MDS Transmodal LTD

Local and Global Transport and Logistics Research

# DEPARTMENT FOR TRANSPORT

# CONTAINER PORT TRANSHIPMENT STUDY

FINAL REPORT

by

MDS Transmodal
In association with
DTZ Pieda Consulting

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## EXECUTIVE SUMMARY

The objective of this study is to identify and quantify the economic costs and benefits for UK ports and for the UK economy of providing additional container port capacity to service the deep sea container transhipment market, and to identify means of reducing the costs and increasing the benefits of transhipment for the competitiveness of the UK economy. The study forms part of the preparatory work for the DfT in developing UK ports policy, in line with statements made in the 2004 Transport White Paper.

The market for moving deep sea containers is growing relatively quickly. Over the period 1992 - 2004, the number of containers entering the GB economy has grown at a rate of approximately 7% per annum, measured by Twenty Foot Equivalent Units (TEU), or around 320,000 TEU more on average in each of the years between 1992 and 2004. We forecast the volume will rise from 7.1m to 10.0m TEU, a growth of 487,000 TEU per annum, in the years to 2010 and reach a total of 19.7m TEU by 2030. A high proportion of that total is made up of containers carried in very large vessels from deep sea markets.

These ships can only call at a limited number of ports in their voyages. Few ports have the facilities to accommodate them and it is only economic to call where (typically) the cargo exchange represents at least 10% of the ship's capacity. These ships make an average of 3.7 calls per voyage within Western Europe before returning to Asia, Africa, Australasia or the Americas. Since on average, ships make roughly 3 calls on the Continent, normally in a French, Benelux and a North German port respectively, that means that some 7 out of 10 services call at a GB port. Services that do not make a GB call will often deliver containers to Britain by switching them (often on the Continent) to other deep sea ships calling in Britain, so that the container will still arrive at a south-eastern deep water port, usually in a deep sea vessel.

However, an increasing proportion of containers for Britain is being delivered from Continental hub ports on 'feeder' vessels to provide a more local level of service, reducing inland transport costs within Britain but adding to port and maritime costs. Grangemouth, the Tyne, Tees, Humber, Bristol and the Mersey are all benefiting. Depending upon the inland origin or destination, such transhipment can make a marginal reduction in end to end delivery costs to some parts of Great Britain, albeit that direct calls at GB ports linked to overland road or rail transport will probably offer a faster and more frequent service.

There is, in addition, a substantial market for the ports industry in transhipping containers at 'hub' ports for markets too small to attract direct calls including, for example, Ireland, Norway, Finland and other Baltic countries and regions around the Bay of Biscay. Continental ports dominate this market but, as recently as 2000, GB ports (principally Felixstowe) were conducting over 1 million TEU moves in this business, transferring containers between different deep sea vessels as well as between deep sea and short-sea vessels. Lack of port capacity in south-east GB ports has inhibited this development, however, because the limited infrastructure available in GB ports is being used increasingly

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for GB domestic traffic and not third country transhipment traffic. The net consequence is that there is now substantially more GB container traffic being transhipped on the Continent than third country containers being transhipped in Britain.

Such transhipment does not generate large revenues for the ports as compared with that earned from stevedoring domestic containers. However, its contribution could be important in the highly competitive ports industry particularly in the early years of a new project when it is not fully occupied by domestic containers. It is a market into which GB ports can tap if capacity is available and rates competitive. However, the recent experience that the ports industry has had in securing planning consents to expand port capacity in south-east Britain has raised a number of important and related questions. These include:

- Despite the fact that the shipping lines express a strong preference for expanding south-east ports as their use minimises ship diversions (en route to a Benelux port) and serves the largest concentration of UK consumers, what are the impacts of developing deep water ports elsewhere in Britain to relieve road and rail congestion and divert more economic activity to the regions?

- What would result from a limited deep water port expansion and more dependence on use of Continental transhipment? This would divert traffic from the GB road and rail networks onto regional feeder services. What environmental impacts would result?

