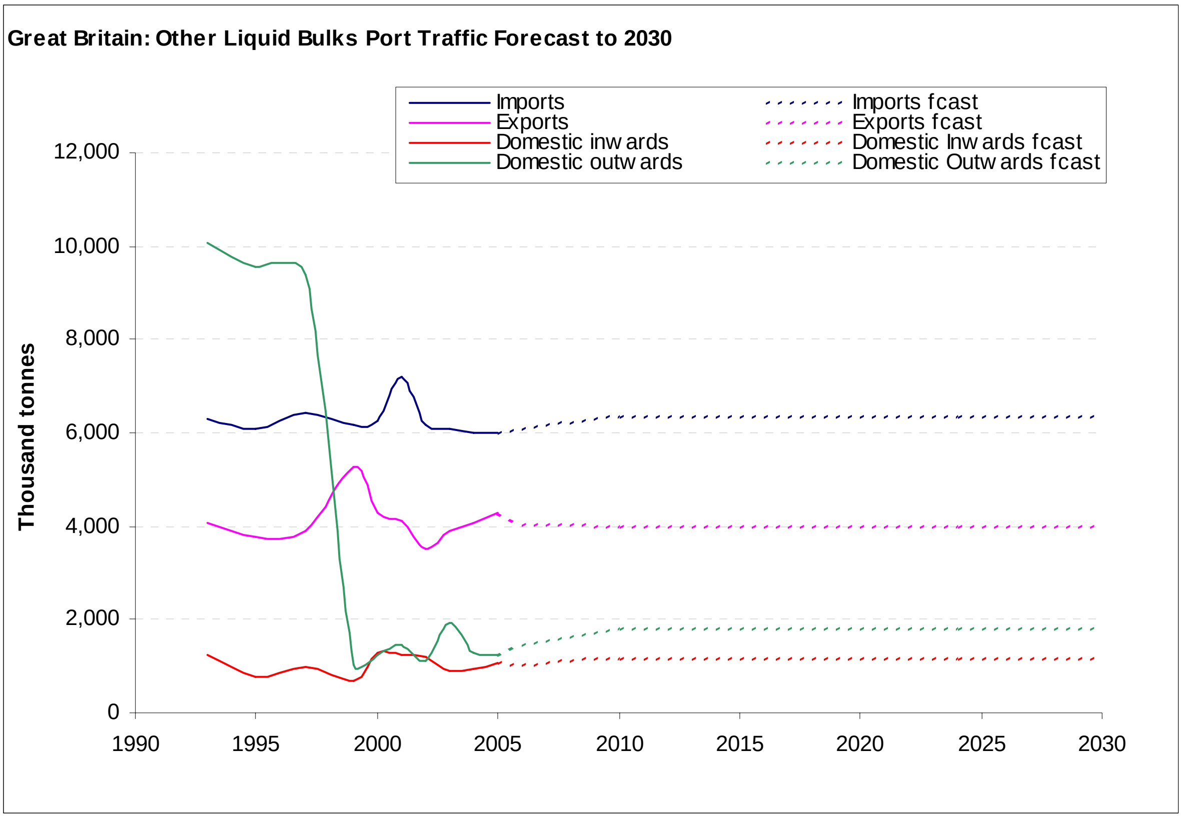


Table 3.2 provides an analysis of "other liquid bulk" traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 3.2: Great Britain Other Liquid Bulk Port Forecast by Port Region to 2030[14]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	0.1%	-	-	-	-	-	-
East of England	5.8%	0.7	0.8	0.8	0.8	0.8	0.8
Gt. London	3.2%	0.4	0.4	0.4	0.4	0.4	0.4
North East	36.6%	4.6	4.9	4.9	4.9	4.9	4.9
North West	16.7%	2.1	2.2	2.2	2.2	2.2	2.2
Scotland	7.1%	0.9	1.0	1.0	1.0	1.0	1.0
South East	1.3%	0.2	0.2	0.2	0.2	0.2	0.2
South West	1.7%	0.2	0.2	0.2	0.2	0.2	0.2
Wales	1.0%	0.1	0.1	0.1	0.1	0.1	0.1
Yorkshire & the Humber	26.8%	3.4	3.6	3.6	3.6	3.6	3.6
Other GB Islands	-	-	-	-	-	-	-
Total	**100%**	**12.6**	**13.3**	**13.3**	**13.3**	**13.3**	**13.3**

Source: MDS Transmodal

[14] For a comparison with the previous forecast see Table 4.24 p.90 of the May 2006 report.

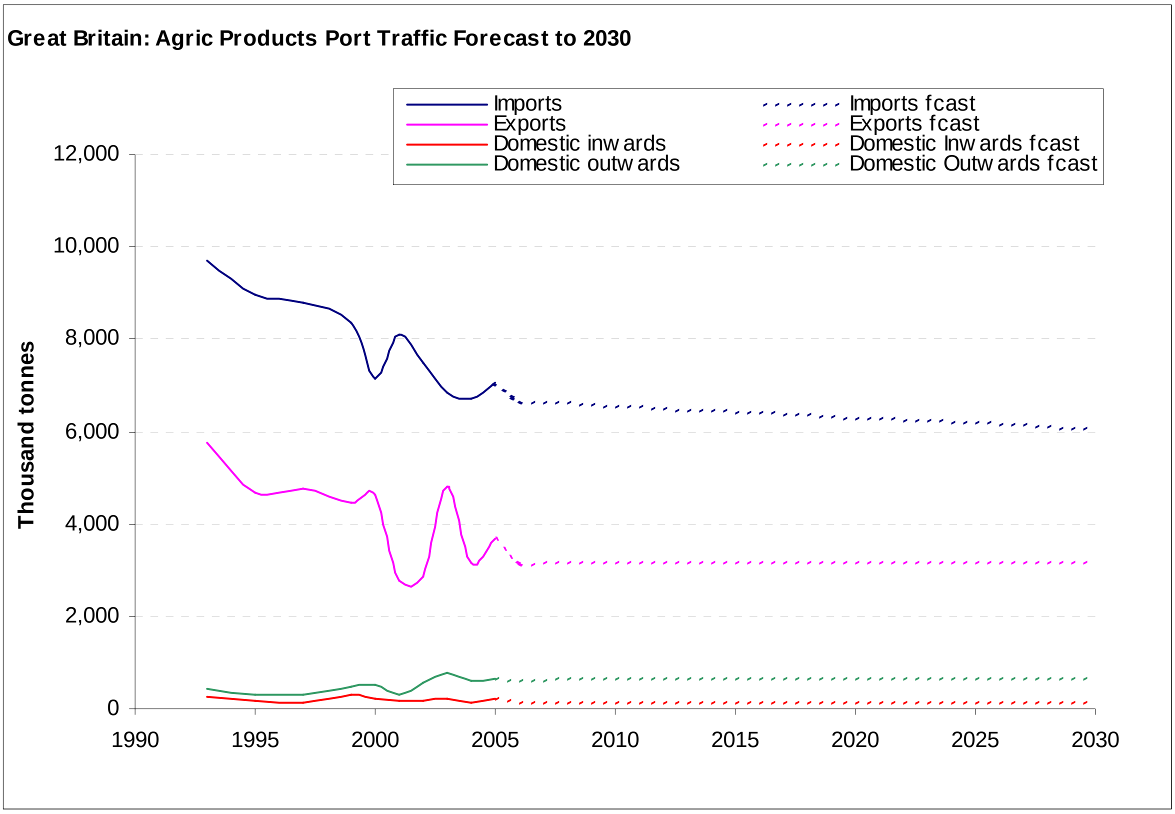
Table 3.3 provides the forecasts for GB agricultural products traffic in tonnes to 2030 with a 2005 base year.

Table 3.3: Great Britain Agricultural Products, Central Forecast to 2030[15]

Million tonnes

	Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
International	Imports	7.1	6.6	6.4	6.3	6.2	6.1	-14%	-0.6%
	Exports	3.7	3.2	3.2	3.2	3.2	3.2	-14%	-0.6%
Domestic	Inwards	0.2	0.1	0.1	0.1	0.1	0.1	-48%	-2.5%
	Outwards	0.7	0.6	0.6	0.6	0.6	0.6	-0.6%	..
Total	Total	11.6	10.5	10.4	10.2	10.1	10.0	-14%	-0.6%
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			-2.1%	*-0.3%*	*-0.3%*	-0.2%	*-0.2%*		

Source: MDS Transmodal



15 For a comparison with the previous forecast see Table 4.51 p.112 of the May 2006 report.

Table 3.4 provides an analysis of GB agricultural products traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 3.4: Great Britain Agricultural Products Port Forecast by Port Region to 2030[16]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	2.1%	0.2	0.2	0.2	0.2	0.2	0.2
East of England	16.7%	1.9	1.8	1.7	1.7	1.7	1.7
Gt. London	14.0%	1.6	1.5	1.5	1.4	1.4	1.4
North East	2.2%	0.3	0.2	0.2	0.2	0.2	0.2
North West	23.3%	2.7	2.4	2.4	2.4	2.4	2.3
Scotland	7.8%	0.9	0.8	0.8	0.8	0.8	0.8
South East	9.2%	1.1	1.0	1.0	0.9	1.0	0.9
South West	6.3%	0.7	0.7	0.7	0.6	0.6	0.6
Wales	3.2%	0.4	0.3	0.3	0.3	0.3	0.3
Yorks & Humber	15.1%	1.8	1.6	1.6	1.5	1.5	1.5
GB Islands	-	-	-	-	-	-	-
Total	100%	11.6	10.5	10.4	10.2	10.1	10.0

Source: MDS Transmodal

Table 3.5 provides the forecasts for GB agricultural products traffic in tonnes to 2030 with a 2005 base year.

Table 3.5: Great Britain Other Dry Bulks, Central Forecast to 2030[17]

Million tonnes

	Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
International	Imports	11.1	10.1	10.2	10.2	10.2	10.2	-9%	-0.4%
	Exports	10.2	10.3	10.3	10.3	10.3	10.3	+1%	..
Domestic	Inwards	15.6	17.1	17.4	17.4	17.4	17.4	+12%	+0.4%
	Outwards	3.5	4.2	4.2	4.2	4.2	4.2	+23%	+0.8%
Total	Total	40.3	41.6	42.1	42.1	42.1	42.1	+4%	+0.2%
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			+0.6%	*+0.2%*	-	-	-		

Source: MDS Transmodal

[16] For a comparison with the previous forecast see Table 4.53 p.115 of the May 2006 report.
[17] For a comparison with the previous forecast see Table 4.60 p.122 of the May 2006 report.

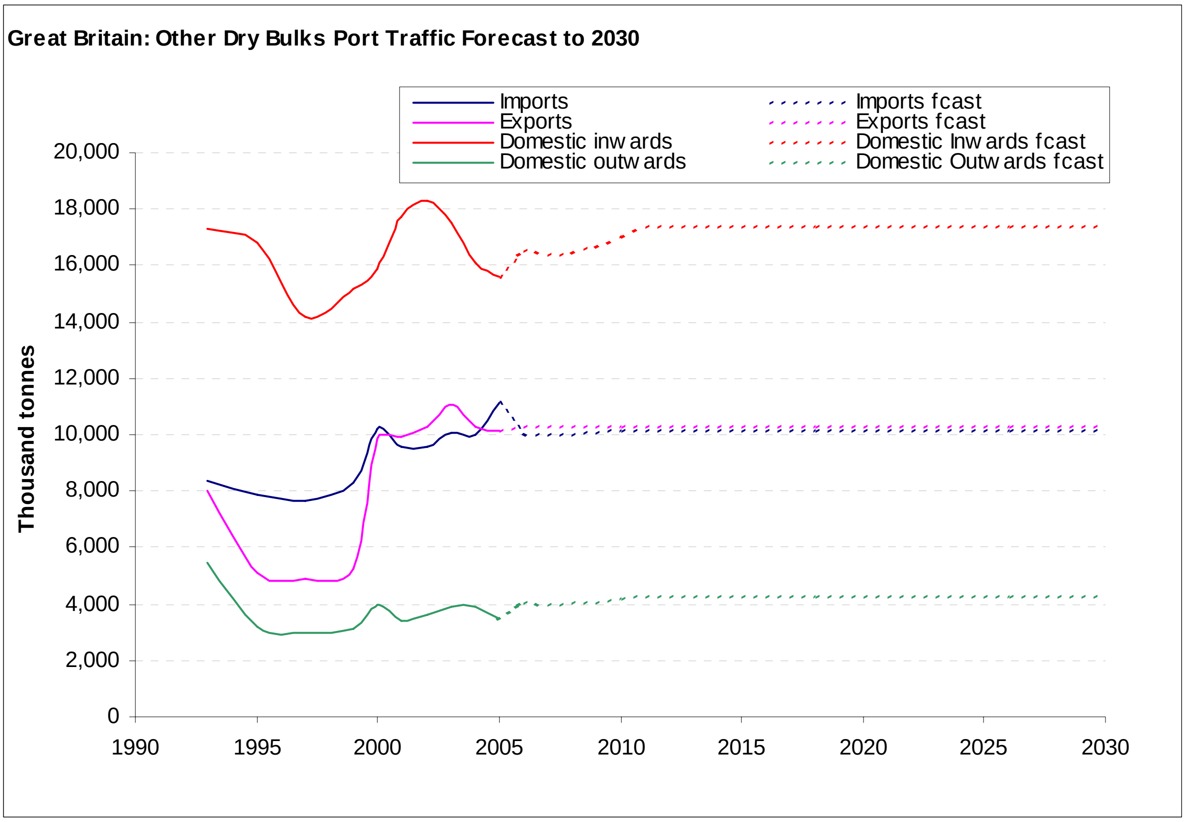


Table 3.6 provides an analysis of GB other dry bulk traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 3.6: Great Britain Other Dry Bulks Port Forecast by Port Region to 2030[18]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	0.1%	-	-	-	-	-	-
East of England	9.5%	3.8	4.0	4.0	4.0	4.0	4.0
Gt. London	13.1%	5.3	5.4	5.5	5.5	5.5	5.5
North East	6.5%	2.6	2.7	2.7	2.7	2.7	2.7
North West	10.3%	4.1	4.3	4.3	4.3	4.3	4.3
Scotland	17.7%	7.1	7.4	7.4	7.4	7.4	7.4
South East	19.4%	7.8	8.1	8.2	8.2	8.2	8.2
South West	9.6%	3.9	4.0	4.0	4.0	4.0	4.0
Wales	4.5%	1.8	1.9	1.9	1.9	1.9	1.9
Yorkshire & the Humber	9.4%	3.8	3.9	3.9	3.9	3.9	3.9
GB Islands	0.0%	-	-	-	-	-	-
Total	100%	40.3	41.6	42.1	42.1	42.1	42.1

Source: MDS Transmodal

[18] For a comparison with the previous forecast see Table 4.62 p.124 of the May 2006 report.

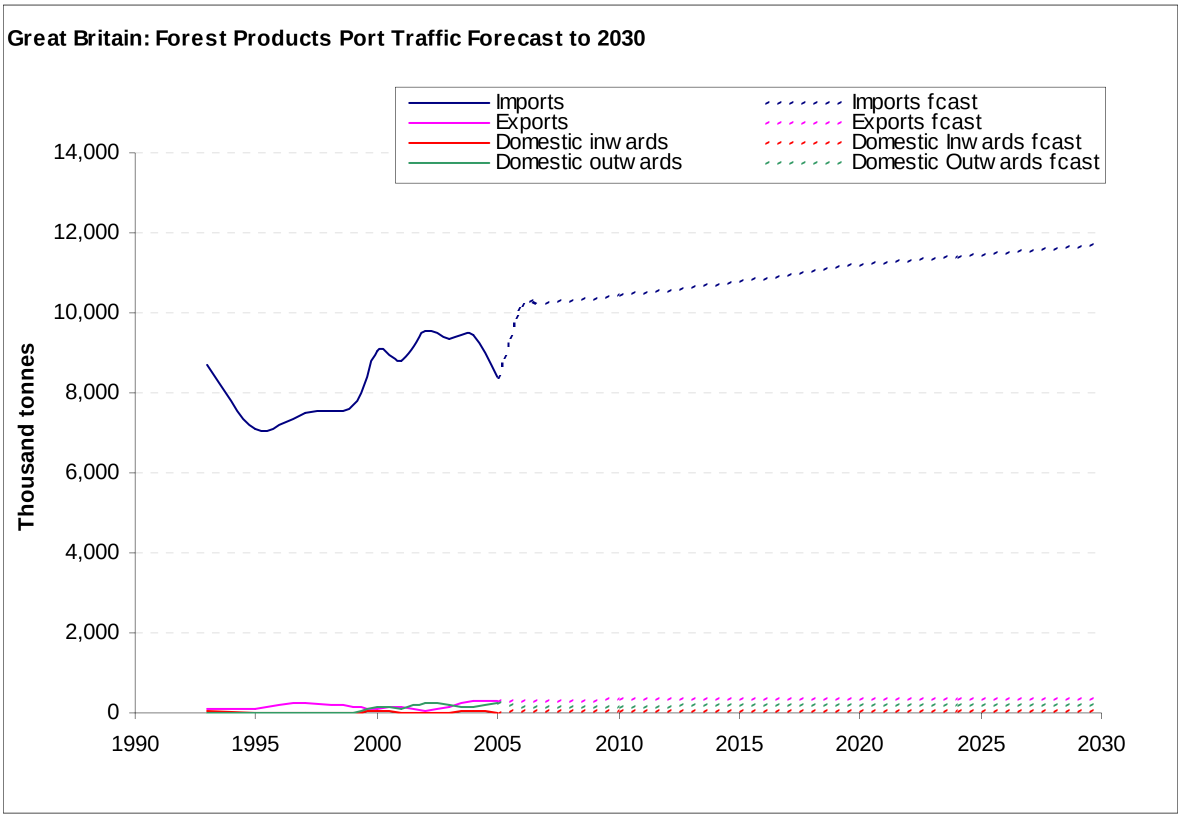
Table 3.7 provides the forecasts for GB forestry products traffic in tonnes to 2030 with a 2005 base year.

Table 3.7: Great Britain Forestry Products, Central Forecast to 2030[19]

Million tonnes

	Direction	2005	2010	2015	2020	2025	2030	% Change 2005-30	% CAGR
International	Imports	8.4	10.4	10.8	11.2	11.5	11.7	+39%	+1.3%
	Exports	0.3	0.3	0.3	0.4	0.4	0.4	+14%	+0.5%
Domestic	Inwards	-	-	-	-	-	-	-	-
	Outwards	0.3	0.2	0.2	0.2	0.2	0.2	-27%	-1.2%
Total	Total	9.0	11.0	11.3	11.8	12.0	12.3		
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			+4.0%	*+0.7%*	*+0.8%*	*+0.4%*	*+0.4%*		

Source: MDS Transmodal



[19] For a comparison with the previous forecast see Table 4.70 p.132 of the May 2006 report.

Table 3.8 provides an analysis of GB forestry products traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 3.8: Great Britain Forestry Products Port Forecast by Port Region to 2030[20]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	2.3%	0.2	0.3	0.3	0.3	0.3	0.3
East of England	20.6%	1.9	2.3	2.3	2.4	2.5	2.5
Gt London	3.4%	0.3	0.4	0.4	0.4	0.4	0.4
North East	1.5%	0.1	0.2	0.2	0.2	0.2	0.2
North West	4.4%	0.4	0.5	0.5	0.5	0.5	0.5
Scotland	10.4%	0.9	1.1	1.2	1.2	1.3	1.3
South East	25.3%	2.3	2.8	2.9	3.0	3.0	3.1
South West	2.3%	0.2	0.2	0.3	0.3	0.3	0.3
Wales	3.9%	0.4	0.4	0.4	0.5	0.5	0.5
Yorks & Humber	26.0%	2.3	2.8	2.9	3.1	3.1	3.2
GB Islands	0.0%	-	-	-	-	-	-
Total	100%	9.0	11.0	11.3	11.8	12.0	12.3

Source: MDS Transmodal

Table 3.9 provides the forecasts for GB general cargo traffic in tonnes to 2030 with a 2005 base year.

Table 3.9: Great Britain General Cargo, Central Forecast to 2030[21]

Million tonnes

	Direction	2005	2010	2015	2020	2025	2030	% Change 2005-2030	% CAGR
International	Imports	3.4	4.5	4.5	4.5	4.5	4.5	+64%	+2.0%
	Exports	1.4	1.4	1.4	1.4	1.4	1.4	+3%	+0.1%
Domestic	Inwards	0.8	0.2	0.2	0.2	0.2	0.2	-77%	-5.7%
	Outwards	1.6	0.6	0.6	0.6	0.6	0.6	-60%	-3.6%
Total		7.1	7.7	7.7	7.7	7.7	7.7	+8%	+0.3%
	% Change p.a.		*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2025-2030*		
			+1.6%	-	-	-	-		

Source: MDS Transmodal

[20] For a comparison with the previous forecast see Table 4.72 p.134 of the May 2006 report.
[21] For a comparison with the previous forecast see Table 4.85 p.146 of the May 2006 report.

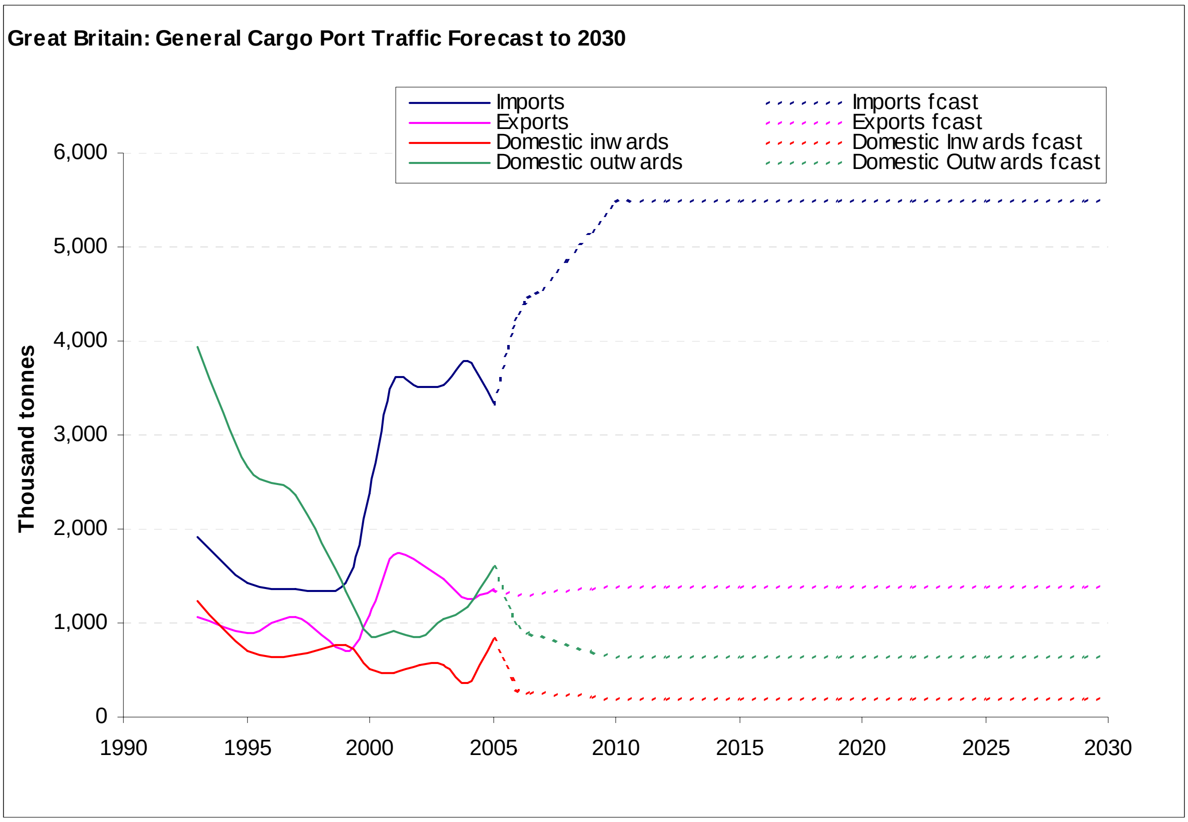


Table 3.10 provides an analysis of GB general cargo traffic for Great Britain by port region up to 2030, assuming that market shares by port region remain the same as in 2005.

Table 3.10: Great Britain General Cargo Port Forecast by Port Region to 2030[22]

Million tonnes

Port of Region	Market Share 2005	2005	2010	2015	2020	2025	2030
East Midlands	0.1%	-	-	-	-	-	-
East of England	6.6%	0.5	0.5	0.5	0.5	0.5	0.5
Gt. London	0.8%	0.1	0.1	0.1	0.1	0.1	0.1
North East	2.9%	0.2	0.2	0.2	0.2	0.2	0.2
North West	5.9%	0.4	0.5	0.5	0.5	0.5	0.5
Scotland	35.7%	4.5	2.8	2.8	2.8	2.8	2.8
South East	29.6%	2.1	2.3	2.3	2.3	2.3	2.3
South West	1.8%	0.1	0.1	0.1	0.1	0.1	0.1
Wales	1.9%	0.1	0.1	0.1	0.1	0.1	0.1
Yorkshire & the Humber	13.7%	1.0	1.1	1.1	1.1	1.1	1.1
GB Islands	1.1%	0.1	0.1	0.1	0.1	0.1	0.1
Total	100%	7.1	7.7	7.7	7.7	7.7	7.7

Source: MDS Transmodal

[22] For a comparison with the previous forecast see Table 4.87 p.148 of the May 2006 report.

4. UNITISED PORT TRAFFIC FORECASTS & CONTAINER TRANSHIPMENT

4.1 The competitive environment

In tonnage terms, the majority of GB port traffic is in the 'bulk' sector, much of which uses dedicated facilities which are closely associated with end users. Such traffics may wax and wane as a consequence of the derived activity in refineries, feed mills, quarries and so forth but are generally not particularly footloose between ports in the short and medium term.

The major exception to this rule in the bulk field is power station coal bound for inland locations which may switch ports in the medium term as contracts are redrawn. We have discussed this in chapter 2 and (given its importance for the rail industry) consider its assignment to inland networks in chapter 5.

There is active competition in the ro-ro field where lines compete for business won by hauliers and may, from time to time, switch ports. Such switches may be driven by a need to accommodate larger ships or to park more trailers at the terminal. However, more recent attention has been paid to the deepsea container field. This is because of the high costs of developing new infrastructure, strong market growth, increasing ship size and the challenges port operators have faced in gaining planning consents given the evitable complexity of the impacts of the proposals put forward.

Our forecasts for lolo and roro traffic are for GB external port traffic. In addition to this external traffic, mainland GB ports also handle container and trailer traffic with the Orkneys, Shetlands, the Isle of Man, the Channel Islands and the Western Isles. On the basis of data in UK Maritime Statistics, we estimate domestic volumes of around 167,000 units in 2005, of which some 67,000 were with the Orkneys and Shetlands. Altogether, that amounts to around 1.6% of all GB mainland port unit load traffic. There is negligible intra mainland unit load traffic except feeder traffics with a foreign origin.

In our report for the DfT published in 2006, we tested a range of different port expansion scenarios in order to estimate the impact of such development on both the UK economy to measure the financial benefit to UK importers and exporters ('end users') and on road and rail networks within Britain. In this report, we seek to update those estimates and to interpret the results in terms of the direct financial contributions they make to the UK. In order to provide a free-standing explanation of backgrounds and assumptions, parts of that earlier report are incorporated within the text.

4.2 Forecasts of Great Britain containerised traffic with 2005 base year

Table 4.1 provides the forecasts for GB forecast containerised tonnes to 2030 by world region with a 2005 base year. Note that tables 4.1 – 4.6 describe external GB port traffic (excluding coastal traffic within GB but including traffic with all of Ireland).

We have attempted to retain consistency between the different ways of defining total TEU passing through GB ports. We estimate that in 2005, of the 7,500,000 lo-lo TEU recorded in DfT Maritime Statistics, that 7,213,000 were international and 287,000 were domestic. We estimate that a total of 450,000 TEU were transhipped, of which 210,000 TEU port movements (105,000 TEU moved) were within GB. It follows that 7,003,000 actual TEU (7,213,000 – 210,000) moved through GB ports, some of which were recorded at both ends of the route at 2 different ports (e.g. Southampton AND Greenock or Felixstowe AND Grangemouth).

Table 4.1: Forecast Great Britain External Containerised Tonnes, 2005-2030, by World Region[23]

Thousand tonnes

	2005	2010	2015	2020	2025	2030	Growth
Exports							
Ireland	1,225	1,874	2,160	2,492	2,721	2,850	+3.4%
NW Europe	1,696	2,299	2,781	3,333	3,822	4,056	+3.5%
Nordic	139	385	435	547	598	665	+6.5%
Mediterranean	1,632	2,075	2,378	2,673	3,007	3,410	+3.0%
E Europe	29	44	56	68	81	94	+4.8%
Africa excl. Med	764	924	1,064	1,211	1,395	1,579	+2.9%
N America	2,003	2,475	2,868	3,270	3,667	4,070	+2.9%
C&S America	619	824	999	1,182	1,398	1,605	+3.9%
W Asia	1,740	2,222	2,645	3,373	3,831	4,844	+4.2%
E Asia	4,678	6,231	7,860	9,483	11,455	13,289	+4.3%
Oceania	342	400	450	500	556	615	+2.4%
Total	14,866	19,753	23,695	28,133	32,529	37,075	+3.7%
Imports							
Ireland	513	725	942	1,028	1,109	1,290	+3.8%
NW Europe	3,467	4,641	5,445	6,043	7,100	7,765	+3.3%
Nordic	1,545	2,157	2,225	2,616	2,359	2,626	+2.1%
Mediterranean	2,028	2,529	2,867	3,323	3,994	4,930	+3.6%
E Europe	98	138	166	224	254	279	+4.3%
Africa excl. Med	1,391	1,649	1,872	2,107	2,725	2,979	+3.1%
N America	3,210	3,634	3,986	4,486	5,140	6,198	+2.7%
C&S America	2,278	2,667	2,997	3,361	3,769	4,152	+2.4%
W Asia	1,857	2,375	2,828	3,282	3,778	4,242	+3.4%
E Asia	7,917	10,286	12,883	14,892	17,505	21,344	+4.0%
Oceania	712	834	939	1,045	1,191	1,306	+2.5%
Total	25,016	31,635	37,152	42,408	48,924	57,114	+3.4%
Total Trade	39,882	51,388	60,847	70,540	81,453	94,189	+3.5%

Source: MDS Transmodal

Note: unitised tonnages based on trade statistics and not port tonnages

Table 4.2 provides the forecasts for GB forecast containerised traffic in TEU to 2030 by world region with a 2005 base year.

[23] For a comparison with the previous forecast see Table 3.11p.44 of the May 2006 report.

Table 4.2: Forecast Great Britain Containerised External Traffic, TEU, 2005-2030, by World Region[24]

Thousand TEU

	2005	2010	2015	2020	2025	2030	Growth
Ireland	125	190	253	281	308	362	4.4%
NW Europe	929	1,328	1,597	1,808	2,155	2,380	3.8%
Nordic	362	543	575	692	635	713	2.7%
Mediterranean	528	734	855	1,013	1,241	1,548	4.4%
E Europe	76	115	142	190	219	244	4.8%
Africa Excl Med	352	469	546	627	810	896	3.8%
N America	828	1,035	1,165	1,338	1,555	1,894	3.4%
C&S America	525	681	780	886	1,006	1,115	3.1%
W Asia	549	765	931	1,101	1,283	1,454	4.0%
E Asia	2783	3,944	5,063	5,960	7,108	8,774	4.7%
Oceania	155	206	238	271	314	348	3.3%
Total TEU	7,213	10,009	12,146	14,167	16,633	19,728	4.1%
Total exc. t'ment	7,003	10,009	12,146	14,167	16,633	19,728	4.2%
*Deep Sea only**	*5,722*	*7,833*	*9,579*	*11,196*	*13,316*	*16,029*	*4.2%*
Container Units	4,401	5,881	6,941	8,095	9,505	11,273	3.8%

Source: MDS Transmodal
* including Mediterranean

Table 4.3 provides the forecasts for GB forecast containerised traffic in TEU to 2030 by GB port region with a 2005 base year.

Table 4.3: Forecast Great Britain Containerised External Traffic, TEU, 2005-2030, by GB port region[24][25]

Thousand TEU

	2005	2010	2015	2020	2025	2030	Growth
North East	150	225	312	365	428	366	3.6%
Yorks. & Humber	506	720	851	984	1,098	1,225	3.6%
East Midlands	22	32	38	44	49	54	3.6%
East England	3,442	4,516	5,538	6,461	7,724	9,376	4.1%
South East	2,126	2,630	3,392	3,959	4,676	4,920	3.4%
London	-	-	-	-	-	-	-
South West	112	189	197	228	255	355	4.7%
North West	604	1,269	1,315	1,540	1,719	2,586	6.0%
Wales	57	81	96	111	124	139	3.6%
Scotland	194	346	408	475	560	707	5.3%
Total	7,213	10,009	12,146	14,167	16,633	19,728	4.1%
Total exc. t'ment	7,003	10,009	12,146	14,167	16,633	19,728	4.2%
Container Units	4,401	5,881	6,941	8,095	9,505	11,273	3.8%

Source: MDS Transmodal

4.3 Forecasts of Great Britain Roll-on Roll-off traffic with 2005 base year

Table 4.4 provides the forecasts for GB forecast Roll-on/Roll-off traffic in tonnes to 2030 by world region with a 2005 base year.

[24] For a comparison with the previous forecast see Table 3.13 p.46 of the May 2006 report. This table describes international TEU (i.e. excludes domestic flows such as to/from NI or domestic feedering. In the case of Scotland to include these volumes raises throughput to 322,000 TEU in 2005. The 2005 volumes DO also include third country transhipments (approx. 240,000 TEU),, the omission of which reduces the 2005 figure to approximately 7.003m TEU but they are excluded in forecasts for 2010 – 2030.

[25] For an approximate comparison with the previous forecast see Table 3.12 p.45 of the May 2006 report

Table 4.4: Forecast Great Britain External Roll-on/Roll-off Tonnes, 2005-2030, by World Region[26]

Thousand tonnes

	2005	2010	2015	2020	2025	2030	%CAGR
Exports							
Ireland	10,337	12,797	14,542	17,281	19,396	21,489	+3.0%
NW Europe	14,538	16,992	20,097	22,985	26,672	28,897	+2.8%
Nordic	1,350	1,393	1,611	2,076	2,283	2,496	+2.5%
Mediterranean	4,571	5,125	5,843	6,856	7,900	9,070	+2.8%
E Europe	636	841	1,065	1,299	1,534	1,771	+4.2%
Total	31,433	37,148	43,157	50,496	57,785	63,722	+2.9%
Imports							
Ireland	6,091	7,420	9,107	10,213	10,974	13,013	+3.1%
NW Europe	33,366	38,269	43,735	49,746	55,992	61,178	+2.5%
Nordic	3,462	3,828	4,395	5,201	7,228	8,609	+3.7%
Mediterranean	9,325	10,990	12,582	14,948	17,141	20,436	+3.2%
E Europe	1,355	1,732	2,137	2,805	3,457	3,812	+4.2%
Total	53,599	62,238	71,956	82,914	94,792	107,047	+2.8%
Total Trade	85,032	99,386	115,114	133,410	152,576	170,769	+2.8%

Source: MDS Transmodal

Table 4.5 provides the forecasts for GB forecast Roll-on/Roll-off traffic in units to 2030 by world region with a 2005 base year.

Table 4.5: Forecast Great Britain External Ro-Ro Units, 2005-2030, by World Region[27]

Thousand units

	2005	2010	2015	2020	2025	2030	%CAGR
Ireland	1,478	1,818	2,135	2,475	2,728	3,110	+3.0%
NW Europe	4,565	5,290	6,137	6,996	7,982	8,689	+2.6%
Nordic	461	496	572	699	890	1,030	+3.3%
Mediterranean	1,335	1,540	1,759	2,079	2,388	2,799	+3.0%
E Europe	190	247	308	391	472	532	+4.2%
Total	8,029	9,390	10,911	12,640	14,460	16,159	+2.8%

Source: MDS Transmodal

Table 4.6 provides the forecasts for GB forecast Roll-on/Roll-off traffic in units to 2030 by port region with a 2005 base year.

[26] For a comparison with the previous forecast see Table 3.14 p.46 of the May 2006 report.
[27] For a comparison with the previous forecast see Table 3.15 p.47 of the May 2006 report.

Table 4.6: Forecast Great Britain External Ro-Ro Units, 2005-2030, by GB port region[28]

Thousand units

	2005	2010	2015	2020	2025	2030	Growth
North East	202	274	325	388	434	431	+3.1%
Yorks. & Humber	946	1,172	1,356	1,578	1,845	2,074	+3.2%
East of England	740	883	1,055	1,229	1,426	1,587	+3.1%
South East	3,831	4,188	4,826	5,560	6,400	7,073	+2.5%
London	558	721	831	959	1,123	1,243	+3.3%
South West	86	101	114	129	149	174	+2.9%
North West	835	1,088	1,278	1,492	1,667	1,860	+3.3%
Wales	422	523	626	694	758	861	+2.9%
Scotland	411	439	499	610	659	797	+2.7%
Total	8,029	9,390	10,911	12,640	14,460	16,159	+2.8%

Source: MDS Transmodal

4.4 Great Britain container market growth

Lo-lo container traffic volumes (measured in units) through GB ports grew by approximately 71% between 1992 and 2005, a compound growth rate of 4.2% per annum. In absolute terms, traffic grew by an average of 146,000 containers per annum. If we deduct our estimate of the volume of third country containers transhipped in GB ports, we conclude that the mean growth rate for domestic containers handled through GB ports at 5.1% (90% growth over the period). If measured as TEU, that growth would be measured as 6.1% per annum, an absolute average growth rate of 292,000 TEU per annum. Results over this period are summarised in table 4.7.

Our central forecast is that GB deep sea and Mediterranean container traffic (measured in TEU) will grow by 42% between 2005 and 2010 and by a further 105% between 2010 and 2030. It is this central forecast which has been used in the modelling of shipping line behaviour. Growth rates will vary by trade route. The highest growth rate can be expected to be from the Asian trades, which we forecast will grow by 210% between 2005 and 2030.

In addition, GB ports currently handle around 1.5m TEU of container traffic with European and Mediterranean countries (short sea) and some 0.5m TEU of containers between ‘third countries’. These latter containers are generally loaded or discharged from deepsea vessels also calling at major hub ports in Germany, the Netherlands, Belgium and France for transfer to or from smaller vessels bound for countries which do not attract generally direct deep sea calls such as Ireland or in Scandinavia and the Baltic.

[28] For a comparison with the previous forecast see Table 3.16 p.47 of the May 2006 report.

Table 4.7: Great Britain port container traffic 1992-2005

	1992	1995	1997	1999	2000	2001	2002	2003	2004	2005	% CAGR 1992-2005
Major South East Ports ('000s units)											
Felixstowe	1,057	1,345	1,600	1,826	1,857	1,855	1,715	1,585	1,711	1,728	3.9%
Southampton	322	471	591	603	684	734	791	846	880	838	7.6%
Thamesport	129	210	257	320	324	308	325	314	377	413	9.4%
London **	329	296	344	464	333	400	374	397	506	451	2.5%
Sub-total	**1,837**	**2,322**	**2,792**	**3,213**	**3,198**	**3,297**	**3,205**	**3,142**	**3,474**	**3,430**	**4.9%**
Other Ports: ('000s units)											
Liverpool	229	262	303	325	334	331	309	356	378	383	4.0%
Forth	51	58	64	66	79	90	103	111	125	132	7.6%
Hull	175	174	146	142	163	128	88	153	172	135	(2.0%)
Goole	20	41	69	69	70	70	51	18	27	61	9.0%
Greenock	6	16	17	22	29	31	33	45	36	36	14.8%
Tees	80	182	168	148	28	48	74	82	82	84	0.4%
Bristol	16	52	19	27	32	48	55	58	66	70	12.0%
Immingham &Gr.**	91	126	158	171	15	19	61	46	50	90	(0.1%)
Other	362	233	138	128	153	167	183	173	222	152	(6.5%)
Total	**2,865**	**3,466**	**3,873**	**4,311**	**4,101**	**4,229**	**4,162**	**4,184**	**4,632**	**4,573**	**3.7%**
Of which:											
Coastwise*	163	132	137	132	153	218	205	189	184	192	1.3%
Short Sea*	1,204	1,469	1,538	1,716	1,619	1,605	1,523	1,527	1,683	1,593	2.3%
Deep Sea	1,498	1,865	2,198	2,463	2,220	2,284	2,319	2,368	2,636	2,697	4.6%
Unspecified:		-		-	109	122	115	100	129	146	-
Sub Total (DfT)	2,865	3,466	3,873	4,311	4,101	4,229	4,162	4,184	4,632	4,573	3.7%
of which lo-lo **	2,671	3,227	3,486	3,898	4,101	4,229	4,162	4,184	4,632	4,573	4.2%
Estimated units transhipped***	(411)	(625)	(744)	(710)	(697)	(614)	(508)	(343)	(305)	(280)	
Net domestic GB lo-lo containers	2,260	2,602	2,742	3,188	3,404	3,615	3,654	3,841	4,327	4,293	5.1%
Net domestic TEU	**3,254**	**3,825**	**4,086**	**4,910**	**5,242**	**5,676**	**5,882**	**6,222**	**7,086**	**7,050**	**6.1%**
TEU container ratio	*1.44*	*1.47*	*1.49*	*1.54*	*1.54*	*1.54*	*1.61*	*1.62*	*1.64*	*1.64*	*1.0%*
Transhipment as % of domestic	*18%*	*24%*	*27%*	*22%*	*20%*	*17%*	*14%*	*9%*	*7%*	*6%*	*-*

TEU equivalent

**coastwise traffic is estimated by determining the proportion of NI port traffic which is with GB ports and deducting this from the UK coastwise total. A corresponding adjustment is made to short sea traffics to remove NI ports traffic recorded under a UK total. In this context, coastwise is taken to mean container movements between GB mainland ports or to small offshore islands*

*** modified to adjust for ro-ro containers allocated to lo-lo between 2000 and 2004 – adjustment carried forward to 2005 for consistency.*

**** Transhipped: in this context, containers lifted from one ship onto a quay and subsequently onto another ship, and not entering the domestic economy through the port in question (it follows that a transhipped container 'scores' twice in terms of port throughput while a domestic container scores only once, even though both take up storage space within the port).*

Source: MDS Transmodal Ltd. Based on DfT Maritime Statistics

Table 4.8 describes approximately how current GB container port traffic is allocated by type and port.