- The volume of transhipment engaged within Britain or on the Continent is a function of the port capacity made available and not needed for domestic cargo. That availability has a knock-on impact on how much is earned by the GB transport industry (including inland modes) and on the overall cost of delivering containers to receivers. How do these different factors balance out?

This study attempts to address these and other questions. It models the (cost-minimising) behaviour of the deep sea lines in delivering containers to end users, taking account of the different options available. Traffic is assigned to the road and rail networks. Ports are ‘selected’ on the basis of shipping costs, vessel sizes, the proportion of cargo bound for Great Britain and the inland distribution of cargo.

Because the principal policy lever available in a market economy will be granting consent for port capacity, the model takes as its driver the allocation of that capacity by port area. These allocations are based upon schemes that are currently being put forward by the industry. Five different scenarios were tested, including one that reflected an eventual shortage of Continental port capacity and corresponding increases in tariffs as the market uses price to ration the use of limited capacity. Modelling sought to identify equilibrium rates whereby port charges varied as a function of supply and demand. Outputs for each scenario included:

- The volume of transhipment, in Britain and of British cargo abroad;
- The consequential GB transport industry revenue;
- The consequential need to build additional feeder port capacity if deep water capacity is not available for deep sea vessel direct calls;
- The impact on the road and rail networks including a monetary valuation of congestion and environmental impacts;
- The direct employment effects, expressed as fulltime equivalent costs created by different levels of activity in ports in different parts of the country;
- The impact on delivery costs to end users;
- The effect on business costs, expressed as gross value-added (GVA) foregone as the result of potentially higher charges in accessing imports/exports.

Our conclusions, under five port capacity scenarios, based upon the volume of deep sea containers involved growing by around 180% by 2030 ( our central forecast derived from the parallel forecasting study), are that:

- The lack of additional port capacity in south-east England would raise end user costs and tend to minimise the use of rail;
- Providing that Continental transhipment capacity continues to be widely available at tariffs comparable with present ones, shipping lines would generally choose to use feeder ships to northern and west coast ports rather than divert deep sea ships to make direct calls at those ports;
- In the event that the supply of capacity on the Continent is inhibited, the lines will (to some extent) make direct calls at northern and western GB ports. End user costs are at their highest, but overall GB transport revenue will also rise, rail freight volumes will be maximised and the environmental impact of road haulage minimised;
- Transhipment of third country containers will take place when GB port supply otherwise exceeds demand. The amount of money earned by the GB ports industry from such activity remains modest. However, in conditions (Scenario 5) where direct deep sea calls to northern and western ports are viable and therefore baseload services are on offer, the extension of port capacity would encourage lines to increase transhipment in GB ports (e.g. to Scandinavia) ensuring a revenue for ports of around £25 per TEU crossing the quay.

Our overall conclusion is that transhipment of third country containers in GB ports is not in itself a major revenue earner. However, it is evident that foreseeable levels of market growth create a demand for container port expansion in Britain. The direct financial costs of maritime and inland transport of containers are lowest with further deep water terminal expansion in the south-east. However, this does not represent a full transport appraisal. In addition, arguments on capacity requirements are more complicated at other locations. In the case of Liverpool, for example, the expansion of facilities to be able to accommodate 'Post-Panamax' vessels is essentially a defensive measure, to ensure existing services are retained when there is a switch to larger container ships too large to enter the existing lock. For all the west coast projects put forward there is also the possibility of services developing between North America and ports east of Suez via the British Isles and Mediterranean. For expansion elsewhere, the question is probably whether port capacity should be built for deep sea vessels (to around 15 metres design draught) or to a maximum of 9-10m draught for feeder vessels. If capacity on the Continent eventually were in short supply in the medium to long term future, Britain would benefit from deep water ports outside of the south-east. Otherwise, an expansion of 'feeder' berths is likely to be sufficient.