Table 4.8: Great Britain container port traffic by port region and type (2005)

'000s TEU

Port region	UK (coastwise)	North Sea & France	Other W.Europe	Med.	Deep Sea	Total
Haven	78	196	131	352	2018	2775
Thames/Medway	2	428	25	75	915	1445
Solent	27	42	2	23	1342	1436
Bristol Channel	16	35	40	27	53	171
Mersey	65	131	82	73	273	624
Clyde	20	3	10	31	-	64
Scottish EC	121	146	1	-	-	268
Tees/Tyne	22	80	58	10	3	173
Humber/Wash	16	238	287	-	2	543
Total	**367**	**1299**	**636**	**591**	**4606**	**7500**

Source: MDST analysis of Maritime Statistics data

If both third country transhipment and intra GB feeder flows are removed, overall TEU through GB ports falls to approximately 7m TEU per annum.

4.5 UK Transhipment market

Third country transhipment at GB ports has declined since 2000 as overall volumes through the major ports have grown. We estimate that transhipment as a percentage of domestic handling reached over 25% in 1997 but has since fallen to around only 6%.

It follows from the above that:

- In 2005, transhipment added approximately 6% to total GB ports domestic lo-lo traffic.

- by comparison transhipment represents 28% of total throughput at Rotterdam, 33% at Le Havre and nearly 40% at Hamburg.

The available evidence suggests that over the last decade, there has been a radical change in the balance of the volume of containers being transhipped in GB ports for third countries as compared with the volume of containers being transhipped on the Continent for Great Britain. It is self evident that the lack of spare capacity available at GB ports and continuing investment at Continental mainland ports has led to a switch of this activity.

4.6 Forecast container growth

Our forecasts are that total GB ports (and the Channel Tunnel) unitised growth will be 120% between 2005 and 2030 as measured in tonnes. Growth will be highest in imports of consumer based manufactures (SITC chapter 8). Growth in containerised tonnes will be higher at 136%, reflecting, particularly, the strength of traffic from Asia. Measured in TEU, we estimate growth will be 182% overall, with growth in traffic from Asia reaching 210%.

The majority of the containers (around 90%) involved are carried in deepsea vessels through deep-water ports, although some will have been transhipped en route, including at other European ports. Those that arrive at the smaller container terminals such as at Grangemouth, Tyne or Immingham will be carried by ‘feeder’ services, generally employing ships of under 1000 TEU capacity (although some are now larger, particularly on routes to West Coast ports). Feeder services offer the advantage of delivering containers to regional ports, reducing inland haulage within Britain but at the expense of an extra maritime leg. Most feeder containers into English ports pass through GB ports which are capable of berthing ships of over 1000 TEU capacity.

These forecasts take into account:

(i) the underlying growth in those trades (of goods) which are normally containerised;

(ii) an underlying trend for container sizes to rise as 20’ containers tend to be replaced by 40’ or 45’ containers (the ratio of TEU to containers has grown from 1.44 to 1.64 between 1992 and 2005); and

(iii) a gradual fall in the tonnes of goods carried per container, reflecting the increasing proportion of inbound consumer goods.

Our modelling is based upon analysing four principal trade routes, being:

(i) the Asian trades, representing 46% of UK containerised trade in 2004 and forecast to reach 52% by 2030.

(ii) Other smaller trades passing through the Straits of Gibraltar (Middle East, Mediterranean, Indian Sub-continent, East Africa;

(iii) the North American trade; and

(iv) the ‘South Atlantic’ trades (Latin America and sub-Saharan Africa).

We have identified the mean vessel sizes serving these markets and forecast how these might change.

The volumes forecasts in this report are marginally higher than those made in some other recent studies (see earlier report published in 2006) which informed planning applications and inquiries into proposed new port facilities, largely as a consequence of the sustained growth observed between 1999 and 2005 measured in TEU (+44% overall or 6.2% per annum). They take into account a clear pattern over the last two decades of a steady growth in the absolute volume of unitised freight entering or leaving Great Britain of around 4-5m extra tonnes each year which we forecast will reach a growth of over 5m tonnes per annum in the years to 2030.

4.7 Intra European traffic

Throughout the exercise, we have concentrated on deep sea lo-lo container traffic. However, several of the shallower water berths on the UK east coast (Tilbury enclosed dock, Ipswich, Goole, Immingham and Hull enclosed docks, the Tees and Grangemouth Dock) handle significant volumes of intra European container traffic. This is typically handled in different vessels which follow stricter schedules than those of the 'feeder' services (which may visit different 'mother ship' berths at Continental hub ports to 'fill-up' with deep sea transhipped goods). Door-to-door intra European services will normally operate between the same fixed terminals within which containers are controlled on a dock-gate to dock-gate rather than a quay to quay basis to maximise reliability so as to better compete with road hauliers using ro-ro ferry services. This intra European market is also expected to grow and to therefore require further capacity in the future. For 2005, we estimate that intra Western European[29] lo-lo container traffic through GB ports amounts to around 1.4m TEU per annum (see table 4.2).

It is not the purpose of this report to allocate shortsea container traffic to berths. However, given that it is a competitor for feeder berth capacity, it is important to assess what capacity might be left after intra European demand is catered for. For the purposes of this exercise, we assume that 'short sea' vessels will carry Irish, Nordic, NW European and East European traffic so that our estimate of 1.5m TEU of GB 'shortsea' port throughput will rise to 3.7m TEU, leading to a need to accommodate an extra 2.2m TEU of traffic to and from short sea vessels between 2004 and 2030. On the basis of a mean quay productivity of 770 TEU per metre an extra 2,857 quay metres would be required for short sea vessels serving intra European markets. Note that where land area is limited a shortage of storage capacity may limit port capacity.

Currently, intra North-European demand is divided approximately between 10% to the west coast (with Iberia and Ireland), 10% on the Scottish east coast and 40% to each of the Tyne/Tees/Humber range and the Solent/Medway/Thames/Haven ranges. That implies a short sea need to handle extra intra European containers as follows:

[29] Ireland, NW Europe, Nordic and E. European

Table 4.9: Estimated demand (2030) for extra intra-European lo-lo port capacity

Port Region	'000s TEU Equivalent	Implied demand for Quay metres
South West/South Wales	75	97m
South East/Haven	880	1143m
North West	145	188m
North East/Humber	880	1143m
Scotland	220	286m
Total	2200	2857m

Source: MDS Transmodal Ltd

We estimate that the different port ranges have the following extra capacity available to handle short sea vessels in the future. This analysis has been changed significantly from the previous report to exclude deepsea facilities at Liverpool and Portbury (which are included in a deep sea analysis) and to take account of the practical use of Tilbury enclosed dock and Greenock. In this exercise, only estimated spare capacity is included in the table below. Capacity is estimated on the basis of quay metres available and not equipment currently installed.

Table 4.10: Estimated feeder/short-sea capacity at existing ports (2007)

Port range	Port	Assumed spare capacity available ('000 TEU)	Equivalent quay metres implied
South West/South Wales	Cardiff	50	75
	Avonmouth	150	200
		200	**275**
South East/Haven		-	
	Tilbury (enclosed)	200	250
	Ipswich	100	130
		300	**380**
North West	Irlam	**50**	**75**
North East/Humber	Tyne	25	30
	Tees	350*	450
	Hull	75	100
	Immingham	150	200
	Goole	100	130
		700	**855**
Scotland	Greenock	150	200
	Grangemouth	100	130
		250	**330**
	Overall total	**1500***	**1915**

* reduced by 250,000 if Tees deep sea project of 1000 quay metres proceeds

Source: MDS Transmodal Ltd.

In order to be able to carry forward a 'net' position into the analysis of deep sea container port demand, we have therefore estimated the following net differences between existing supply and forecast demand at short sea ports before analysing deep sea container services that either use GB ports or tranship from the Continent. The estimated net 'shortfall' of 1007 metres of quay (2922 metres less 1915 metres) equates to around 775,000 TEU of required capacity by 2030. However, 'spare' capacity in (say) the Bristol Channel or in Scotland may not, of course, be a substitute for a shortfall in the South East.

Table 4.11: Estimated 2030 supply demand position to carry forward to the analysis of deepsea traffic currently accommodated by south-east ports and feeder services (quay metres) (excludes deep sea terminals)

	Apparent (quasi) capacity supply (m)	Forecast Intra European demand expressed as quay metres (m)	Net short-sea quay metres (demand less supply) required to carry forward
South West/South Wales	275	97	+178
South East/Haven	380	1,169	-789
North West	75	195	-120
North East/Humber	855	1,169	-314
Scotland	330	292	+38
Total	**1,915**	**2,922**	**-1007**

Source: MDS Transmodal Ltd.

Note that the proposed new Hull Container Terminal replaces an existing terminal in an enclosed dock, whose working area is expected to transfer to ro-ro operations.

4.8 Measuring the impact of port capacity enhancement

We have shown above that there is a relationship between the capacity of the port system and the method which the shipping and transport industry adopts in serving its markets; as available 'spare' capacity has fallen in Britain so third country transhipment has switched to the Continent. In a competitive environment in which shipping lines seek to minimise the cost of delivering cargo, the use of port capacity to tranship cargo between vessels provides lines with the opportunity to exploit economies of scale on ocean voyages - a trade off between adding to port handling costs in order to reduce shipping costs. Transhipment can also provide a means of reducing the number of deep water ports required by promoting 'hub and spoke' networks and, in doing so, also potentially trading off between inland and maritime transport in serving regional markets. As we shall see below, the more containers that are fed to Great Britain via a Continental hub, the less inland haulage is required in Britain, and the less containers move by rail. However, this can only be reversed by increasing the total amount of port capacity available. There is an obvious trade-off between investment in port and in shipping capacity to deliver a 'global' transport network.

Our approach to quantifying these various trade-offs is based upon the underlying principles that shipping lines will seek to minimise their costs of distributing containers and that port owners will maximise revenue based upon their competitive position. Within the complex and competitive environment of the NW European container port market, this is a difficult matter to quantify.

Standard practice in the deep sea market is for lines to distribute containers across NW Europe by making calls at a number of different deep water ports. As a minimum, these will generally be via a port in Northern France, a Benelux port and a North German port. This represents our 'minimum' or base case against which different alternatives will be tested. In fact most lines will also make a direct call at a UK south-east port; at Felixstowe, Southampton or Thamesport, or, on the secondary deep sea services using smaller 'Panamax' vessels, Tilbury. Some North American services will choose Liverpool, although this does involve a significant maritime diversion.

The proportion of a deep sea ship's cargo serving N.W.Europe that is accounted for by Great Britain will typically be in the range of 15–20%. A line which chooses to make a direct call at a GB port will face the cost of diverting its ship to a GB port and the extra time entering and leaving the GB port as well as port handling and inland delivery costs. By contrast, a line which chooses instead to serve Great Britain by feeder services (transhipping on the Continent) will be able to reduce inland transport costs in Britain by delivering to different 'regional' ports and will face lower port charges at these smaller ports in Britain. However, it will have to face the cost of transhipment on the Continent and the feeder ship's costs. The proportion of cargo bound for Britain will largely determine that choice. In many cases, a line may make a direct call in Britain, but still serve part of Britain (typically Scotland) by feeder ship to cut down on inland transport costs.

The following schedule describes some of the key assumptions we have made in defining the cost model.

Table 4.12: Key assumptions in determining the transhipment cost model

Vessel costs (charter)	500 TEU (feeder)	: £5,000/day	
	5000 TEU	: £16,700/day	
	8500 TEU	: £21,750/day	
Stevedoring charges	Handling/container:	deep sea ports	:£70
		short sea ports	:£50
		transhipment	:£80 (+ £40 in transfer costs)
Bunker costs	£145/tonne (consistent with $67 per barrel for Brent crude oil)		
Gross Port entry costs	£4/TEU of ship capacity		
Inland transport costs	Road :	£80 + £0.75/km	
	Rail :	£200* + £0.26/km	
	* including £89 drayage plus £62 terminal lifts on and off rail		

Source: MDS Transmodal Ltd

Table 4.13 describes fluctuations in charter rates over the last few years. It will be observed that there has been a significant decline in rates since the production of our earlier study, and this has been taken into account in this report.

Table 4.13: Charter rate trends for 2900 and 3500 TEU container ships (value in May each year)

$ per day

	Nominal TEU	
May	**2900**	**3500**
2002	9400	12500
2003	21150	24100
2004	32000	36000
2005	40000	42500
2006	24800	29400
2007	23900	30820

Source: Howe Robinson Container Index

These cost assumptions have been brought together to determine the 'delivery cost' for a container over and above the costs which a deep sea line faces in taking a ship directly to the largest of the Continental ports Rotterdam (defined below as 'delivery cost' per TEU).

The above costs are broadly similar to those assumed in the earlier exercises (published 2006) except that charter rates have been reduced significantly to reflect a fall in market rates. At the time the earlier study was conducted, charter rates had risen to record levels and were being forecast by brokers to continue rising. In practice, the reverse took place. We believe the rates used in this analysis represent the long run cost of providing ship capacity at current real discount rates.

We have also taken the opportunity to revise inland distribution patterns by combining data provided by both a major shipping line and by a member of the ports industry, in both cases to overcome the criticism that otherwise the most recent distribution pattern of containers inland was from data published by the DfT from a survey in 1991.

These two data sets provided over 500,000 observations and reflected container movements through all the major and most feeder ports. By combining the two data sets, we sought to provide a more reliable and single estimate for GB deep sea distribution (see table 4.32).

Our modelling exercise, described in the next few pages, sets out to not only reflect trade-offs between the diversion of ships from the shortest maritime distances against savings in inland costs but also to take account of the preference for shipping lines (with different scales of operation) to concentrate their deepsea activities on as few ports as possible to minimise management and other costs. However, important lessons can be drawn from a straightforward and simpler comparison of those diversion costs and inland transport costs using the above assumptions and the revised (combined) inland distribution data. Table 4.14 below sums the impact of mean inland distances from the overall GB market and diversion costs for a 5000 TEU vessel where 20% of the market (the ship's cargo) is for Great Britain. Inland costs are based on road or rail costs, whichever is the cheaper. Two shipping routes are considered; across the North Atlantic and for ships passing through the Mediterranean.

Table 4.14: Sum of inland and diversion costs for 5000 TEU vessel operation

			Diversion costs/TEU £		Combined costs/TEU £	
Port	Mean inland km	Mean* inland cost £	Via Atlantic	Via Mediterranean	Via N. Atlantic	Via Mediterranean
Bristol	247	244	+26	+30	270	274
Felixstowe	293	263	+8	+3	270	266
Liverpool	225	229	+37	+47	265	276
London	262	245	+11	+6	256	251
Southampton	270	250	+7	+3	256	252
Teesport	299	266	+11	+24	276	290

Source: MDST

* based upon whichever offers lowest cost (road or rail)

The lowest cost routeing for both shipping routes appears to be via either London or Southampton, although the differences between the results for different ports could be regarded as relatively small and, of course, subject to particular market conditions which may bias the optimum solution for a given line because of its particular contracts. However, the level of charges that a port terminal can levy will be heavily informed by its relative locational advantages. One has also to recognise that even a mean difference of £1 per TEU handled does amount to a significant sum when taken over a port's annual traffic level.

For a given cargo distribution and set of assumptions of road, rail and shipping costs it is, of course, possible to identify that (direct) port of call which will appear to minimise costs for a 'generic' shipping line. In practice, however, different lines choose different ports. We have modelled choice of port by taking into account:

- the world area served; diversion costs will be marginally different for services from North America rather than elsewhere because the diversion to a GB port is less.

- the capacity of vessel operated and scale of shipping line. In practice, different lines will operate different sizes of vessel (with, therefore, different diversion costs). Furthermore, because lines derive operational benefits from concentrating their services on a single port, the model aims to 'fit' generic lines into actual port terminals. This means that a port which could only offer a single deepwater berth will be less attractive (competitive) than one offering several berths and being, therefore, able to accommodate a larger line. As market size grows so smaller terminals of finite capacity will find it harder to offer a cost effective competitive services to the larger lines.

The model allocates 'lines' to ports until either capacity is used up or overall operating costs are minimised. Where a port fills up, the model assumes it will raise its tariff until demand falls to less than supply; traffic then being reallocated to other ports to 'clear' the market

As a base case, we have assumed the following deep water port capacities for each year tested, assuming NO further deep water terminal investments. We have assumed that without a development at Hunterston, the Clyde would not be competitive for deep sea services, so that 'Greenock' has been classified as a 'short sea' port.

Table 4.15: Deep water port capacity assumed without further infrastructure

(Thousand TEUs)

Port	2005	2010	2015	2020	2025	2030
Felixstowe	2835	3100	3100	3100	3100	3100
Thamesport	564	613	613	613	613	613
Tilbury	483	524	524	524	524	524
Southampton	1377	1657	1657	1657	1657	1657
Avonmouth	512	559	559	559	559	559
Liverpool	891	974	974	974	974	974

* based on current quay metres and forecast improvements in productivity
Source: MDS Transmodal Ltd

It is self evident that continuing trade growth will mean that the existing south-east ports will reach capacity in a relatively few years if no additional infrastructure is added. In practice, this will mean that further traffic volumes will be handled through 'feeder' ports such as the Tyne, Cardiff, Immingham and Grangemouth. However, given (as we shall see below) that these do not represent minimum cost solutions for most GB destinations when capacity is not constrained and also imply an overall longer delivery time, it is self-evident that market equilibrium will only be achieved if handling charges in the established deep water ports rise to the point where the overall cost of serving the market by feeder port (or a mixture of direct and feeder services) is equalised by the cost of serving the market with direct calls. Simultaneously, of course, if stevedoring charges rise at the GB deep water port then the proportion of the ships' cargo to be handled at that deep water port will fall because an increasing proportion of GB cargo will be fed from a Continental port. Our modelling assumes that the typical market stevedoring rates for feeder port, deep water port and transhipment (ship-to-ship) services of £50, £70 and £80 per box respectively are the minimum sufficient to fund further investment but that higher rates may be charged when such market conditions permit. In addition we have found that lines also face an administrative cost, and sometimes further transfer costs within ports, when containers are transhipped, for which we add £40 per container. It will follow that if capacity at existing deep water ports in the UK and on the Continent is not expanded, port tariffs will rise and, at some point, other ports will be able to enter the market at viable rates.

The net consequence of a shortfall in deep sea port capacity increasing the volume of 'fed' traffic will be an increase in 'delivery cost' to users and, in all likelihood, a severe reduction in the amount of long distance (and therefore rail) freight carried within Britain. As a consequence the average length of rail-hauls for containers would decline, as would the rail share of total inland haulage. Overall revenue in GB from the transport industry would fall (a greater proportion of the value in the transhipment chain will be added at sea or on the Continent) and the volume of transhipment containers on the Continent will rise.

By a similar token, however, the construction of further or additional port capacity in Britain could lead to deep water port capacity exceeding domestic demand and thereby creating the opportunity to tranship within a GB port for third countries whose economies are too small to attract deep sea container ships (e.g. Ireland or Norway). This will generate revenue for the GB transport industry. Of course, that opportunity can only be exploited if deep sea vessels have been attracted in the first place! We have assumed that no more than 40% of a port's traffic would be transhipped between third countries (based on N.W. European experience).

Implicit in the above argument is that, in the absence of adequate deep water container port capacity in Britain, 'feeder' ports will be able to expand to fill the gap, and that there will also be adequate capacity in Continental ports to provide transhipment capacity for UK cargo. Similarly, we have assumed that there will be adequate and suitable rail network capacity to accommodate the intermodal rail freight volumes forecast. We also assume the relative costs of different modes remain constant. There are potentially significant rail freight capacity constraints from the Haven and Thames container terminals as a consequence of passenger traffic growth on the East Coast Main Line and through London (Crossrail). We have taken a generic approach to the location of such feeder port capacity; simply associating that capacity with different port regions. In some cases (e.g. the Bristol Channel) existing port infrastructure at Bristol or Cardiff lends itself to being turned over to feeder port activity. Elsewhere (e.g. on the Thames) additional infrastructure may be required. In each case, one should remember that growth in intra European lo-lo traffic will also need to be catered for. The analysis above suggested that an additional 1007 quay metres would be required to service growth in intra European lo-lo traffic by 2030 over and above the demand from deep sea traffic.

The development of this model has highlighted the fact that the location where containers are handled is effectively determined by the infrastructure provided. In the short to medium term, limited port capacity means that shipping lines have little choice but to make the best use of the port infrastructure available. It follows that volume and location of transhipment is a by-product of the historic planning and investment decisions made by (or for) the ports industry. This is evident in the case of Felixstowe's transhipment traffic over the last decade; initial growth as a consequence of there being available spare capacity and then decline as domestic UK demand squeezed that business out (most noticeably to Antwerp). The agent of that transition was the pricing mechanism.

The pricing mechanism has been used to inform our modelling approach. It is not in the gift of Government to dictate how much container traffic is transhipped so, in order to usefully address the terms of reference, we have developed a modelling approach which tests the impact of different port capacity strategies on:

- how and where containers will be transhipped;

- transport revenue within the GB economy;
- delivery costs per container to UK shippers and receivers;
- the wider impact of any increase in delivery costs on the overall economy; and
- externalities (non user costs) reflected in Sensitive Lorry Miles.

The decision to tranship on the Continent rather than to make a direct call does also have an impact on level of service. Relatively few importers into the UK specify the point of inland discharge, preferring to leave that decision until cargo is landed. A retailer, for example, who will have ordered goods several months ahead of demand in the Far East, might only choose to decide whether the goods he imports will be sold in Northern or Southern Britain when cargo is landed and after he can see how sales are developing. He may leave it to the last moment to inform the shipping line to which distribution building it must make a delivery. Not only does this tend to add to UK port congestion and to militate against the use of rail (because goods cannot be easily forwarded to the specified destination at a moment's notice), it also renders remote transhipment less attractive. A container held in Rotterdam will not be delivered on (different) feeder services (to either Scotland, Northern or Southern England) for 2-3 days after being called up. The same container held in Felixstowe or Southampton could be delivered 'next day'.

On the other hand, where a retailer is able to anticipate his future trading patterns, there are clear benefits in locating regional distribution centres (RDCs) within or near ports to minimise onward haulage. B&Q have adopted this approach through Immingham to their warehouses in Yorkshire and Lincolnshire as have WalMart on the Tees, using semi-dedicated feeder services from Rotterdam to make deliveries to distribution buildings next to the quay. This has the further advantage of their retaining the flexibility to choose their deep sea carrier (between Asia and NW Europe) because of the variety of lines serving a major hub such as Rotterdam. That choice would not be available if the location decision was based on a particular deep sea carrier serving the Tees or Humber on a direct call basis.

4.9 Scenarios of future UK and continental port supply

There has been considerable debate within the industry and in the industry press as to which terminal developments will best suit UK needs. It has been argued that further projects in the south-east will have adverse impacts on inland road and rail congestion. By contrast, the lines have tended to express a preference for more capacity in these same south-east ports because they believe that minimises overall through transport costs.

The two deep water Scottish projects that have been proposed (Hunterston and Scapa Flow) would rely heavily on third country transhipment (including by sea or rail to England and Wales) because their own domestic market in Scotland is itself relatively small. In this exercise, we have not examined their potential any further. Projects at Liverpool, Teesside and Avonmouth offer the prospect of diverting direct calls away from congestion in the south-east. The Secretary of State has now granted consent for the proposals at London Gateway, Liverpool, Felixstowe South and Bathside Bay. Associated British Ports have proposed the extension and redevelopment of container facilities at Southampton which could add up to 2m TEU to that port's capacity. However, even with consent, there are no guarantees these projects will be completed as lines have still to choose which port to patronise. If, for example, one or more schemes were unattractive to leading shipping lines, the port company concerned may not have adequate confidence to begin to invest in major 'up front' costs such as channel dredging. All these projects will to some degree rely on the long term commitments of deep sea lines. Such commitments are not straightforward for lines that operate within alliances, which may not themselves last long enough to match the requisite commitments to port terminal owners and operators.

It was not practical in the time available to test every possible combination of potential circumstances. It was, in any event, the main objective of this study to determine whether, in principle, transhipment within or beyond Great Britain was in the broad interests of the economy.

In this report, we have limited the scenarios being tested to:

Scenario 1	No more deep sea capacity
Scenario 2	Felixstowe South, Bathside Bay, London Gateway, Liverpool and Southampton expansion
Scenario 3	Scenario 2 plus expansion at Bristol and Tees
Scenario 4	Scenario 3 less expansion at Southampton

Note: the assumption of expansion in capacity at Southampton has been included at ABP's request and on the basis that ABP claim it could be achieved within the existing dock estate. There may be a need for a Harbour Revision Order (HRO) or other consents.

The capacities assumed for each scenario are set out below:

Table 4.16: Deep Sea capacity tested by Scenario

('000s TEUs p.a.)

	2005	2010	2015	2020	2025	2030
Scenario 1						
Haven	2835	3100	3100	3100	3100	3100
Thames/Medway	1047	1137	1137	1137	1137	1137
Southampton	1377	1657	1657	1657	1657	1657
Bristol	512	559	559	559	559	559
Liverpool	891	974	974	974	974	974
Tees	-	-	-	-	-	-
Total	**6662**	**7427**	**7427**	**7427**	**7427**	**7427**
Scenario 2						
Haven	2835	4110	5664	5664	5664	5664
Thames/Medway	1047	1137	3690	3690	3690	3690
Southampton	1377	1657	3699	3699	3699	3699
Bristol	512	559	559	559	559	559
Liverpool	891	974	1418	1418	1418	1418
Tees	-	-	-	-	-	-
Total	**6662**	**8437**	**15029**	**15029**	**15029**	**15029**
Scenario 3						
Haven	2835	4110	5664	5664	5664	5664
Thames/Medway	1047	1137	3690	3690	3690	3690
Southampton	1377	1657	3699	3699	3699	3699
Bristol	512	559	559	1891	1891	1891
Liverpool	891	974	1418	1418	1418	1418
Tees	-	-	1110	1110	1110	1110
Total	**6662**	**8437**	**16139**	**17471**	**17471**	**17471**
Scenario 4						
Haven	2835	4110	5664	5664	5664	5664
Thames/Medway	1047	1137	3690	3690	3690	3690
Southampton	1377	1657	1657	1657	1657	1657
Bristol	512	559	559	1891	1891	1891
Liverpool	891	974	1418	1418	1418	1418
Tees	-	-	1110	1110	1110	1110
Total	**6662**	**8437**	**14097**	**15428**	**15428**	**15428**

Table 4.17 describes scenario 2 in more detail.

Table 4.17 describes scenario 3, with all port developments considered, in more detail.

Table 4.17: Deep water ports and schemes considered within the model and capacity assumed: Scenario 3

Port			2005	2010	2015	2020	2025	2030
Felixstowe	Existing Quays	(m)	2,793	2,793	2,793	2,793	2,793	2,793
	Existing Productivity	(TEU/m)	1,015	1,110	1,110	1,110	1,110	1,110
	Proposed Quays	(m)		910	910	910	910	910
	ProposedProductivity	(TEU/m)		1,110	1,110	1,110	1,110	1,110
	Capacity	(TEU)	2,834,895	4,109,756	4,109,756	4,109,756	4,109,756	4,109,756
Bathside Bay	Existing Quays	(m)	0	0	0	0	0	0
	Existing Productivity	(TEU/m)	1,015	1,110	1,110	1,110	1,110	1,110
	Proposed Quays	(m)			1,400	1,400	1,400	1,400
	ProposedProductivity	(TEU/m)			1,110	1,110	1,110	1,110
	Capacity	(TEU)	0	0	1,553,783	1,553,783	1,553,783	1,553,783
London Gateway	Existing Quays	(m)	0	0	0	0	0	0
	Existing Productivity	(TEU/m)	1,015	1,110	1,110	1,110	1,110	1,110
	Proposed Quays	(m)			2,300	2,300	2,300	2,300
	ProposedProductivity	(TEU/m)			1,110	1,110	1,110	1,110
	Capacity	(TEU)	0	0	2,552,643	2,552,643	2,552,643	2,552,643
Tilbury	Existing Quays	(m)	590	590	590	590	590	590
	Existing Productivity	(TEU/m)	824	888	888	888	888	888
	Proposed Quays	(m)						
	ProposedProductivity	(TEU/m)						
	Capacity	(TEU)	486,266	523,847	523,847	523,847	523,847	523,847
Thamesport	Existing Quays	(m)	650	650	650	650	650	650
	Existing Productivity	(TEU/m)	863	943	943	943	943	943
	Proposed Quays	(m)						
	ProposedProductivity	(TEU/m)						
	Capacity	(TEU)	560,788	613,189	613,189	613,189	613,189	613,189
Southampton	Existing Quays	(m)	1,357	1,357	1,357	1,357	1,357	1,357
	Existing Productivity	(TEU/m)	1,015	1,221	1,221	1,221	1,221	1,221
	Proposed Quays	(m)			1,840	1,840	1,840	1,840
	ProposedProductivity	(TEU/m)			1,110	1,110	1,110	1,110
	Capacity	(TEU)	1,377,355	1,656,666	3,698,780	3,698,780	3,698,780	3,698,780
Bristol	Existing Quays	(m)	630	630	630	630	630	630
	Existing Productivity	(TEU/m)	812	888	888	888	888	888
	Proposed Quays	(m)				1,200	1,200	1,200
	ProposedProductivity	(TEU/m)				1,110	1,110	1,110
	Capacity	(TEU)	511,560	559,362	559,362	1,891,176	1,891,176	1,891,176
Liverpool	Existing Quays	(m)	1,097	1,097	1,097	1,097	1,097	1,097
	Existing Productivity	(TEU/m)	812	888	888	888	888	888
	Proposed Quays	(m)			800	800	800	800
	ProposedProductivity	(TEU/m)			555	555	555	555
	Capacity	(TEU)	890,764	974,000	1,417,938	1,417,938	1,417,938	1,417,938
Teesport	Existing Quays	(m)	0	0	0	0	0	0
	Existing Productivity	(TEU/m)	1,015	1,110	1,110	1,110	1,110	1,110
	Proposed Quays	(m)			1,000	1,000	1,000	1,000
	ProposedProductivity	(TEU/m)			1,110	1,110	1,110	1,110
	Capacity	(TEU)	0	0	1,109,845	1,109,845	1,109,845	1,109,845

Total South-East	**5,259,304**	**6,903,457**	**13,051,998**	**13,051,998**	**13,051,998**	**13,051,998**
Total Non South-East	**1,402,324**	**1,533,362**	**3,087,145**	**4,418,959**	**4,418,959**	**4,418,959**

Source: MDS Transmodal Ltd

It is not for this study to assess the viability of individual port projects. Similarly, the selection of these scenarios does not imply that other projects could not emerge. However, there can be no question that the viability and timing of the projects have some interdependence. For example, in the event that no further deep water projects in the south-east of England proceed and the Continental mainland ports do not expand beyond present plans, it is self evident that a stronger case can be made for UK deep water ports beyond southern Britain. In effect, if lower (shipping + port + inland transport) cost solutions are denied to them in the South-East, some lines might choose to patronise deep water ports in northern or western Britain as an alternative to feeding from the Continental mainland. Such lines could then serve southern Britain overland, by feeder services or by direct calls through lines exchanging containers en route at ports such as Algeciras to ships still using the limited capacity available in the South East. For example, a ship loading containers for N.W. Europe in Shanghai and calling in the Tees in tandem with Le Havre, Rotterdam and Hamburg could discharge containers for southern Britain en route at Algeciras. Those containers would be collected by a following ship from (say) Singapore which was calling at Southampton. Such an approach inevitably adds to final ‘delivery’ costs to UK shippers and receivers, but could render ‘off-route’ deep water ports viable at some point. However, this is a more expensive through cost solution than a direct call because of the extra handling costs involved.

In summary, therefore, these additional scenarios are intended to explore.

(i) the circumstances under which transhipment will take place either of UK cargo or of third country cargo in GB ports; and

(ii) the direct transport costs involved; and

(iii) the impact on inland infrastructure.

Our exercise assumes and confirms that under present conditions, a direct call in a GB port is cost effective. In some scenarios, the proportion of lines making such direct calls falls away (particularly Scenario 1) as lack of capacity drives up the equilibrium (market clearing) rate for stevedoring and ‘drives away’ lines to the Continent.

Approximately three quarters of the deep sea vessels serving N.W. Europe presently serve GB by direct calls. The remaining quarter serve Britain indirectly in various ways. In some cases, lines will simply not compete vigorously for UK cargo. In other cases, containers will only be loaded on the ships (of a given line) that are calling directly. Alternatively, containers will be exchanged remotely between services (e.g. at Singapore, Port Said or Malta) in such a way that cannot be easily identified by available statistics, because to all intents and purposes, a container will arrive in a deep sea vessel at a GB port.

As pointed out above, a significant proportion of GB deep sea containers are fed from Continental ports to GB hub ports. While it might appear more cost effective for transhipment on the Continent to be linked to regional services (e.g. Rotterdam to the Tees) to minimise inland distribution costs, three factors may also encourage ‘feeding’ between deep water ports. Firstly, the line in question may operate other deep sea vessels on services which can offer a ‘free-ride’ between, say, Rotterdam and either Southampton or Felixstowe. Secondly, the line in question may have its transport network based at the ‘hub’ port (including onward rail services) and be reluctant to have to find alternative transport services for inland distribution. Thirdly, and probably most important, the line may not know where within Britain the container is eventually bound for. Lines quite normally accept cargo which will be held at a port until the receiver decides where he wishes it to be delivered. In those circumstances, lines will quite normally feed containers <u>between</u> hub ports.

As far as we have been able to judge, approximately half of the total TEU fed from Continental ports to Great Britain move on ‘regional’ services which provide an alternative means of onward transport to longer ‘overland’ haulage from GB deep water ports in the south-east. It is this traffic of around 500,000 TEU in 2005 that is represented in the model as ‘feeder’ traffic. The principal regional ports served are Grangemouth, Tyne, Tees, Immingham, Bristol, Liverpool and Greenock. The remaining traffic of around 500,000 TEU carried mainly on deep sea services, but also on feeder ships offering a ‘fill-in’ service, is routed via transhipment at Continental hub ports <u>instead</u> of lines making direct calls or interlining before ships reach the North Sea. This represents around 10% of total non European (deep sea) traffic. These containers could have been interlined or transhipped at any port between Hong Kong and Britain and, from a UK perspective, should not perhaps be seen as transhipped cargo in any case. No net trade-off is made between maritime and inland costs. One could say that this traffic reflects the fact that the mean number of European port calls per deep sea rotation is 3.7 and not 4.0 (i.e. if all made a direct call in a GB port). Containers carried on vessels not calling directly in Great Britain are still landed at south-east ports.

The modelling exercise is intended to reflect the way that different levels of GB port capacity will lead to different levels of transhipment and consequential impacts on different aspects of the UK transport industry and economy. It deals with feedering to non-hub ports, but not with container transfers between hub ports which are a substitute for the lack of direct calls by the given line under current conditions. It is, accordingly, important to recognise that current (base year) conditions reflect the fact that 10% of deep sea containers face the additional cost of Continental port transhipment and feeding to a GB port. Given that this transfer is often onto another deep sea vessel making the voyage across the North Sea in any case, the only extra maritime cost in those circumstances is the extra dwell time for the ship from which containers are handled. In these circumstances, we believe the mean incremental cost of such transfers is around £160 per container (£100 per TEU), which, taken over the whole market, adds only around £10 per TEU to the mean 'delivery' cost of all deepsea containers to Britain. From the view of port capacity utilisation, given that most such containers arrive on 'another' deep sea vessel, the effect is relatively insignificant and has a neutral impact on Scenario comparisons. Furthermore, in the event that capacity constraints on the Continent reflected in rising port charges inhibited this approach, the lines could simply switch such container transfer to more remote ports, interlining before vessels reach the North Sea. This is effectively, a cost faced outside of Great Britain and need not be considered further.

Modern Ports argued that the capacity to conduct transhipment between third countries at GB ports conferred a competitive advantage on ports in attracting deep sea services. It is important to understand how this process might work.

A deep sea service serving four European ports of call in a string will have the opportunity to tranship at any one providing there are appropriate services. Transhipment to Scandinavia and the Baltic normally will be at the North German port call and to Ireland, northern Britain and Bay of Biscay ports at the Benelux port or at Le Havre.

Several of the feeder services involved will also carry intra European traffic and multiport between N. European ports. Consequently, transhipment to the same feeder service can actually take place at different ports; there is considerable choice.

In the case where deep sea ships 'interline' to serve Great Britain through the absence of a GB port call, that will take place where service rotations permit. Because Rotterdam enjoys more calls than other ports, transhipment is most likely to take place there. However, other opportunities exist, including at ports thousands of miles away in the Mediterranean or as far away as Singapore.

Choice will be heavily influenced by price. A stevedore will offer lower rates for the marginal activity of transhipment if it has physical lifting and stacking capacity. However, a more powerful driver may be the ownership of the stevedoring company. If the line has an interest in that stevedoring company, transhipment is more likely.

Because a line already has options to tranship at several other ports it already calls at (Hamburg, Rotterdam etc.), the availability of transhipment capacity in a British port is unlikely to be the key driver in it choosing (regardless of which GB port) to have a GB port of call. It follows, therefore, that only if a GB port in the south-east offered lower transhipment rates than Continental ports would it make the line more likely to make a GB call. Price will in any event have an impact on the decision to make a GB port call for domestic (gateway) containers. As we show below, if there is inadequate capacity to handle all the GB traffic on offer by direct services, available capacity will be rationed by price. Only if it was economic for UK ports to offer third country transhipment capacity at a lower rate than on the Continental mainland could an advantage for GB be identified. That is, if physical conditions in UK ports did allow lower cost capacity to be developed, there would be an advantage to

Britain. Otherwise, it is an advantage that the market would not, in practice, create in the first place.

Different arguments may apply for niche markets outside the South East. Competition between GB ports may be influenced by the availability of transhipment capacity, as this will offer a marginal advantage once the decision to make a direct call is made. Western seaboard ports also enjoy the competitive advantage to serve Ireland on a transhipment basis. Liverpool exploits this opportunity to make itself more attractive for direct deep sea calls. Liverpool and potentially Bristol can also ‘pair-up’ with Irish ports where feeder vessels are serving Ireland in any event.

Different arguments may apply in the case of northern and western GB port projects. Our analysis suggests that these may prove attractive if the supply of capacity on the Continent for transhipment is exhausted. In those circumstances, the ability to tranship to other third countries forms a key factor in their strategy.

West coast ports may also benefit if one or more of the lines conclude that North Sea port capacity will at some stage become so limited that it is worth considering serving the British Isles on routes between ‘Suez’ and East Coast North America, to make use of the port deepenings taking place in the USA and deploy very large container ships. This would represent a significant departure from existing route strategies, and is tested below as a separate scenario.

4.10 Comparing scenarios

We have assessed the impact of adding to port capacity through transport cost modelling on:

i) The volume of transhipment likely to take place in GB ports and of GB containers in Continental ports.

ii) Changes in the overall value accruing to the GB transport industry.

iii) Changes in the overall cost of delivery of containers to GB receivers (and collection from shippers).

In each case, the driver is taken as the decision to construct extra GB port capacity at particular ports and the outcome is taken as volumes of (different forms of) transhipment and the associated impact on port throughput and inland networks. These transhipment outcomes are associated with a wide range of other impacts, including those on the demand for feeder ports, road and rail traffic volumes and so forth.

Scenario 1: No further deep sea capacity

In the event that no further container terminal capacity was available in Britain, it is self-evident that Great Britain will be increasingly served by transhipment via the Continent through feeder berths. In each scenario, it is assumed that adequate capacity would be built for deep sea vessels on the Continent to serve UK needs.

By 2030, the model suggests that only 29% of deep sea containers will be able to enter GB via a south-east deep sea port; the break-even destination between direct delivery and feedering in Britain will be in the Midlands. For the cost to be equalised between a route via the south-east and a feeder service via the north east/Humber, stevedoring rates in south-east ports would rise by up to 85% by 2030 from a ‘base case’ reference rate of £70, as a consequence of a 180% growth in demand and no significant additional capacity in the south-east.

Table 4.18 summarises results for Scenario 1 for the years 2005-2030 in 5 year intervals showing the volume of traffic passing through GB ports by port and the assignment of road and rail freight. The conversion of forecast feeder port demand into required quay metres in different port regions, taking into account the net position in 2005 is presented in table 4.19. The key features to note are:

- The volume of third country containers transhipped at GB ports would remain at around 300,000 TEU but would eventually rise as some lines cease to call directly in the UK, leaving some spare capacity for transhipment for those that remain. This would effectively reflect a residual benefit from a general failure to offer the capacity the major lines will demand. Only a minority of lines would serve GB directly by that year.

- The volume of GB containers transhipped on the Continent would grow to 10.8m TEU by 2030, more than double the volume handled directly in GB ports.

- As overall demand grows so the proportion of demand satisfied in the south-east falls from around 88% to 29%.

- The delivery cost of containers to the GB economy rises from £223 in 2004 to £233 per TEU in 2030 (around £42 per tonne of cargo). While traffic growth will lead to economies of scale through the use of larger deep sea vessels, for GB users costs would rise as a higher proportion of goods face the cost of feedering.

- The proportion of overall inland traffic moving by rail falls. Rail TEU kilometres rise initially from 436 million to 455 million TEU kilometres by 2010 but then fall back severely as long distance traffic from the south-east ports is replaced by feeder services from the Continent, declining to 185 million TEU kilometres by 2030.

- The overall value of transport revenue by the GB transport industry per TEU handled falls as an increasing proportion is earned by Continental ports and feeder services.