Clearly, the impact on inland networks must be studied carefully. The 5th scenario, where deep water berths beyond the south-east appear to be successful, is the most effective scenario in terms of transport revenue, increasing rail freight and minimising the environmental impact of road haulage. However, it also leads to higher end user (delivery) costs for UK importers and exporters. It is a scenario that is dependent on the Continental ports choosing not to expand indefinitely to serve third countries. It reflects dependency on the part of the UK on other parties not being proactive. It is difficult to exaggerate the level of connectivity between these various issues.

# 1. INTRODUCTION

## 1.1 Terms of Reference and Study Objectives

The Department for Transport (the Department) has commissioned a study of container transhipment as it relates to the UK, to assess the implications of servicing the transhipment market for UK ports and the impact of transhipment on the competitiveness and growth of the UK economy. Container transhipment can be defined as the exchange of containers between ships via a port terminal, involving 2 separate lifts between the ship and the quay.

UK Ports Policy will be subject to a review in 2006 and this study forms part of the evidence base for that review. An important element of that review will concern the balance of supply and demand in the industry. Container traffic constitutes an important growth sector. Container transhipment can only take place where port capacity is available over and above 'domestic' or local requirements. It follows that it is important to understand the main economic costs and benefits for UK ports of servicing and competing in both the transhipment and domestic market and similarly the implications for the competitiveness of the UK economy of having sufficient port capacity in the UK to service the deep sea container domestic market in the most economic way possible. Further, this study should also identify the possible means of reducing costs and increasing the benefits of transhipment for the competitiveness of the UK economy.

The Department required that the study should describe and explain the present state of demand and supply for container port services and that it should provide an assessment of the impact of transhipment in generic terms based on scenarios of future UK port capacity covering the medium to long term (up to 2030). The scenarios should include at least two "do something" supply side scenarios. The study was required to consider how the interaction between port transhipment capacity and other variables in the logistics chain affects end customers and UK competitiveness.

**The Department has acknowledged that while this was potentially a large task, the study was essentially intended to scope the issue and to make a first attempt at a quantitative estimate of the costs and benefits involved.**

## 1.2 Report Content

This Report presents the key findings of the study as follows:

**Chapter 2** sets the study in context. It provides a definition of transhipment as it applies to Great Britain and explains the underlying economic principles of transhipment. It also sets out the possible economic impacts of transhipment on the GB economy and how such impacts might be measured.

**Chapter 3** describes the North West European container market by trade routes, the ships employed, the services they operate and the main ports used and port expansion plans. A brief description of these ports is provided. Overall market trends are outlined. Changes over time in port connectivity are discussed.

**Chapter 4** describes the GB container market, examining recent trends and forecasting to 2030. The volume of containers transhipped is estimated, including both containers transhipped in Britain and containers for Great Britain transhipped on the Continent. Forecasts are compared with those made in other exercises.

**Chapter 5** describes the methodology adopted to examine the relationship between port capacity, transhipment levels and the overall impact on the GB transport industry and the wider economy. Assumptions are set out in detail. Five scenarios are described.

**Chapter 6** describes the results of the modelling exercise. The driver is taken to be the provision of port capacity in Britain and abroad. Outputs are described in terms of the volumes of containers transhipped, the consequences insofar as impacts on the road and rail networks and the need for feeder port capacity are concerned, GB transport industry revenue and the wider impact on user (delivery) costs and on the GB economy.

**Chapter 7** describes three further effects of the different levels of transhipment on the GB economy under each of the five scenarios of port supply. The framework considers:

- The direct port employment effects, expressed as fulltime equivalent jobs created by different levels of activity in ports.
- The effects on business costs, expressed as GVA foregone as the result of potentially higher charges in accessing imports.
- The port revenue effect, which considers the impact on port income of differing levels of transhipment /direct shipping under the different scenarios

**Chapter 8** summarises our key findings and conclusions.

# 2. BACKGROUND TO THE STUDY

***"transhipments are important to the liner operations' economics and the lines look to consolidate their operations on hub ports...if they were to lose this business it would have correspondingly substantial adverse consequences. This consideration is of national interest."*** *(Modern Ports: a UK Policy, Para. 2.1.4)*

***This study seeks to update and improve understanding of how important transhipment is to the economic welfare of ports, port communities and the wider economy.***

## 2.1 Definition and Issues

This study is concerned with two definitions of transhipment as it affects Great Britain:

1. Transhipment of third country containers in GB ports
2. Transhipment of containers bound to or from GB at Continental ports (feedering)

***Third country transhipment***

The principal drivers for third country transhipment at deep water ports within North West Europe are:

a) To reduce the number of direct calls that large deep sea vessels need to make to serve the wider market. Vessels that cost around $50,000 per day to operate are too expensive to divert to small markets such as Ireland or Norway for relatively small cargo exchanges. It is cheaper to serve such economies by transhipment from large 'mother' ships to feeder ships.

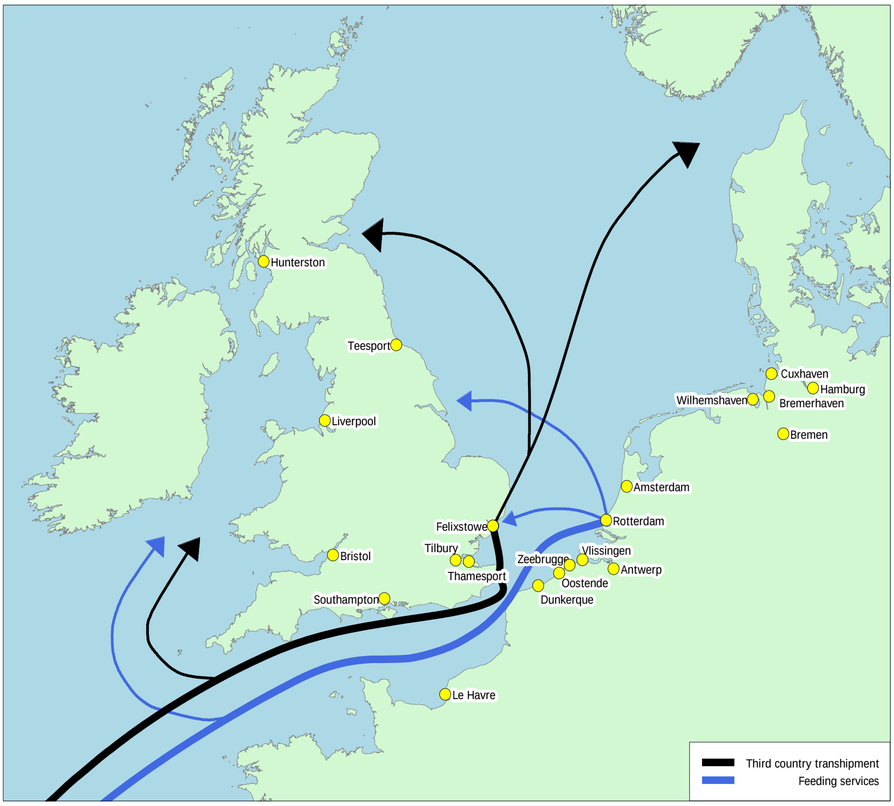
b) To allow the largest possible ships to operate on long-haul routes to maximise scale economies, without having to provide deep water port facilities in each country served.

Inevitably, these two drivers support each other.

The deep sea container market is served by a number of shipping lines acting alone (such as Maersk or MSC) or in operating alliances with others (such as K Line or MISC). These lines operate a large variety of routes (known as 'strings') that follow a timetabled port rotation with a 'fixed' fleet. Thus, for an example, a Far East – NW Europe string might be served by 8 vessels each round tripping in 56 days to offer a weekly frequency and calling at 8-10 ports. On average, 3.7 of those ports will be in NW Europe and normally (typically in around 70% of strings) one will be in Great Britain. With the exception of a few lines calling