- The volume of containers handled at feeder ports grows from a modelled volume of 487,000 TEU in 2005 to 10,839,000 TEU by 2030, which, at approximately 770 TEU per quay metre in 2030, and including 1007 quay metres to deal with short sea growth will require 15,084 additional feeder quay metres by 2030 covering an area of at least 400 hectares. This is an area corresponding to more than Tilbury, Thamesport, Felixstowe and Southampton Container Terminals combined. Table 4.19 indicates how, nominally, these additional quay lengths would be distributed in 2030 (to cater for deep sea traffics).

- The model suggests that the absence of any new deep water capacity would lead to more deepsea traffic to Liverpool, although this would eventually wane as the port would find itself unable to accommodate the larger vessels available.

Table 4.18: Results for Scenario 1: No further deep sea capacity

Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Demand (1000 TEUs)	**5722**	**7834**	**9578**	**11196**	**13317**	**16029**
UK SE Deep Sea Supply (1000 TEUs)	5259	5893	5893	5893	5893	5893
UK Non-SE Deep Sea Supply (1000 TEUs)	1708	1867	1867	1867	1867	1867
Delivery cost (£m)	£1,277	£1,728	£2,099	£2,493	£3,005	£3,735
Delivery cost/TEU (£)	£223	£221	£219	£223	£226	£233
Port Throughputs (1000 TEUs)						
UK Deep Sea SE Ports	5035	5686	5769	5590	5410	4708
UK Deep Sea Non-SE Ports	199	863	770	886	657	482
Total Deep Sea Ports	5234	6549	6539	6476	6067	5190
Transhipment Potential (SE)	224	207	125	303	405	907
Transhipment Potential (Non-SE)	80	111	204	88	341	-
Southwest Feeder Ports	0	29	257	668	1036	1337
Southeast Feeder Ports	0	59	453	899	1679	2980
Northwest Feeder Ports	179	504	1350	1840	2454	3581
Northeast Feeder Ports	91	391	615	886	1623	2347
Scotland Feeder Ports	217	301	364	428	456	594
Total Feeder Ports	487	1285	3039	4720	7249	10839
Continental Transhipment Ports (Transhipment Lifts)						
Revenues (m)						
UK SE Deep Sea Port Lifts	£236	£295	£318	£338	£353	£373
UK Non-SE Port Lifts	£9	£41	£39	£50	£41	£36
Feeder Port Lifts	£15	£38	£87	£135	£217	£309
Total UK Port Lifts	£260	£374	£444	£523	£611	£718

Year	2005	2010	2015	2020	2025	2030
UK SE Deep Sea Port Entry	£69	£79	£77	£70	£65	£56
UK Non-SE Port Entry	£2	£10	£9	£11	£8	£6
Feeder Port Entry	£1	£3	£8	£12	£18	£26
Total UK Port Entry	£72	£92	£94	£93	£91	£88
UK SE Deep Sea Port Total	£305	£374	£395	£408	£418	£429
UK Non-SE Port Total	£11	£51	£48	£61	£49	£42
Feeder Port Total	£16	£41	£95	£147	£235	£335
Total UK Port Total	£332	£466	£538	£616	£702	£806
UK SE Deep Sea Maritime	£54	£65	£69	£69	£82	£65
UK Non-SE Maritime	£5	£20	£17	£19	£23	£12
Feeder Maritime	£25	£62	£146	£223	£333	£490
Total Maritime	£84	£147	£232	£311	£438	£567
UK SE Deep Sea Port Transhipment	£5	£5	£3	£7	£11	£21
UK Non-SE Deep Sea Port Transhipment	£2	£3	£5	£2	£6	£0
Total UK Transhipment	£7	£8	£8	£9	£17	£21
UK SE Deep Sea Rail Distribution	£130	£120	£96	£76	£45	£51
UK Non-SE Rail Distribution	£4	£17	£14	£16	£6	£3
Feeder Rail Distribution	£0	£0	£0	£0	£0	£0
Total UK Rail Distribution	£134	£137	£110	£92	£51	£54
UK SE Deep Sea Road Distribution	£629	£686	£680	£660	£642	£550
UK Non-SE Road Distribution	£24	£98	£85	£98	£68	£57
Feeder Road Distribution	£38	£104	£246	£392	£616	£956
Total UK Road Distribution	£691	£888	£1021	£1150	£1326	£1563
Continental Transhipment Lifts	£36	£91	£208	£324	£497	£743
Total revenue earned by GB transport industry	£1164	£1499	£1677	£1867	£2096	£2444

Source: MDS Transmodal Ltd

We have not examined how or where an extra 15 kilometres of short sea berths could be created if no deep sea berths were to proceed. However, the difficulty of finding suitable sites should not be underestimated.

Table 4.19: Implied need for further feeder and short sea berths, Scenario 1 (2030)

Region	Additional feeder demand for quay metres (m)	Net Intra-European trade requirement *(m)	Implied need for further short sea quay metres (m)
South West/S.Wales	1,736	-178	1,558
South East/Haven	3,870	+789	4,659
North West	4,651	+120	4,771
North East/Humber	3,048	+314	3,362
Scotland	771	-38	733
Total	**14,076**	**+1007**	**15,083**

Source: MDS Transmodal Ltd

Scenario 2: All consented deepsea schemes (+ Southampton) proceed

The principal impacts as compared with Scenario 1 are:

- User costs fall from £226 (Scenario 1) in 2025 to £205, before rising to £213 as further capacity is required to avoid (more expensive) Continental transhipment taking place.

- GB transport industry earnings would rise by £543m per annum, largely by avoiding the loss of turnover to Continental ports and generally non UK owned feeder vessels.

- There would be some switching of deep sea services to the west coast in the short run as a consequence of a shortfall in capacity in the South-East and associated rise in market rates for port container handling.

- The need for extra short sea berths would fall from 15 kilometres to 4 kilometres in 2030.

- Continental transhipment would fall from 7.2m TEU to 0.9m TEU in 2025 before rising to 2.6m TEU in 2030.

- Rail TEU kilometres would rise by 130% by 2025 before falling back in 2030. Under Scenario 2, there would be more than 6 times more rail activity in 2025 than under Scenario 1.

- Total road activity would also rise, by 20% over and above Scenario 1 by 2025. However, the total additional value of Sensitive Lorry Miles (+ £80m) would be far less than the extra user costs involved under Scenario 1 (+ £328m) so that, overall, Scenario 2 leads to a more efficient use of resources.

It is important to recognise that the benefits which the developments in Scenario 2 do depend upon port owners deciding it is in their interest to proceed with the developments which are consented. We have incorporated Scenario 2 results into our analysis of impacts on inland networks (chapter 5).

Table 4.20: Results for Scenario 2: All consented deepsea schemes proceed (+ Southampton)

Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Demand (1000 TEUs)	**5,722**	**7,834**	**9,578**	**11,196**	**13,317**	**16,029**
UK SE Deep Sea Supply (1000 TEUs)	5,259	6,903	13,052	13052	13,052	13,052
UK Non-SE Deep Sea Supply (1000 TEUs)	1,708	1,867	2,311	2311	2,311	2,311
Delivery cost (£m)	£1,277	£1,704	£1,961	£2,292	£2,725	£3,407
Delivery cost/TEU (£)	£223	£218	£205	£205	£205	£213
Port Throughputs (1000 TEUs)						
UK Deep Sea SE Ports	5,035	6,407	8,073	9,429	11,210	12,601
UK Deep Sea Non-SE Ports	199	704	923	1,086	1213	839
Total Deep Sea Ports	5,234	7,161	8,996	10,515	12,423	13,440
Transhipment Potential (SE)	203	496	3,229	2,985	1,842	787
Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Southwest Feeder Ports	0	30	9	10	12	83
Southeast Feeder Ports	0	30	20	23	109	489
Northwest Feeder Ports	179	242	12	14	16	1200
Northeast Feeder Ports	91	141	212	250	299	223
Scotland Feeder Ports	217	279	329	384	458	594
Total Feeder Ports	487	723	582	681	894	2589
Continental Transhipment Ports (Transhipment Lifts)	487	723	582	681	894	2589
Revenues (m)						
UK SE Deep Sea Port Lifts	236	305	323	377	448	613
UK Non-SE Port Lifts	9	32	37	44	51	41
Feeder Port Lifts	15	21	16	19	25	73
Total UK Port Lifts	260	358	376	440	524	727
UK SE Deep Sea Port Entry	69	87	114	136	165	185
UK Non-SE Port Entry	2	8	11	13	15	11
Feeder Port Entry	1	2	2	2	2	6
Total UK Port Entry	72	97	119	151	182	202
UK SE Deep Sea Port Total	305	392	437	513	613	798
UK Non-SE Port Total	11	40	46	57	66	52
Feeder Port Total	16	23	18	21	27	79
Total UK Port Total	332	455	501	591	796	929
UK SE Deep Sea Maritime	54	62	73	83	94	111
UK Non-SE Maritime	5	16	19	21	24	23
Feeder Maritime	25	36	27	31	41	126
Total Maritime	84	114	119	135	159	260
UK SE Deep Sea Port Transhipment	5	12	74	68	42	10
UK Non-SE Deep Sea Port Transhipment	2	6	8	5	5	8
Total UK Transhipment	7	18	82	73	47	18
UK SE Deep Sea Rail Distribution	130	160	194	227	269	279

Year	2005	2010	2015	2020	2025	2030
UK Non-SE Rail Distribution	4	14	18	22	22	8
Feeder Rail Distribution	£0	£0	£0	£0	£0	£0
Total UK Rail Distribution	£134	£174	£212	£249	£291	£287
UK SE Deep Sea Road Distribution	£629	£772	£939	£1,097	£1,304	£1,466
UK Non-SE Road Distribution	£24	£80	£102	£120	£134	£90
Feeder Road Distribution	£38	£58	£47	£53	£70	£197
Total UK Road Distribution	£691	£910	£1,088	£1,270	£1,508	£1,753
Continental Transhipment Lifts	£36	£51	£40	£47	£61	£178
Total revenue earned by GB transport industry	£1,164	£1,557	£1,883	£2,183	£2,642	£2,987

Source: MDS Transmodal Ltd

Table 4.21: Implied need for further feeder and short sea berths, Scenario 2 (2030)

Region	Additional feeder demand for quay metres (m)	Net Intra-European trade requirement *(m)	Implied need for further short sea quay metres (m)
South West/S.Wales	108	-178	(70)
South East/Haven	635	+789	1,424
North West	1,558	+120	1,678
North East/Humber	290	+314	604
Scotland	771	-38	733
Total	**3,362**	**+1007**	**4,369**

Source: MDS Transmodal Ltd

Scenario 3: Scenario 2 PLUS the addition of the proposals at Tees and Bristol

Scenario 3 assumes that by 2030, both the Bristol (1200m of new deep water quay) and Tees (1000m) schemes are added to the national inventory. It is assumed that these projects, like those under Scenario 2, would be self funding from the dues and charges which inform shipping line behaviour.

The main impacts over Scenario 2 are:

- Overall user costs remain the same (£205/TEU) in 2020 and 2025 but then rise to £211 in 2030, demonstrating that these developments could make a more beneficial contribution than the alternative of feeder berths.

- The overall need for feeder berths falls by only 1200 metres. Approximately 1000 metres of the extra deep-water berths would in practice serve short sea vessels (at least until 2030).

- There would be a corresponding reduction of Continental transhipment of 972,000 TEU in 2030 (but only by 32,000 TEU in 2025).

- There is an increase in GB transport earnings of £88m per annum in 2030, largely as a consequence of reduced Continental transhipment and longer inland hauls within Great Britain.

- Total rail TEU kilometres is marginally lower in 2025 but significantly higher in 2030 as a consequence of national distribution from the Tees and Bristol substituting for regional feeder services.

- The reduction in user costs by £26m per annum in 2030 would be almost exactly the same as the increase in the value of Sensitive Lorry Miles (+£24m) suggesting there is no significant net benefit in resource utilisation.

- Total stevedoring revenue at deepsea ports would rise by only £10m (from £546m to £556m) in 2025 (+£12m in 2030) including potential transhipment revenue despite the cost of the additional infrastructure that would need to be funded.

Table 4.22: Results for Scenario 3: All consented deepsea schemes proceed (+ Southampton) plus Bristol and Tees Schemes

Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Demand (1000 TEUs)	**5,722**	**7,834**	**9,578**	**11,196**	**13,317**	**16,029**
UK SE Deep Sea Supply (1000 TEUs)	5,259	6,903	13,052	13,052	13,052	13,052
UK Non-SE Deep Sea Supply (1000 TEUs)	1,708	1,867	2,311	4,753	4,753	4,753
Delivery cost (£m)	£1,277	£1,704	£1,961	£2,292	£2,724	£3,381
Delivery cost/TEU (£)	£223	£218	£205	£205	£205	£211
Port Throughputs (1000 TEUs)						
UK Deep Sea SE Ports	5,035	6,407	8,073	9,429	10,203	12,593
UK Deep Sea Non-SE Ports	199	704	923	1,086	2,252	1,819
Total Deep Sea Ports	5,234	7,161	8,996	10,515	12,455	14,412
Transhipment Potential (SE)	203	496	3,229	2,858	2,016	459
Transhipment Potential (Non-SE)	80	270	369	332	205	72
Southwest Feeder Ports	0	30	9	10	12	106
Southeast Feeder Ports	0	30	20	23	109	106
Northwest Feeder Ports	179	242	12	14	16	611
Northeast Feeder Ports	91	141	212	250	267	167
Scotland Feeder Ports	217	279	329	384	458	628
Total Feeder Ports	487	723	582	681	862	1,617
Continental Transhipment Ports (Transhipment Lifts)	487	723	582	681	862	1617
Revenues (£m)						
UK SE Deep Sea Port Lifts	£236	£305	£323	£377	£408	£590
UK Non-SE Port Lifts	£9	£32	£37	£44	£92	£80
Feeder Port Lifts	£15	£21	£16	£19	£24	£46
Total UK Port Lifts	£260	£358	£376	£440	£524	£716
UK SE Deep Sea Port Entry	£69	£87	£114	£136	£153	£186

Year	2005	2010	2015	2020	2025	2030
UK Non-SE Port Entry	£2	£8	£11	£13	£27	£23
Feeder Port Entry	£1	£2	£2	£2	£2	£4
Total UK Port Entry	£72	£97	£119	£151	£182	£213
UK SE Deep Sea Port Total	£305	£392	£437	£512	£561	£776
UK Non-SE Port Total	£11	£40	£46	£57	£119	£103
Feeder Port Total	£16	£23	£18	£21	£26	£50
Total UK Port Total	£332	£455	£501	£591	£806	£929
UK SE Deep Sea Maritime	£54	£62	£73	£83	£89	£106
UK Non-SE Maritime	£5	£16	£19	£21	£40	£22
Feeder Maritime	£25	£36	£27	£31	£40	£81
Total Maritime	£84	£114	£119	£135	£169	£189
UK SE Deep Sea Port Transhipment	£5	£12	£74	£65	£51	£12
UK Non-SE Deep Sea Port Transhipment	£2	£6	£8	£8	£5	£2
Total UK Transhipment	£7	£18	£82	£73	£56	£14
UK SE Deep Sea Rail Distribution	£130	£160	£194	£227	£242	£297
UK Non-SE Rail Distribution	£4	£14	£18	£22	£38	£29
Feeder Rail Distribution	£0	£0	£0	£0	£0	£0
Total UK Rail Distribution	£134	£174	£212	£249	£280	£326
UK SE Deep Sea Road Distribution	£629	£772	£939	£1,097	£1,185	£1,464
UK Non-SE Road Distribution	£24	£80	£102	£120	£259	£220
Feeder Road Distribution	£38	£58	£47	£53	£68	£122
Total UK Road Distribution	£691	£910	£1,088	£1,270	£1,512	£1,806
Continental Transhipment Lifts	£36	£51	£40	£47	£59	£111
Total revenue earned by GB transport industry	£1,164	£1,557	£1,883	£2,183	£2,654	£3,075

Source: MDS Transmodal Ltd

Table 4.23: Implied need for further feeder and short sea berths, Scenario 3 (2030)

Region	Additional feeder demand for quay metres (m)	Net Intra-European trade requirement *(m)	Implied need for further short sea quay metres (m)
South West/S.Wales	138	-178	(40)
South East/Haven	138	+789	927
North West	794	+120	914
North East/Humber	217	+314	531
Scotland	816	-38	778
Total	**2,103**	**+1007**	**3,110**

Source: MDS Transmodal Ltd

Scenario 4: Scenario 2 PLUS Tees and Bristol schemes LESS Southampton scheme

This Scenario was designed to compare the value of adding capacity on the west coast and in the north-east as compared with a similar amount of capacity in the South-East.

- In terms of user costs (delivery costs), scenario 4 performs marginally better than Scenario 2 in 2025 (+£3 per TEU) and worse in 2030 (- £3). As demand grows (from 2025 to 2030) the model suggests capacity is better located in the South-East.

- In terms of GB transport revenue there is also very little difference (+ £47m in 2025, - £9m in 2030) between Scenario 2 and Scenario 4.

- Scenario 4 leads to considerably more Continental transhipment by 2030 (+ 707,000). This corresponds to Scenario 4 leading to an extra 1,883,000 TEU being handled in non south-east ports while there would be a greater loss: 2,582,000 TEU in south-east ports. That is, much of the direct call traffic for which there would be inadequate south-east capacity in 2030 would transfer to feeder services and not to direct services to non south-east ports. More feeder berth capacity would be required.

- There would be a significant reduction in Rail TEU km of 14% in 2025 (9.5% in 2030).as a consequence of there being more feeder traffic.

- As compared with Scenario 2, deepsea stevedoring and (potential) transhipment revenue would rise by £32m in 2025 (+ £29m in 2030).

- The value of overall Sensitive Lorry Miles are more or less identical.

Table 4.24: Results for Scenario 4 – additional capacity in the Haven and Thames and at Liverpool, Bristol and the Tees

Year	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
Demand (1000 TEUs)	**5,722**	**7,834**	**9,578**	11,196	13,317	16,029
UK SE Deep Sea Supply (1000 TEUs)	5,259	6,903	11,010	11,010	11,010	11,010
UK Non-SE Deep Sea Supply (1000 TEUs)	1,708	1,867	3,421	4,753	4,753	4,753
Delivery cost (£m)	£1,277	£1,704	£1,967	£2,299	£2,695	£3,455
Delivery cost/TEU (£)	£223	£218	£205	£205	£202	£216
Port Throughputs (1000 TEUs)						
UK Deep Sea SE Ports	5,035	6,407	7,910	9,237	10,032	10,011
UK Deep Sea Non-SE Ports	199	704	1,094	1,288	1,889	2,722
Total Deep Sea Ports	5,234	7,161	9,004	10,525	11,921	12,733
Transhipment Potential (SE)	203	496	2,415	1,773	1,143	999
Transhipment Potential (Non-SE)	80	270	324	130	439	740
Southwest Feeder Ports	0	30	11	12	91	162
Southeast Feeder Ports	0	30	24	27	92	499
Northwest Feeder Ports	179	242	14	16	504	1162
Northeast Feeder Ports	91	141	203	239	191	918
Scotland Feeder Ports	217	279	323	377	518	555
Total Feeder Ports	487	723	574	671	1,395	3,296

Year	2005	2010	2015	2020	2025	2030
Continental Transhipment Ports (Transhipment Lifts)	487	723	574	671	1,395	3,296
Revenues (£m)						
UK SE Deep Sea Port Lifts	£236	£305	£316	£369	£462	£518
UK Non-SE Port Lifts	£9	£32	£44	£52	£80	£125
Feeder Port Lifts	£15	£21	£16	£19	£40	£94
Total UK Port Lifts	£260	£358	£376	£440	£582	£37
UK SE Deep Sea Port Entry	£69	£87	£112	£134	£149	£137
UK Non-SE Port Entry	£2	£8	£13	£15	£23	£46
Feeder Port Entry	£1	£2	£2	£2	£2	£7
Total UK Port Entry	£72	£97	£127	£151	£174	£190
UK SE Deep Sea Port Total	£305	£392	£428	£503	£611	£655
UK Non-SE Port Total	£11	£40	£59	£67	£103	£171
Feeder Port Total	£16	£23	£18	£21	£42	£101
Total UK Port Total	£332	£455	£505	£591	£766	£927
UK SE Deep Sea Maritime	£54	£62	£73	£83	£93	£92
UK Non-SE Maritime	£5	£16	£23	£25	£26	£42
Feeder Maritime	£25	£36	£27	£32	£69	£154
Total UK Maritime	£84	£114	£123	£140	£188	£288
UK SE Deep Sea Port Transhipment	£5	£12	£55	£40	£25	£18
UK Non-SE Deep Sea Port Transhipment	£2	£6	£7	£4	£11	£22
Total UK Transhipment	£7	£18	£62	£44	£36	£40
UK SE Deep Sea Rail Distribution	£130	£160	£195	£227	£238	£197
UK Non-SE Rail Distribution	£4	£14	£22	£26	£28	£61
Feeder Rail Distribution	£0	£0	£0	£0	£0	£0
Total UK Rail Distribution	£134	£174	£217	£253	£266	£258
UK SE Deep Sea Road Distribution	£629	£772	£920	£1,074	£1,166	£1,168
UK Non-SE Road Distribution	£24	£80	£121	£143	£229	£319
Feeder Road Distribution	£38	£58	£45	£53	£106	£266
Total UK Road Distribution	£691	£910	£1,086	£1,270	£1,501	£1,753
Continental Transhipment Lifts	£36	£51	£39	£46	£96	£226
Total revenue earned by GB transport industry	£1,164	£1,557	£1,870	2,158	2,569	2,978

Source: MDS Transmodal Ltd

Table 4.25: Implied need for further feeder and short sea berths, Scenario 4 (2030)

Region	Additional feeder demand for quay metres (m)	Net Intra-European trade requirement *(m)	Implied need for further short sea quay metres (m)
South West/S.Wales	162	-178	(16)
South East/Haven	499	+789	1288
North West	1162	+120	1282
North East/Humber	918	+314	1232
Scotland	555	-38	517
Total	**3,296**	**+1007**	**4,303**

Source: MDS Transmodal Ltd

4.11 Transport industry impacts

Table 4.26 (a)-(f) summarise the results of the different scenarios by 5 year interval.

The results suggest that:

- If more deep water capacity is built in the south-east and Liverpool to the full extent of consents granted (including that also assumed at Southampton), further deep water capacity will not be demanded beyond the south-east until after 2020.

- Volumes transhipped on the Continent creating a corresponding demand for feeder berths will rise to 10.8m TEU in 2030 in Scenario 1 as compared with only 2.6m TEU in Scenario 2.

- GB transport revenue is minimised under Scenario 1. Revenues are more or less the same under Scenarios 2,3 or 4.

- Delivery costs are highly sensitive to there being capacity for direct calls and less sensitive to its location.

- Third country transhipment is effectively opportunistic and will be predicated by a port capturing domestic deep sea traffic in the first place. If the existing consented schemes plus Southampton are constructed by 2020, third country transhipment volumes could reach 3m TEU per annum before falling again as domestic growth squeezes it out.

Table 4.26: Model results compared [1]

(a) Supply - GB Deep Sea Port Capacity ('000 TEU)

	2005	2010	2015	2020	2025	2030
Scenario 1	6,662	7,427	7,427	7,427	7,427	7,427
2	6,662	8,437	15,029	15,029	15,029	15,029
3	6,662	8,437	16,139	17,471	17,471	17,471
4	6,662	8,437	14,097	15,428	15,428	15,428

(b) Demand ('000 TEU)

	2005	2010	2015	2020	2025	2030
Forecast Demand	5,722	7,834	9,578	11,196	13,317	16,029
Via south-east deep sea ports ('000s TEU)						
Scenario 1	5,035	5,686	5,769	5,590	5,410	4,708
2	5,035	6,407	8,073	9,429	11,210	12,601
3	5,035	6,407	8,073	9,429	10,203	12,593
4	5,035	6,407	7,910	9,237	10,032	10,011
Via non south-east deep sea ports ('000s TEU)						
Scenario 1	199	863	770	886	657	482
2	199	704	923	1,086	1,213	839
3	199	704	923	1,086	2,252	1,819
4	199	704	1,094	1,288	1,889	2,722

(c) GB containers transhipped on Continent ('000 TEU)

	2005	2010	2015	2020	2025	2030
Scenario 1	487	1,285	3,039	4,720	7,249	10,839
2	487	723	582	681	894	2,589
3	487	723	582	681	862	1,617
4	487	723	574	671	1,395	3,296

(d) Third country potentially transhipment in GB ports ('000 TEU)

	2005	2010	2015	2020	2025	2030
Scenario 1	304	318	329	391	746	907
2	304	766	3,598	3,190	2,047	1,123
3	304	766	3,598	3,190	2,221	531
4	304	766	2,739	1,903	1,582	1,739

(e) GB transport revenue (£m)

	2005	2010	2015	2020	2025	2030
Scenario 1	1,164	1,499	1,677	1,867	2,096	2,444
2	1,164	1,557	1,883	2,183	2,642	2,987
3	1,164	1,557	1,883	2,183	2,654	3,075
4	1,164	1,557	1,870	2,158	2,589	2,978

(f) Delivery cost (£/TEU)

	2005	2010	2015	2020	2025	2030
Scenario 1	223	221	219	223	226	233
2	223	218	205	205	205	213
3	223	218	205	205	205	211
4	223	218	205	205	202	216

(1) Key to Scenarios:

Scenario 1 No more deep sea capacity
Scenario 2 Felixstowe South, Bathside Bay, London Gateway, Liverpool and Southampton expansion
Scenario 3 Scenario 2 plus expansion at Bristol and Tees
Scenario 4 Scenario 3 less expansion at Southampton

Source: MDS Transmodal Ltd

4.12 Impact on regional transport networks

The different scenarios have contrasting impacts on inland transport networks. Those that only offer new port capacity in the south-east clearly have the most serious impact upon congested parts of both the road and rail networks around London. Scenario 3 does appear to offer, in the long term, the prospect of a higher proportion of container traffic passing via west coast ports and a positive comparative impact on non-user (external) costs as measured by DfT's Sensitive Lorry Miles (SLMs). The SLMs calculated above are equivalent to around 18p per TEU km (48p per container mile), as compared with the national average shown the DfT's Sensitive Lorry Mile document of a mean SLM of 51.1p per lorry mile. Given the high proportion of motorway activity for container traffic, the mean for containers is marginally lower. However, this strategy does not significantly reduce overall user costs and implies that the private sector will make the necessary investments in port infrastructure.

We have assumed that the volume of containers carried per train remains constant into the future. This implies that the rapid growth in 9’6” containers, forecast to reach 50% of all TEU by around 2010, will be addressed by loading gauge upgrade on high volume routes. On low volume routes, a wagon based solution may well be more cost effective.

Table 4.28 summarises the TEU km of road and rail freight and the Sensitive Lorry Mile impact by scenario. The worst performer in terms of Sensitive Lorry Miles is Scenario 3 as extra deep sea traffic through non south-east ports has the effect of extending both road and rail lengths of haul as compared with the feeder services (in Scenario 2) which would have been replaced.

To simply force traffic to use feeder services to reach regional ports tends to divert traffic from rail and not from road. This is because the great majority of containers for Northern Britain already use northern ports or arrive at regional rail terminals from South-East ports. This is readily illustrated. Let us assume that the distribution of container traffic for deepsea cargo shown in table 4.32 below also reflects that for short sea traffic. That would imply that the 3 Northern English regions account for around 2.1m TEU trip ends (i.e. 30.2% of 7.0m TEU, see table 4.32).

Table 4.27: Regional distribution of containers by inland origin/destination and port region (estimated).

	Approx. container trip ends (m TEU), 2005
Southern & Eastern England & Wales	2.54
Midlands	2.08
Northern England	2.11
Scotland	0.26
	7.00

In 2005, there were approximately 715,000 (1.15m TEU) containers moved to and from the ports by rail (source Freightliner), of which approximately 60% (690,000 TEU) were with terminals in Northern England.

Northern English ports (Liverpool, Irlam, Goole, Immingham, Hull, Tees and Tyne) handled some 1.33m TEU (source Maritime Statistics). It follows that almost as many containers were handled through northern English port and rail terminals (a total of 2.02m TEU) as appeared to have a northern origin or destination (2.11m TEU). While there will inevitably be some ‘leakage’ (containers through Liverpool, Tees and the Humber for the Midlands), the overall conclusion must be that the volume of containers moving by road between South-East ports and Northern England is limited.

Detailed breakdowns of these inland unit km by mode and SLM values disaggregated according to Government Office Region are provided in chapter 5. Note that the regional disaggregation refers to the region's roads that are being travelled along rather than the origin/destination of the HGVs. For example, traffic from London to Scotland passing along the M1/M6 would appear on roads in Greater London, East of England, South East, East Midlands, West Midlands, North West and Scotland. The same approach is used in the regionalisation of rail unit kilometres, assuming that rail network capacity is available.

Table 4.28: Scenarios compared by road and rail TEU km and SLMs (1)

(a) Rail TEU km (m)

Scenario	2005	2010	2015	2020	2025	2030
1	436	455	373	309	163	185
2	436	587	734	858	1,004	990
3	436	587	734	858	962	1,124
4	436	587	747	873	867	886

(b) Road TEU km (m)

Scenario	2005	2010	2015	2020	2025	2030
1	927	1,209	1,359	1,506	1,682	1,940
2	927	1,264	1,565	1,830	2,167	2,440
3	927	1,264	1,565	1,830	2,174	2,575
4	927	1,264	1,563	1,827	2,050	2,436

(c) SLMs (£m)

Scenario	2005	2010	2015	2020	2025	2030
1	167	218	245	271	303	349
2	167	228	282	329	390	439
3	167	228	282	329	391	463
4	167	228	282	329	369	438

(1) Key to Scenarios:

Scenario 1 No more deep sea capacity

Scenario 2 Felixstowe South, Bathside Bay, London Gateway, Liverpool and Southampton expansion

Scenario 3 Scenario 2 plus expansion at Bristol and Tees

Scenario 4 Scenario 3 less expansion at Southampton

Source: MDS Transmodal Ltd

Note:

The overall mean length of inland haul shown for 2005 in these tables is marginally lower than is actually experienced because the modelling aimed to mimic the behaviour of deep sea lines in minimising costs. This implies using feeder services to serve 100% of some country-to-region flows whereas, in practice, some containers will move overland by road, albeit at a marginally higher cost. This small difference does not materially affect our conclusions.

4.13 Impact on demand for feeder port capacity

It is one of the features of the discussions concerning future deep sea port capacity allocation that feeder traffic is often regarded as a makeweight. On a short term basis, transhipment traffic is often attractive to deep sea ports as 'filler' traffic and there is therefore active competition despite the fact that, in the longer term, domestic traffic is commercially more attractive. A similar attitude pervades the feeder port market. Relatively small ports are keen to attract business and, as a consequence, there is a presumption that overall feeder capacity can be indefinitely extended. However, this is clearly not the case. In the most extreme ‘feedering’ scenario (Scenario 1), an extra 15 kilometres of feeder or short-sea port quay metres are required by 2030, which would require around 150 container cranes; five times the present number at Felixstowe. This length would need to be complemented by no less than 10 km of additional quay length on the Continent. The lack of development of further deep water capacity in Great Britain will not only ‘require’ port capacity abroad; it will require extensive new or radically redeveloped feeder port infrastructure in Britain. The regional requirement for additional port capacity, expressed as required quay metres, is summarised in table 4.29 for 2030.

Table 4.29: Feeder and transhipment port capacity required by scenario in 2030
(required quay metres)

2030	**Scenario 1**	**2**	**3**	**4**
South West/S.Wales	1,558	(70)	(40)	(16)
South East/Haven	4,659	1,424	927	1,288
North west	4,771	1,678	914	1,282
North East/Humber	3,362	604	531	1,232
Scotland	733	733	778	517
Total	15,083	4,369	3,110	4,303
Continental Port requirement	9,853	2,353	1,472	2,307

* based upon discharge rate of 1100 TEU/quay metre per annum with deep sea vessel and 770 TEU/quay metre per annum with feeder vessel. Does not include intra European demand at deepsea Continental Port terminals as this requirement can be catered for at short sea ports.
Source: MDS Transmodal Ltd

An important aspect of the UK ports industry is its ability to self fund almost all infrastructure investment. The modelling approach we have adopted allows us to monitor the impact of both extra capacity and forecast growth on the gross revenue likely to accrue to the deepsea container port sector under different scenarios.

In order to conduct this analysis, we have assumed that:

- Revenues from deep sea direct services will depend upon volumes and the ‘market clearing’ rate that the model generates by port.

- Revenues from transhipment traffic (at £80 per container double-handled) are capped by (a), available capacity and (b), a maximum of 40% of any individual port’s throughput being transhipped.

- Remaining capacity being available for feeder traffic, providing the total volume of feeder traffic forecast to be available is not less than total net port capacity on offer (at £50 per container single handled).

Thus, for example, under Scenario 1, capacity as is available at a port such as Liverpool will be used for feeder traffic in any given year. However, under Scenario 3, the amount of capacity available from 2015 onwards will always exceed the feeder market available. We have assumed in these circumstances that the deep sea ports will also win the feeder business available in competition with the smaller ports such as Goole or Ipswich, that intra European traffic will remain unaffected and continue to patronise non deep sea ports such as Hull. Feeder traffic is only allocated to a port in its own region.

Table 4.30 Modelled deep sea container port revenues (i.e. those of the Haven, Thames, Medway, Solent, Bristol, Mersey and Tees)

£m (inc. port entry)

	2005	2010	2015	2020	2025	2030
Scenario 1						
Deepsea direct	316	425	443	469	467	471
Third country transhipment	7	8	8	9	17	21
Feeder	6	1	8	1	13	21
Total	329	434	459	479	497	513
transhipment ('000s TEU)	*304*	*318*	*329*	*391*	*746*	*907*
feeder ('000s TEU)	*179*	*29*	*257*	*39*	*429*	*682*
Scenario 2						
Deepsea direct	315	432	483	570	679	850
Third country transhipment	7	18	82	73	47	18
Feeder	6	1	1	1	0	8
Total	329	451	566	644	726	876
transhipment ('000s TEU)	*304*	*766*	*3598*	*3190*	*2047*	*787*
feeder ('000s TEU)	*179*	*30*	*41*	*33*	*12*	*253*
Scenario 3						
Deepsea direct	316	432	483	569	680	879
Third country transhipment	7	18	82	73	56	14
Feeder	6	1	8	9	12	24
Total	329	451	573	651	730	917
transhipment ('000s TEU)	*304*	*766*	*3598*	*3190*	*2221*	*531*
feeder ('000s TEU)	*179*	*30*	*253*	*283*	*398*	*778*
Scenario 4						
Deepsea direct	316	432	487	570	714	826
Third country transhipment	7	18	62	44	36	40
Feeder	6	1	7	8	9	24
Total	329	451	556	622	759	884
transhipment ('000s TEU)	*304*	*766*	*2739*	*1903*	*1582*	*1739*
feeder ('000s TEU)	*179*	*30*	*238*	*251*	*282*	*782*

This analysis suggests that the various projects included in Scenario 2, representing an increase in deep water port capacity of 7.603m TEU, will, by comparison with Scenario 1 in

2020 raise modelled port revenue by £164m (644m - £479m) per annum then rising to an increase of £363m per annum by 2030. The capital costs of these various projects (net of warehousing and other ancillary costs) could be expected to be in the order of £2.5 billion, which implies the private sector could be reasonably expected to fund such an increase in capacity..

4.14 Alternative shipping strategies

The scenarios considered above all assume that the established practice of the deep sea container shipping industry of serving N.W. Europe by a mixture of 3 or 4 direct port calls per ship per voyage, supported by feeder services, is maintained. It is, however, possible that alternative strategies will emerge to address changing environments. We have considered the option for some lines of developing alternative strategies for North Atlantic services as a consequence of the major deep water container terminals on the east coast of North America being able to receive Post Panamax vessels.

It is important to recognise that the shipping lines could adopt a wide range of different approaches addressing this opportunity. However, as a matter of principle, we believed it was important to examine whether some such concepts might be cost effective.

It is possible that lines will wish to make increased use of large post- Panamax container vessels to serve the Asia–Mediterranean-EC North American trades to exploit the deepening of the US ports but will find it difficult to fill the vessels without adding additional markets. One such option would be to divert such vessels via the British Isles as a substitute for the direct North Atlantic services which currently serve Britain. Such a service could, for example, serve such ports as Southampton, Bristol, Liverpool or the Clyde by adding on an extra week to overall round voyage time of a service which would otherwise proceed directly between the Straits of Gibraltar and North America. Substantial volumes of North Atlantic cargo already use the Port of Liverpool in any event. The strategy would effectively involve adding one ship to a vessel string currently offering a weekly service between, say, Singapore and New York. We have modelled the costs involved, taking account of the negative impact on unit costs on the North Atlantic leg for the residual service from the Continental mainland ports as a consequence of around a 20% loss of scale (i.e. the British Isles share of that market) for services between NW Europe and North America. That is, we assumed that such a service would (as a consequence) be using smaller ships than would otherwise be the case, not being able to ‘top up’ with UK or Irish business.

The results of this analysis are summarised in table 4.31. Four alternative GB port calls were considered; Southampton (test A), Bristol (B), Liverpool (C) and Hunterston (D). In each case, it was assumed that the switch of GB cargo to and from North America and Asia would lead to reductions in the volume of traffic on other services, and consequent loss of scale economies at any given market size. The concepts were tested using our LINCOST model, which takes into account:

i) an assumed pattern of trade for a given vessel string between each port
ii) the cost faced in each port in terms of stevedoring and ship access
iii) vessel operating and capital costs
iv) the cost of maintaining the associated fleet of containers

In addition, we take into account inland road and rail costs within Great Britain as for the scenarios tested above.

The services we tested are based upon actual container service strings that have recently been operated, in this case by the Grand Alliance. That is, this is a comparative exercise that could be considered by a single shipping entity.

Our conclusions are that a call at the south coast port of Southampton offers a lower overall through transport cost than current practice, and that this cost does reveal potential system savings for the services tested. These overall savings, for the 3 strings considered (Asia – N. America, Asia – N.E. Europe and N.E. Europe – N. America) are small, just £3m per annum overall in an overall annual service cost of over £500m (excluding inland costs). We assume port charges as in our base case (i.e. £70 per container handled at a GB deep water port). However, the exercise does demonstrate that the strategy is realistic using an existing 'standard' port of call.

Adopting the same strategy to serve Bristol instead saves £7m versus the base reference case and to serve Liverpool saves £15m. Our conclusion is that this strategy may be commercially attractive and could offer an effective means of relieving congestion at south-east ports given Post Panamax capability on the West Coast. In other words, it allows lines to divert traffic from existing congested ports at no net cost and, indeed, to make a small saving.

The costs of serving the Clyde instead of Liverpool or Bristol are higher than the base reference case by £10m as a consequence of containers having to travel much longer distances inland to serve the entire GB market. In each case, to retain comparability, we have assumed that the services will address the whole GB market. Our conclusion is, therefore, that an English west coast port call would be cost effective, given Panamax berths. In practice, a line calling on the Clyde would continue to serve southern England via other strings or feeders from Continental ports.

Table 4.31: The concept of diverting Asia – N. America Post Panamax services to Great Britain – comparative costs* by port (2005 market volumes)

	Maritime costs £m	Port entry £m	Inland costs Great Britain £m	Total £m	Incremental savings per GB TEU*
Base case	508	60	94	663	-
Via Southampton	507	59	94	660	£2.4
Via Bristol	508	59	89	656	£6.6
Via Mersey	510	59	78	647	£15.3
Via Clyde	509	59	105	673	(£10.2)

* costs for the 3 strings affected, Asia – N. America, Asia – NW Europe, NW Europe – N. America, including all maritime costs and inland transport and port handling costs in Britain.
Source: MDS Transmodal Ltd

The model includes the cost implications for feeder vessels to Iberia, Scandinavia and Ireland. For an individual GB port, the consequence would be that the twice weekly visit of a 6,000 TEU vessel would lead to a mean cargo exchange of 3,240 TEU, with a further 2,025 TEU handled to and from feeder vessels, adding up to 273,780 TEU (5,265 TEU X 52 weeks) exchanged at the GB port, reflecting a need for 290m of quay (effectively one berth).

This approach will also force containers on that service to and from the third country transhipment areas such as Scandinavia and the Baltic to tranship at a GB port. Consequently, even if the cost of delivering GB domestic containers is neutral, there would be a benefit to the GB economy from the stevedoring revenue from transhipping third country containers. The approach appears to be cost effective.

4.15 Sensitivity to assumption on distribution

The entire exercise described in chapter 4 has been based upon a revised distribution of deep sea container import and export traffic within Great Britain as compared with the earlier report. The revised distribution indicates a lower proportion of containers inbound to the south-east, largely as a consequence of importers locating new large warehouses in the Midlands for national onward distribution. Goods for the south-east tend to be forwarded on to retailers' Regional Distribution Centres in a secondary movement. Lower assumed charter rates as compared with the May 2006 report reduce the cost of diversion to ports on the west coast or to the north-east. Table 4.32 below compares the distribution assumed in this study and that indicated by the 1991 origin-destination survey on which the earlier exercise was based.

Table 4.32: Distribution of containers by region* (%)

	Revised (based on distribution port and shipping data contributed to MDST)	Original MDST distribution (1991 DfT survey)
North East	2.8	4.6
Yorkshire & Humberside	12.4	9.4
East Midlands	16.6	7.4
East of England	8.9	12.4
South East	9.9	13.6
Greater London	9.0	11.7
South West	5.2	5.6
West Midlands	13.1	9.4
North West	15.0	15.3
Wales	3.4	4.3
Scotland	3.7	6.3
Total	100.0	100.0

* the volume of containers was estimated separately for imports and exports for each county; the larger of the two numbers used, and then summed to regions to replicate balancing volumes of empty containers.

The changes that table 4.32 reflect do correspond to the general impression in the distribution and shipping industries that there has been a relative growth in traffic to the Midlands and to the Yorkshire and Humberside areas, reflecting an increase in the number of distribution buildings erected, and a relative decline in traffic to the South-East and Greater London. We have re-run the model on the basis of the 'original' distribution assumptions for Scenario 2 to check whether this revised distribution would lead to a different set of conclusions. This is described in Table 4.33 below.