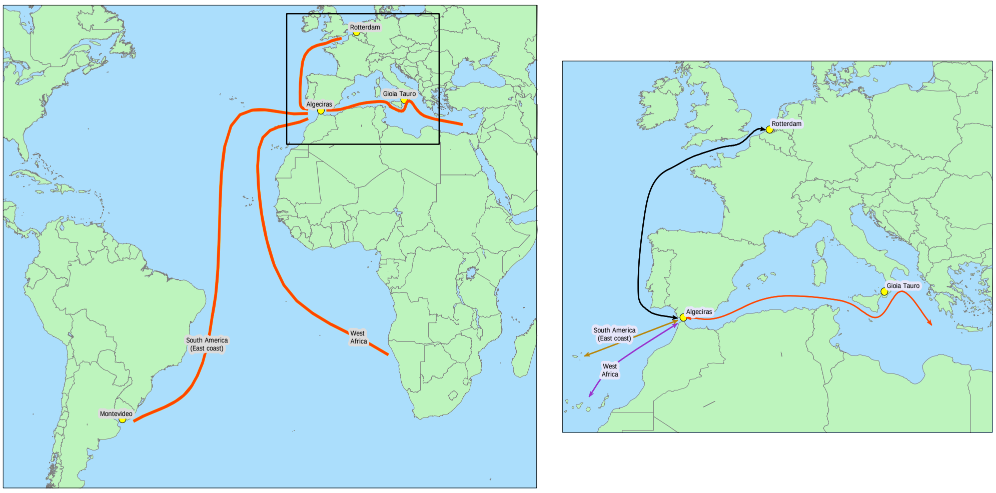
## Figure 2.1 Transhipment illustrated: Third country from UK and Continental to UK

Third country transhipment ports




## Figure 2.2 Example of Interlining

An example of interlining at Algeciras




in Liverpool and one at Bristol, that GB call will be in the south-east, at Felixstowe, Tilbury, Thamesport or Southampton.

The deep sea container industry operates in a free-market environment. The container ports of the European Union compete with each other for business. In these circumstances, transhipment at another deep water port such as Rotterdam, which is visited within the same vessel rotation, is clearly a close substitute for transhipment at a GB port. Insofar as shipping line costs are concerned, there may be relatively little difference, given the competitive nature of the industry, between transhipping between third countries at, say, Felixstowe or Antwerp. The short sea intra European feeder ships that serve this market frequently call at more than one ‘hub’ port on the same voyage allowing deep sea lines to exploit operational advantages in comparing one port with another (in terms of delivery schedules).

***Continental Transhipment of GB container cargo***

The GB port capacity that would facilitate large-scale transhipment of third country containers is also available for containers bound for GB (domestic containers). Conversely, it follows that one of the impacts of demand growing more rapidly than port capacity would be for there to be an increase in transhipment in third countries of GB container cargo and a reduction in transhipment of third country traffic in GB ports, a process driven by the pricing mechanism for port services.

There has been a well established distribution pattern for deep sea containers within Britain whereby the areas more remote from the deep water container ports are served by rail. However, lack of capacity in south-east ports and cost effective feedering services have led to a growing proportion of deep sea containers for Scotland, the North East, Humberside and now Merseyside being fed from deep sea ports by sea; sometimes from other GB ports, but more often from Continental ports. The driver to use feeder services is generally cost at the expense of service quality (there are speed and frequency challenges in using feeder services). However, as traffic has grown so has the frequency of feeder service that can be offered, so that service levels have improved.

Both forms of transhipment are directly affected by the availability of deep water capacity in Britain. Essentially, the greater the capacity at major British deep water ports to handle deep sea shipping services, the greater is the potential available capacity for handling third country transhipment with consequential benefical effects on port income and employment. The knock on impact of this is that less capacity is required at Continental ports and corresponding (paired) GB feeder ports to handle transhipped boxes. The implications of providing greater capacity at GB deep water ports therefore may be negative for some feeder ports.

The GB port supply/demand situation is dynamic and the potential capacity available for third country transhipment and consequently the demand for feedering fluctuates in step with changing trade volumes and as new deep water berths come on stream, either in the UK or on the Continent.