Table 4.33: Different inland distribution model results compared

'000s TEU

	2005		2015		2030	
	Scenario 2 revised distribution	**Original distribution**	**Scenario 2 revised distribution**	**Original distribution**	**Scenario 2 revised distribution**	**Original distribution**
SE deep sea	5035	5199	8073	8723	12601	12268
Non SE deep sea	199	0	923	-	839	1142
Feeder ports						
South West/ S Wales	-	-	9	-	83	145
South East	-	-	20	-	489	355
North West	170	-	12	-	1200	159
North East	91	178	212	286	223	1012
Scotland	217	344	329	569	594	948
Total	**5722**	**5722**	**9578**	**9578**	**16029**	**16029**

The fact that the ‘original’ distribution does not explain why some deep sea traffic does enter GB through direct shipping at a non-SE port (Liverpool) in 2005 does suggest that the revised distribution despite lacking a rigorous statistical sampling basis, more accurately reflects current reality. By 2015, the revised distribution forecasts that a significant volume of deep sea traffic will use Liverpool whereas the original distribution did not produce an explanation. The earlier analysis was forced to assume that around 7% of the market behaved differently because (in effect) those flows were explained by a typical demand conditions for some lines. The revised distribution allows the whole market to be modelled as one and is therefore more satisfactory and merits consideration. The overall conclusion that the great majority of port demand will remain in the South East is, however, not disturbed.

There is significant interest in the ports industry in better establishing the inland distribution of containers. The 1991 survey was based upon a relatively small sample (2%) of all Customs entries; a sample of those completing Customs returns were asked to add further detail on mode, origin and destination and so forth. That approach is no longer practical because intra EU traffic is not required to make Customs entries. Furthermore, some extra EU traffic may ‘enter’ the European Union Customs regime through other countries before arriving in the UK.

The approach adopted in this study, in utilising data provided by commercial organisations may lack the rigour of strict statistical sampling, but it benefits from representing a much higher proportion of total container movements, around one eighth (12%) of all containers passing through GB ports. We believe that the sources of the two data sets will to some extent correct the bias that each individual may reflect. The shipping line sourced data only includes traffic the line organises inland and not the onward ’merchant haulage’ in the UK of traffic it carries only as far as the port. As a result, the sample may include more long distance hauls because of the rail services that line can also offer. On the other hand, the ‘port’ sourced data is based on data from hauliers which may underestimate (but not exclude) traffic first passing through inland rail terminals.

4.16 The impact of adding to port capacity summarised

This study was intended to examine the value which transhipment might confer to the GB ports industry as well as the wider economy. This question was to be considered in the context of:

- Continuing deep sea growth in the demand for container handling services at GB ports. Domestic demand is forecast to grow by 182% between 2005 and 2030;
- the current and foreseeable capacity available in GB ports and on the Continent;
- trends in increasing vessel size and capacity; and

- the economics and competitive structure of the ports and container shipping industry.

It is our view that it is unrealistic to assess the value of transhipment in isolation from that of the overall relationship between capacity and domestic demand. In 2005, there was approximately 7.0m TEU of domestic container traffic to and from Great Britain. Some 1m TEU of that figure was transhipped elsewhere in Europe before it landed. A further 0.5m TEU of business was transhipped between third countries or between GB ports. Growth in domestic demand will dominate the market for port services in Britain. By contrast, lines have a wide choice of where to tranship for third countries and will tranship where capacity is available and price competitive. It will have relatively little effect on the decision to make a UK port call.

The study has therefore tended to focus on the relationship between the availability of GB port capacity and a range of different outcomes, of which the ability to tranship and its economic benefit is only one aspect. These other outcomes included the overall level of revenue enjoyed by the GB freight industry, end user costs (costs of delivery), the relative impact of different port construction strategies on the road and rail networks, including environmental measurement, and the impact on the overall economy.

These issues were tested through a number of scenarios against the normal or typical behaviour of the shipping lines in delivering and collecting containers from end users. The principal device adopted was cost modelling. In each case, the scope to tranship third country containers at a GB port was predicated upon the availability of capacity at the current market rate while transhipment of GB domestic containers at a Continental port was an outcome based upon the transport cost modelling of alternative routings.

Our principal conclusions were that:

- The lack of additional GB deep water container port capacity (Scenario 1) would raise user costs, reduce GB transport revenue, and add (relatively) to road freight and environmental costs. A need for a very extensive expansion in the number of feeder berths emerges, for which plans do not exist. The overall impact on the economy was generally negative, raising end user costs.

- A ‘south east plus Liverpool’ development approach (Scenario 2) succeeds in reducing user costs significantly over a ‘do nothing/feeder’ approach. This strategy is expected to be ‘free’ to the public purse except (perhaps) for the creation of some extra rail network capacity.

- The development of yet further capacity beyond the south-east (Scenario 3) produces more or less identical results as far as public interest measurements are concerned as compared with more feeder berths. Whether the ports involved choose to proceed with these developments is a matter for the private sector. The modelling suggests that much of this extra capacity will in practice accommodate feeder (smaller ship) traffic.

- Extension of ports capacity under Scenario 3 does not add greatly to total deep sea port earnings, partly because 'existing' ports would lose bargaining power.

- A strategy (Scenario 4) which substituted extra capacity in the west and north for a similar amount of capacity in the South East (a switch of around 15% of total deep water terminal capacity) would reduce Sensitive Lorry Miles non user costs by 6% and reduce rail earnings by around 8%.

- Where there is adequate deep sea capacity in south-east ports to address the market (Scenario 2, 2020), the only direct deep sea traffic won by ports outside the south-east is in Liverpool. As traffic builds up and south-east capacity is exhausted, the model suggest that some of the deep sea traffic will be attracted to 'regional' berths on a direct basis, and the balance will be attracted to feeder services.

We also considered a number of possible alternative routing strategies which some lines may consider in order to address growing port congestion, the employment of larger vessels and the opportunity that continually expanding markets might offer in terms of new services. The one that showed potential was one in which lines diverting deep sea services between Asia East Coast North America (via the Suez Canal) to a GB port call. The diversion of Post Panamax vessels to a GB west coast port en route between Asia and N. America did appear to be cost competitive, and may therefore have some modest potential for diverting cargo from the south-east.

Our overall observation is that the availability of port capacity in Britain and the Continent and the impact on the transport networks and on overall economic performance are highly interconnected. There can be no doubt that adding to port capacity does convey economic and user benefits at no cost to public sector funds, providing port expansion continues to be self funding.

5 INLAND IMPACTS OF PORT TRAFFIC FORECASTS TO 2030

We have employed our GBFM to establish the impact that forecast growth in port traffic is expected to have on inland road and rail networks. For each cargo group, inland origins and destination assumptions were established and the geographical relationship with the ports used as the basis for assigning traffic to road and rail networks. Modal share and, in the case of short sea traffic, choice of port is based upon the transport cost equations calibrated within GBFM. Thus, for example, our assumption that road haulage costs will tend to rise as a consequence of per capita GDP growth raising drivers' wages will tend to divert some unit load traffic onto longer shipping routes to reduce overland costs.

Table 5.1 provides forecasts of the inland impacts of unitised port traffic up to 2030. The forecast suggests that total Ro-Ro unit kilometres (including Channel Shuttle traffic and assuming all Ro-Ro traffic is transported by road) will increase by 98% up to 2030, while total Lo-Lo unit kilometres will grow by 135%.

Lo-Lo rail modal share is forecast to increase from about 7% in 2005 to 9% in 2030, reflecting an increase in the proportion of deep sea Lo-Lo traffic compared to short sea traffic, the latter being much less likely to be transported inland by rail. However, this proportion will fall as container traffic is diverted to regional feeder services if South-East ports 'fill up'.

Table 5.2 also describes estimates up to 2030 of the unit kilometres of unitised port traffic transiting each region. In 2005 the South East had the most transit unit kilometres, mainly because of the presence in the region of major Ro-Ro gateways to the Continental mainland and deep sea container ports at Southampton and Thamesport. The different growth rates in unit kilometres for each region up to 2030 reflect the mix of port traffic transiting each region.

Table 5.1: Forecasts of GB port unitised traffic by mode

Million Unit Kilometres

	2005	2010	2015	2020	2025	2030	% Change
BY MODE							
Ro-Ro* – total (all by road)	2,290	2,637	3,062	3,542	4,049	4,523	+98%
Lo-Lo – total	974	1,411	1,532	1,788	2,095	2,289	+135%
Of which: by road	*732*	*963*	*1,092*	*1,263*	*1,462*	*1,708*	*+133%*
Of which: by rail	*242*	*319*	*440*	*525*	*633*	*581*	*+140%*
Total unitised port traffic – by road	3,022	3,600	4,154	4,805	5,511	6,231	+106%
Total unitised port traffic – by rail	242	319	440	525	633	581	+140%
Total unitised port traffic	3,264	3,919	4,594	5,330	6,144	6,812	+109%
Modal % for rail	7%	8%	10%	10%	10%	9%	

Table 5.2: Forecasts of unitised port traffic by region crossed

Million unit kilometres

	2005	2010	2015	2020	2025	2030	% Change
ROAD TONNE KM BY REGION CROSSED							
North East	50	62	73	86	98	110	+120%
Yorks. & Humber	236	293	336	390	449	514	+118%
East Midlands	283	336	384	444	512	581	+105%
East of England	630	752	831	961	1,115	1,282	+103%
South East	732	835	991	1,144	1,320	1,479	+102%
London	77	90	107	124	143	163	+112%
South West	122	146	171	198	228	260	+113%
West Midlands	307	377	442	510	579	617	+101%
North West	295	369	423	492	555	635	+115%
Wales	104	126	149	168	187	213	+105%
Scotland	186	212	244	288	325	377	+103%
Average length of road haul	258	252	251	251	250	244	
Average length of rail haul	332	332	334	333	331	319	

Source: MDS Transmodal

* Including Channel Tunnel

Table 5.3 provides forecasts of inland impacts of non-unitised port traffic up to 2030, using the GB Freight Model to analyse the amount of transport by road and rail. The forecast suggests that, while total tonne kilometres will increase by 4%, rail tonne kilometres will fall by 2015 due to a reduction in the demand for imported coal and then recover to have fallen by just 10% by 2030. Imported coal is by far the most important bulk rail traffic handled through ports and then transported inland by rail. The modal split for rail fluctuates in line with the relative volume of coal imports compared to other non-unitised port traffics, the latter being more likely to be transported inland by road. The average length of haul by road increases from 88km in 2005 to 92km in 2030, which reflects a change in the mix of bulk traffic towards traffics that are distributed further inland.

Table 5.3: Forecasts of GB port non-unitised traffic by mode 2005-30

Million Tonne Kilometres

	2005	2010	2015	2020	2025	2030	% Change
Total non-unitised port traffic – by road	8,254	8,729	8,835	8,940	9,005	9,078	+10%
Total non-unitised port traffic – by rail	5,169	4,846	3,710	4,318	4,829	4,850	-6%
Total non-unitised port traffic	13,423	13,575	12,545	13,258	13,824	13,928	+4%
Modal % for rail	39%	36%	30%	33%	35%	35%	
Average length of road haul (km)	*88*	*91*	*91*	*92*	*92*	*92*	
Average length of rail haul (km)	*138*	*138*	*135*	*136*	*137*	*137*	

Source: MDS Transmodal

The impact of these changes on road and rail networks themselves are described in the following figures. They describe the assignment of all unitised road freight to and from the ports in 2005, 2015 and 2030, showing that the largest current flow, between Dover and Folkestone and through Kent and along the M25 to Watford, will remain the dominant international road freight corridor. In volume terms, international road freight along the entire M1/M6 corridor as far as Cheshire remains larger than on the road corridors that serve either the Solent, the Haven or the Humber ports.

The rail freight analysis highlights the pressure which growth through Southampton, the Haven and the Thames will place on the network, particularly through North London. The largest increase is forecast to be from Southampton and London Gateway.

Figure 5.1 HGV movements: all external unitised road freight: 2005

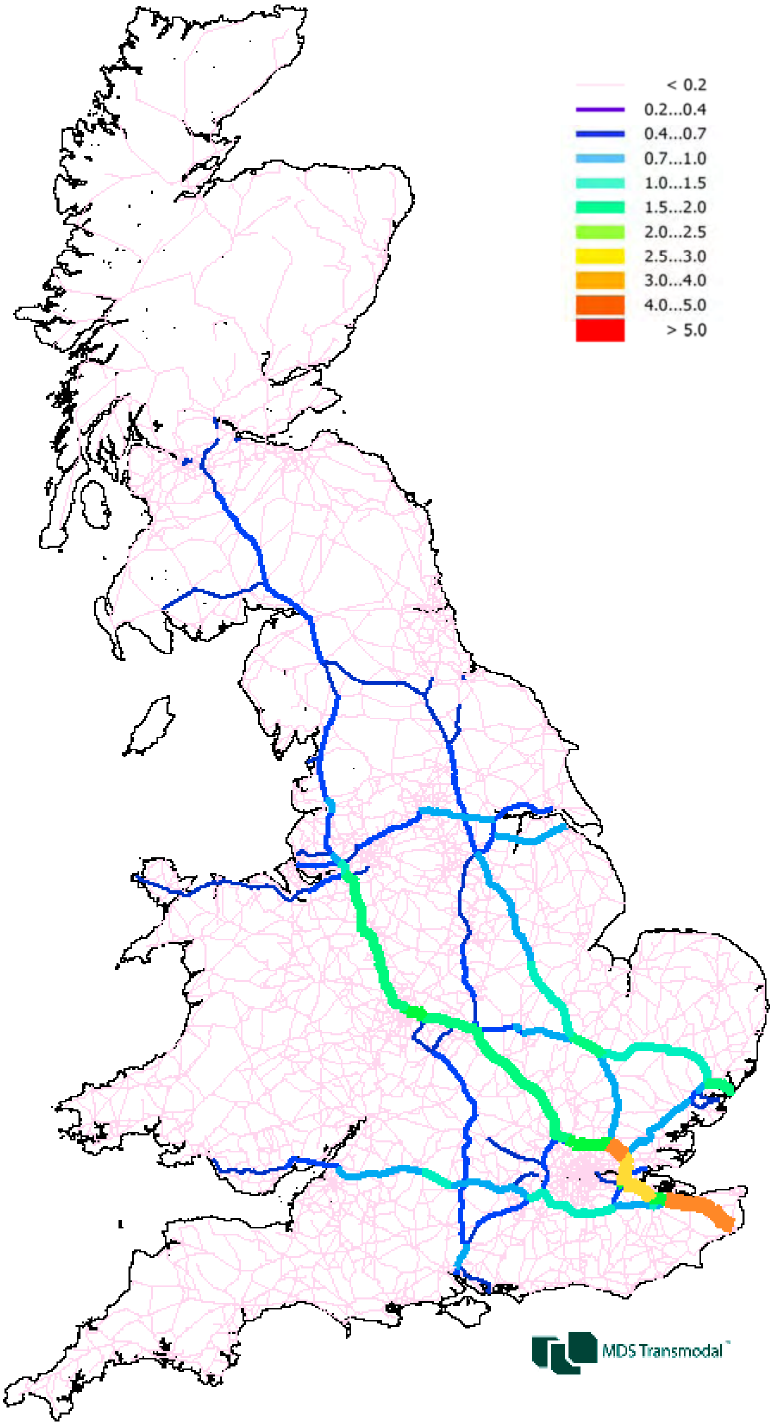


Figure 5.2: HGV movements: all external unitised road traffic: 2015

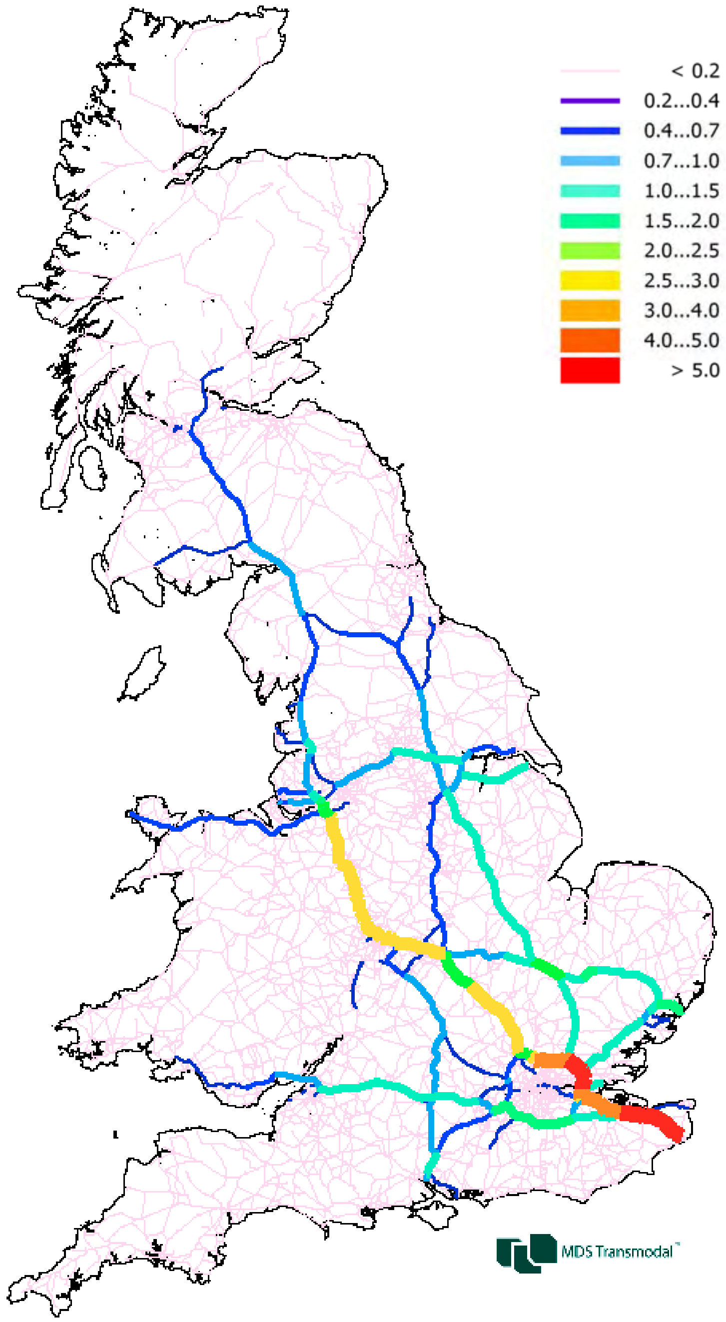


Figure 5.3: HGV movements: all external unitised road traffic: 2030

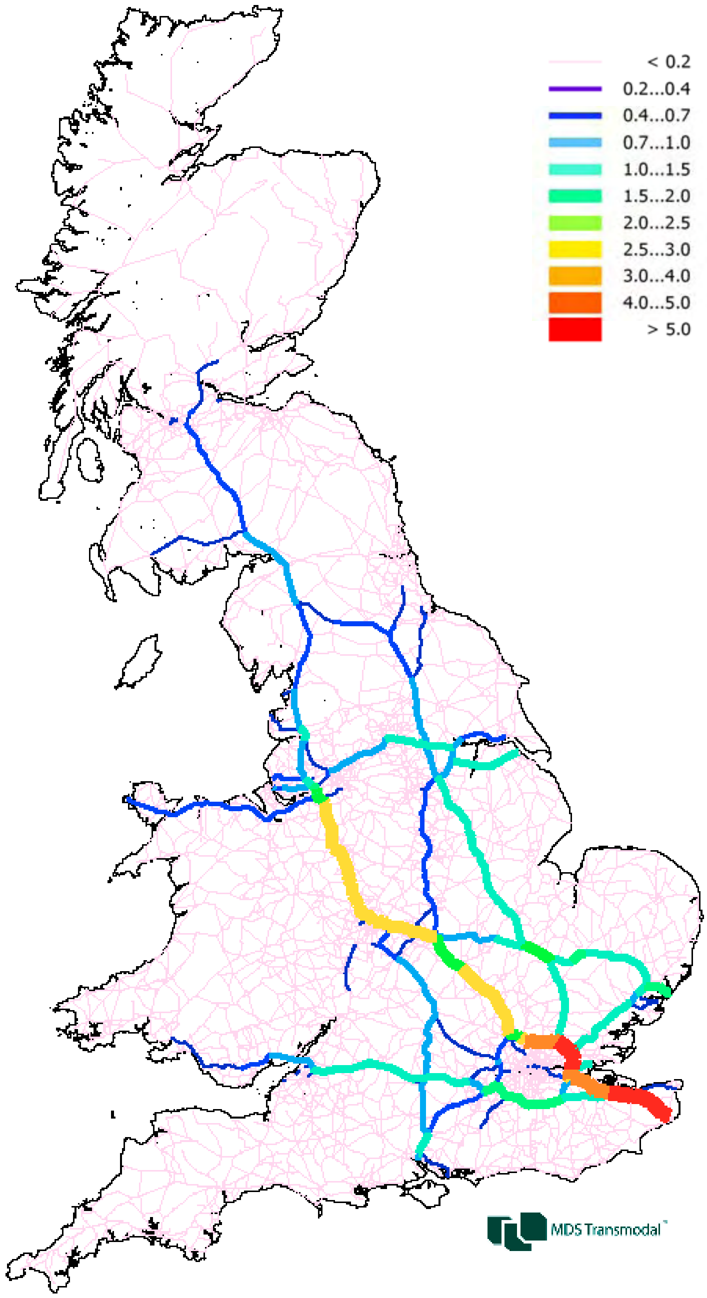


Figure 5.4: Train movements: all port based container traffic 2006

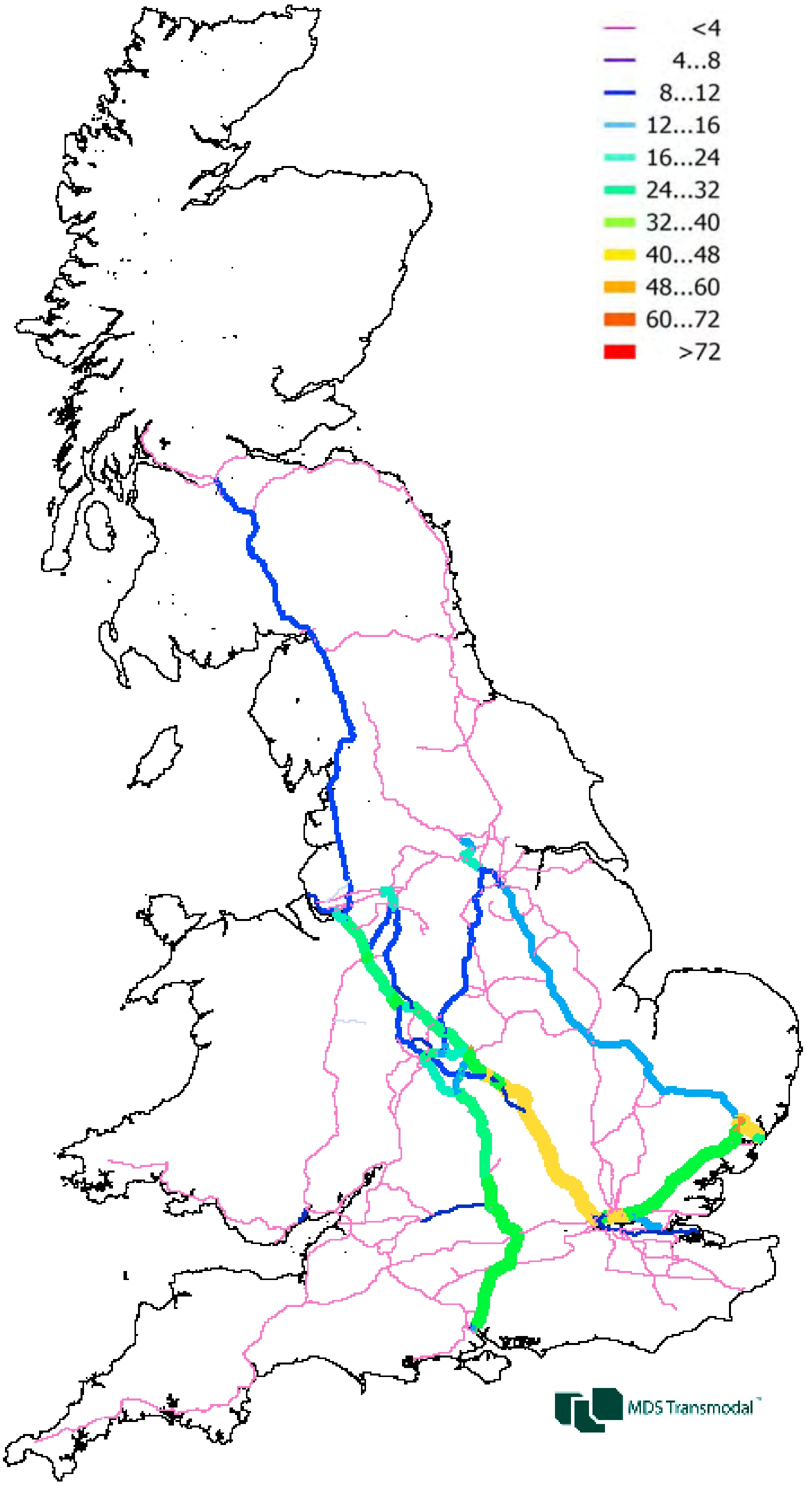


Figure 5.5: Train movements: all external container traffic 2015

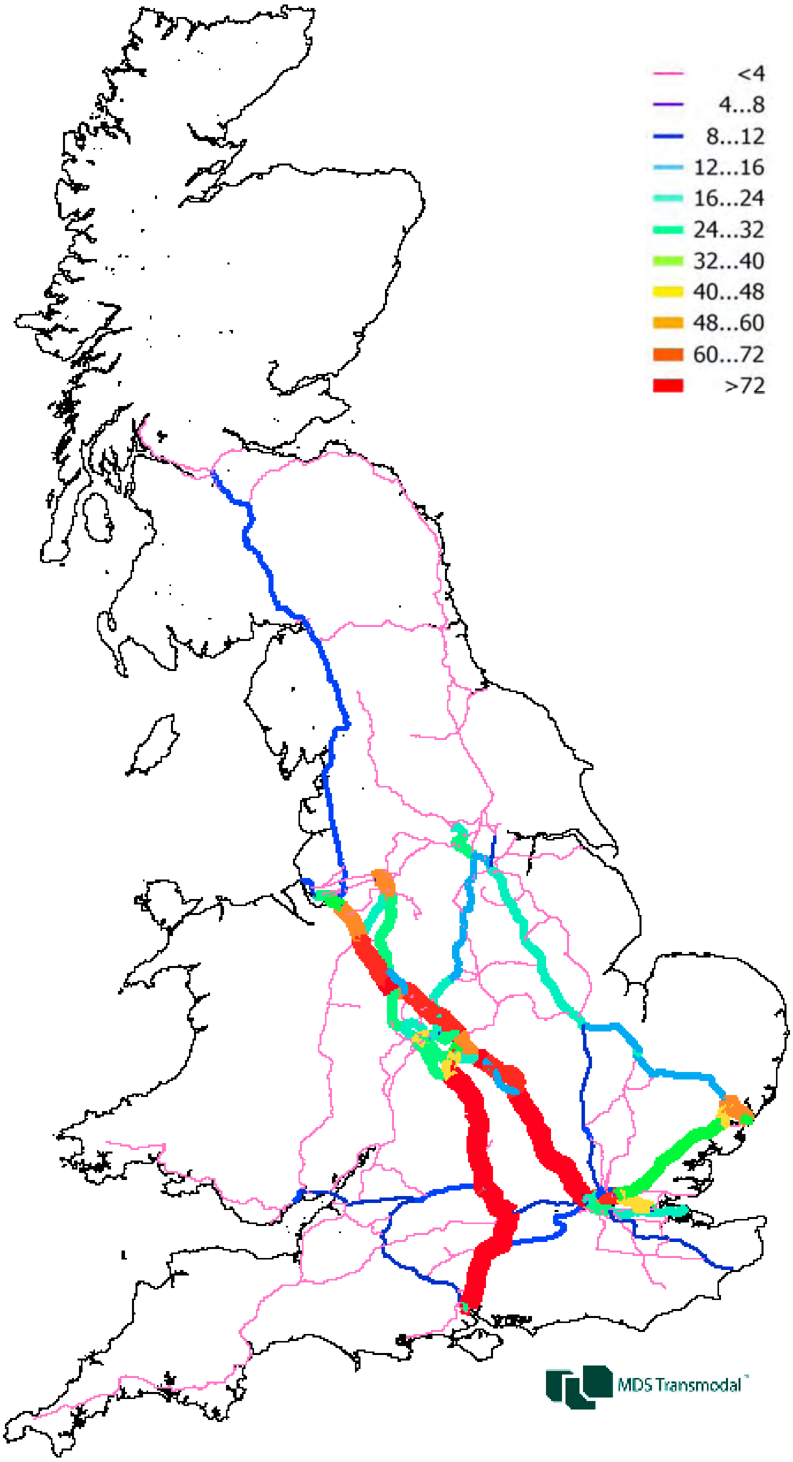


Figure 5.6: Train movements: all external container traffic 2030

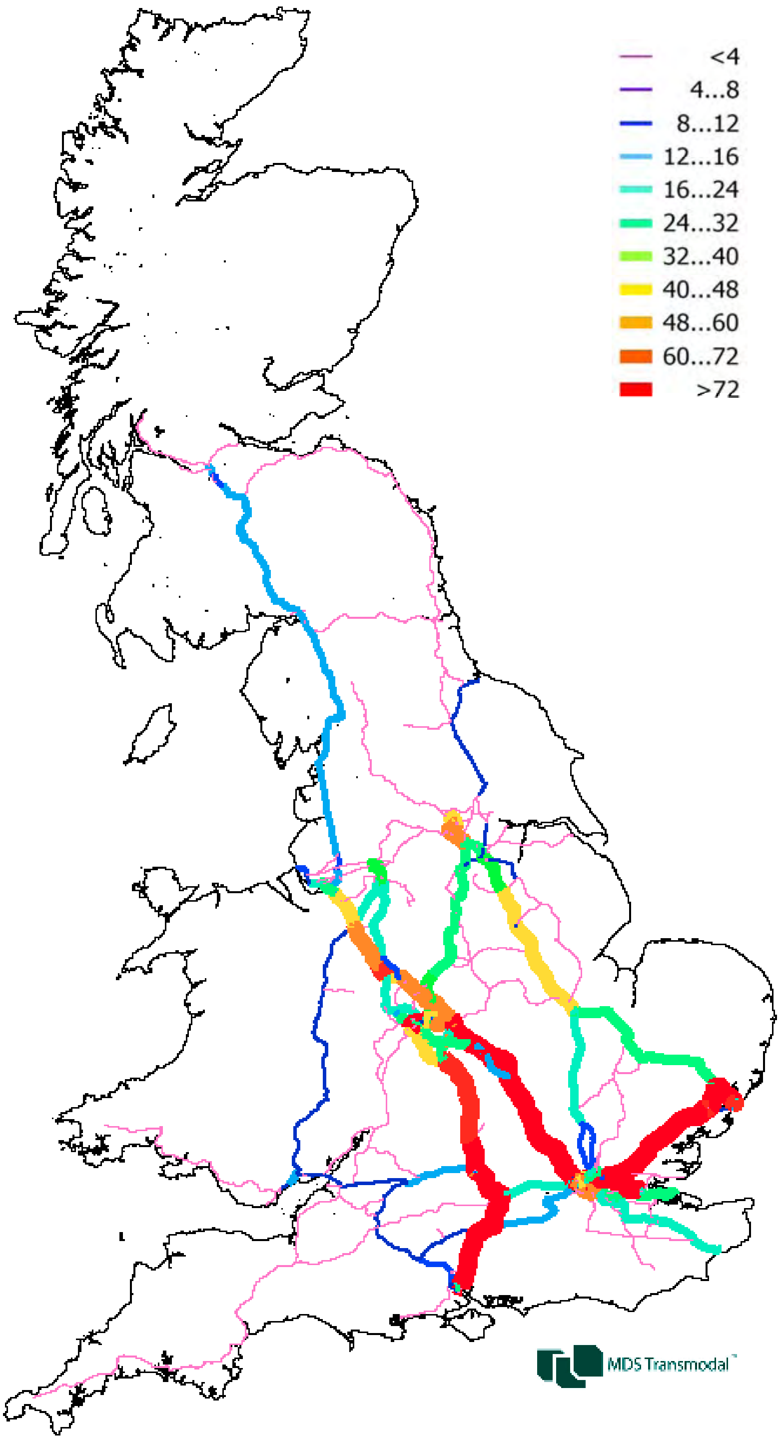
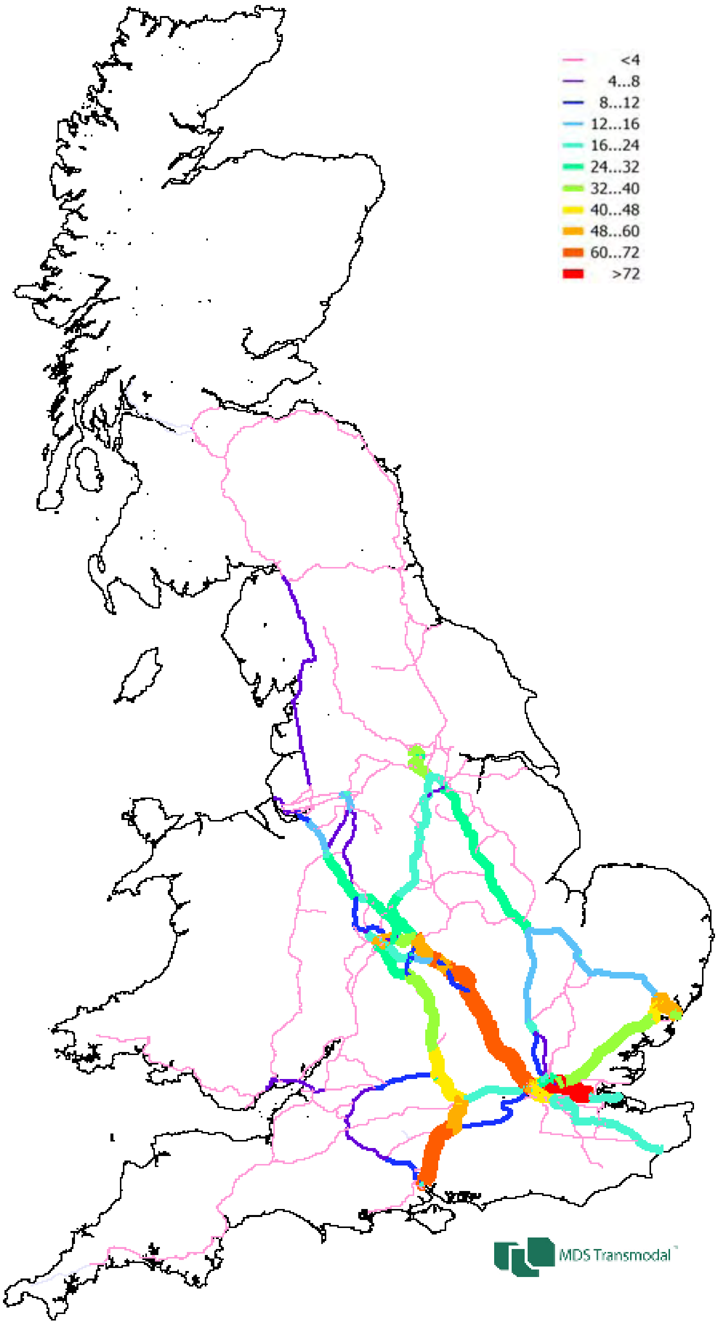


Figure 5.7: Train movements. Net increase in external container traffic 2006 to 2030



6. OVERALL FORECASTS OF DEMAND FOR UK PORTS TO 2030

In 2005, GB ports plus the Channel Tunnel handled a total of 536 million tonnes of cargo.

Table 6.1 summarises the revised non-unitised forecasts for Great Britain in tonnes. Non-unitised traffics are forecast to grow by 4% overall to 429 million tonnes, mainly driven by a forecast increase in LNG imports.

Table 6.1: Overall Forecast Growth in GB Non-unitised Traffic in Tonnes to 2030

Million Tonnes

Mode of appearance	2005	2010	2015	2020	2025	2030	% CHANGE 2005-2030	% CAGR 2005-2030
BULK TRAFFIC GB "major" ports								
Liquid bulk	260	276	267	277	280	282	+9%	+0.3%
Dry bulk	120	109	98	105	110	111	-8%	-0.3%
Other general cargo (including import/export vehicles)	32	34	35	35	36	36	+16%	+0.6%
Total GB non unitised	411	419	400	417	426	429	+4%	+0.2%

Source: MDS Transmodal

Table 6.2 summarises the forecasts for the unitised cargoes in tonnes and units. Between 2005 and 2030 container traffic is expected to grow by 174% as measured by TEU and HGV units are expected to grow by 101%.

Table 6.2: Overall forecast growth in GB unitised traffic to 2030

Million

	2005	2010	2015	2020	2025	2030	% CHANGE 2005-2030	% CAGR 2005-2030
Lo-lo tonnes	40	51	61	71	81	94	135%	3.5%
Lo-lo TEU	7	10	12	14	17	20	174%	4.2%
Ro-ro tonnes (including Channel Tunnel)	85	99	115	133	153	171	101%	2.8%
Ro-ro units (including Channel Tunnel)	8	9	11	13	14	16	101%	2.8%

Total port tonnes for Great Britain are forecast to grow by 30% to 694 million tonnes.

Appendix: Major Ports Non-unitised Traffic in Thousands of Tonnes, Great Britain, 1995-2030

	Actual (1995 - 2005)											Forecasts (2010 - 2030)				
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
LIQUID BULK																
Liquefied gas	-	-	-	-	-	6,425	7,980	7,782	7,476	7,341	7,827	27,404	35,854	41,333	43,804	45,433
Crude oil	183,285	183,309	178,101	183,511	186,014	184,254	168,557	172,524	160,319	161,595	153,499	147,981	129,707	132,351	132,919	133,382
Oil Products	75,862	80,459	76,967	78,141	79,829	83,360	79,463	75,184	77,221	82,834	85,876	87,090	88,635	90,180	90,180	90,180
Other Liquid Bulk	20,205	20,374	20,696	15,581	13,128	13,106	13,985	11,964	11,921	12,297	12,599	13,289	13,289	13,289	13,289	13,289
All Liquid Bulk Traffic	279,352	284,142	275,764	277,233	278,971	287,145	269,985	267,454	256,937	264,067	259,801	275,764	267,485	277,153	280,192	282,284
DRY BULK																
Ores	25,210	25,118	27,124	26,005	25,249	20,307	19,559	16,987	17,989	17,820	17,929	17,399	17,456	17,600	17,756	17,997
Coal	23,012	21,954	23,322	24,652	21,769	25,463	37,471	41,187	35,595	39,453	50,202	39,968	28,575	34,711	40,488	40,600
Agricultural Products	14,126	13,904	13,982	14,979	13,623	12,564	11,388	11,112	12,660	10,622	11,633	10,487	10,352	10,223	10,101	9,984
Other Dry Bulk	32,934	30,631	29,694	31,761	31,844	39,902	40,703	41,690	42,304	40,206	40,305	41,560	42,045	42,046	42,047	42,049
All Dry Bulk Traffic	95,282	91,607	94,122	97,397	92,485	98,236	109,121	110,976	108,548	108,101	120,069	109,414	98,428	104,580	110,392	110,630
ALL BULK TRAFFIC																
Bulk fuels	282,159	285,722	278,390	286,304	287,612	299,502	293,471	296,677	280,611	291,223	297,404	302,443	282,771	298,575	307,391	309,595
Other bulks	92,475	90,027	91,496	88,326	83,844	85,879	85,635	81,753	84,874	80,945	82,466	82,735	83,142	83,158	83,193	83,319
All Bulk Traffic	374,634	375,749	369,886	374,630	371,456	385,381	379,106	378,430	365,485	372,168	379,870	385,178	365,913	381,733	390,584	392,914
OTHER GENERAL CARGO																
Forestry Products	7,211	7,184	7,740	8,310	7,856	9,356	9,077	9,842	9,766	9,950	9,009	10,966	11,349	11,795	12,043	12,307
Iron & Steel Products	9,667	10,113	8,927	9,527	8,401	9,622	9,608	10,032	8,729	9,759	10,084	9,562	9,607	9,700	9,801	9,950
Import/Export Vehicles	2,763	4,985	3,353	4,968	3,840	3,935	3,879	4,573	4,743	5,158	5,294	5,569	5,840	6,107	6,309	6,499
General Cargo & Containers	5,679	22,362	5,415	22,899	4,240	4,853	6,712	6,572	6,599	6,573	7,129	7,720	7,720	7,720	7,720	7,720
All other general cargo	25,320	44,644	25,435	45,704	24,337	27,766	29,276	31,019	29,837	31,440	31,516	33,817	34,516	35,322	35,873	36,476

All Ports and Channel Tunnel, Unitised Traffic in Thousand Units, Great Britain, 1995-2030

	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
CONTAINER & RORO TRAFFIC																
Container traffic excluding transhipment traffic (Note	2,602	2,489	2,742	2,839	3,188	3,404	3,615	3,654	3,841	4,327	4,293	5,881	6,941	8,095	9,505	11,273
RoRo ports and Channel tunnel traffic (Notes 2 & 3)	4,286	4,519	5,162	5,647	6,001	6,905	7,105	7,461	7,650	7,828	8,196	9,390	10,911	12,640	14,460	16,159
All container and RoRo traffic	6,888	7,008	7,904	8,486	9,189	10,309	10,720	11,115	11,491	12,155	12,489	15,271	17,852	20,735	23,965	27,432

Note 1: Container traffic excluding transhipment traffic for 1995-2005, based on estimates by MDS Transmodal; forecast years 2010-30 only includes GB external traffic, excluding 3rd country transhipment & GB domestic traffic.

Note 2: Includes estimates by MDS Transmodal for the number of containers carried on RoRo services (between 2000 and 2005 have been factored up by 1.5 to estimate the number of container units carried).

Note 3: Forecasts years 2010-30 only includes GB external traffic, excluding traffic with the Channel Islands, the Isle of Man and the Northern Isles (167,000 units in 2005).