## 2.2 Principles of Transhipment

The principal purpose of transhipment is to reduce the overall cost of shipping by exploiting the very considerable economies of scale by using larger vessels for long haul routes. Deep sea container vessels of greater than 10,000 TEU capacity are now being built. In order to fill such ships and provide acceptable levels of frequency, these large ships will call directly at ports in several major load centres (e.g. Singapore, Netherlands, France) on a round voyage that might include (say) 10 port calls and serve smaller economies through feeder services to these major load centre ports. Further economies in port calls are made through ‘interlining’ en route, where containers will be transferred between ocean-going vessels on different routeings to minimise the number of separate services required. For example, a Mediterranean to North America service could tranship to a South Africa to North West Europe service at a port in the Straits of Gibraltar.

In so far as transhipment within North West Europe is concerned, the deep sea lines enjoy some choice as between the ports used for transhipment. Typically, an individual deep sea ship will call at four ports: e.g. Rotterdam (or Antwerp), Hamburg (or Bremerhaven), Felixstowe (or Southampton) and Le Havre. Transhipment to smaller economies such as in Scandinavia, Ireland or Atlantic Iberia could take place at any of these major load centres, although Rotterdam continues to dominate this market. Choice will depend upon port capacity, price/level of service and the feeder services available. In some cases, deep sea lines will effectively feed ‘in house’ using their own deep sea vessels which can transfer containers between the major load centres to reduce the number of calls some ships make. For example, a line may choose not to make a GB call with one of its strings and instead tranship containers for Britain using another string which does call at a Continental port and (say) Felixstowe. British ports clearly have an opportunity to engage in this interlining market if they have adequate capacity.

For Britain, however, a further opportunity exists because of its geography. The lines prefer to minimise the diversion of their ships to reach ports that are ‘off-route’. Deep sea container port capacity in Britain is concentrated in the south-east, effectively en route between the Atlantic and the North Sea ports on the Continental mainland. Containers for Northern Britain (i.e. the North West, Yorkshire & Humberside, the North East and Scotland) traditionally have been delivered by rail from south-east ports. However, the option is also available to deliver such containers by sea, from either Continental ports at which the deep sea vessels also call or from the GB ports themselves. The regional ports of discharge in the UK would not generally be able to accommodate deep sea vessels and typically charge £20-25 less per container handled than the deep sea ports.

Transhipping in Rotterdam to the Forth, the Tyne and the Tees relieves shortage of capacity at UK deep sea container ports. On a smaller scale, the same function is performed by feeder services from Felixstowe to the same ports and from Southampton to the Mersey and the Clyde. Of course, transhipping in UK deep water ports to coastal feeders does ‘use up’ further deep water terminal quay capacity. The costs of such services, including double handling in ports and the shipping feeder services, are (typically) marginally cheaper than by rail, but frequencies and transit times are inferior. Rail can facilitate a next day delivery on a daily basis. It is also normal for cargo for the UK to be consigned to a UK deep water port and not to the inland destination, so that to select a UK regional feeder port of discharge prior to the deep sea vessel's arrival in Europe is often not possible; feedering therefore does not offer the same level of service to all shippers.

It is clear that the choices that lines make are based upon available port capacity. Transhipment handling is highly competitive because several ports all participate in the same international market. Rates for double handling containers (ship to port to ship) are only marginally higher than for the single handling of containers for the domestic market. There is also indirect competition for transfers between load centres from lower cost transhipment providers beyond North West Europe. For example, a container for the UK on a ship bound for Antwerp and not calling in the UK could transfer at Mediterranean ports for (say) £50 instead of at Rotterdam for £80, even if a second deep sea vessel carrying the container from Antwerp to Felixstowe was 'in-house' and so effectively free to the user. It is also important to note that some lines have commercial interests in some port terminals, where transhipment is therefore more likely to occur (e.g. MSC's terminal at Antwerp).

In all these circumstances, a clear hierarchy of demand will emerge whereby firstly, a deep sea load centre port will handle national domestic traffic and secondly, such a port will seek transhipment traffic to make full use of the capacity available.

There is a potential added benefit to a port in that attracting transhipment traffic will also make it more likely that a shipping line will call in the first place. However, for the UK overall, lines generally will find it cheaper to make a direct call than to tranship on the Continent, because of the amount of cargo which is bound for Britain.

## 2.3 The value of transhipment

### *UK Ports Policy*

The DETR's policy statement on the ports industry, *Modern Ports*, issued in November 2000, took the view that container transhipment at UK ports provided a positive contribution to UK interests:

> "transhipments are important to the liner operations' economics and the lines look to consolidate their operations on hub ports...if they were to lose this business it would have correspondingly substantial adverse consequences. This consideration is of national interest".[1]

Since 2000, continued growth in the overall volume of containers to and from the UK domestic economy has tended to use up the finite capacity available at Britain's container ports, leading to the diversion of some third country transhipment traffic previously handled to Continental ports to leave capacity available for domestic deep sea cargo. In parallel, congestion in Britain's ports is fostering an increase in the proportion of GB trade itself transhipping at Continental ports to arrive in Britain on feeder vessels at regional feeder ports. While there has been only modest (9%)

[1] Modern Ports: a UK Policy, Para. 2.1.4, Department of the Environment, Transport and the Regions, November 2000.

growth over the last four years (2000 – 2004) in the volume of containers crossing quays in the major south-east ports, container traffic in northern ports has grown by around a quarter. This may have the potential environmental advantage of reducing inland lengths of haul within Britain, while reducing net revenue for the GB transport industry.

In these circumstances, and given that part of the argument put forward by promoters for the expansion of GB deep water container capacity is based on third country transhipment traffic, it has become necessary to understand how important transhipment is to the economic welfare of ports, port communities and the wider economy.

***User costs***

The pressure for transhipment is in part generated by the expansion of container traffic overall and particularly on long haul routes from the Far East. Shipping lines find that competitive pressures encourage them to invest in ever larger ships rather than to raise service frequency with the existing (smaller) ships, and instead to improve effective frequency by interlining en route. The consequence is that North European ports are faced with the task of handling much larger vessels; deeper in the water by a couple of metres as compared with the largest ships built before 1990. On the basis of vessels already on order, between 2000 and 2008 the mean capacity of the world's largest 200 ships will have grown by 69% from 4933 TEU to 8343 TEU. A high proportion of these ships will be employed on services to North West Europe and will figure in the routes that serve the UK.

Not only does this limit the number of ports that can handle the larger vessels, it also adds considerably to the amount of cargo handled at the limited number of ports able to accommodate them. Transhipment leads to the volume of containers handled at ports growing more rapidly than the trade which is being supported, as transhipped containers will cross a North European quay three times instead of once (twice at the transhipment port and once at the load or destination port). Ports will inevitably compete to establish themselves as hub ports, in part because such ports are able to charge higher tariffs for domestic cargoes through the particular capability they offer. Higher throughputs can fund greater investment in maritime infrastructure (in particular dredging) to accommodate ever larger ships that offer economies of scale to client shipping lines.

There are potential advantages for economies that can accommodate such hub ports through reducing user costs and enhancing the level of service available to local shippers. As foci for a wide range of deep sea and feeder routes, the frequency and variety of services available provide locational advantages for any local industry. To take an extreme case, a small island such as Malta can enjoy the benefits of worldwide direct container services because it hosts a transhipment hub; an advantage which other and larger Mediterranean islands without transhipment ports (e.g. Crete) do not enjoy. Such advantages can manifest themselves in terms of freight rates. For example, shippers in Great Britain have traditionally enjoyed lower deep sea container freight rates than those in Ireland because all containers shipped to Ireland via lolo services will face the extra cost (say £250 per container) of a feeder ship leg to a port such as

Rotterdam, and extra handling, as compared with a GB exporter having access to a choice of direct services from Southampton, Tilbury, Felixstowe and so forth.

The concentration of services on hub ports may therefore have commercial disadvantages for UK receivers. It has been noticeable that the growing shortage of deep water container capacity in GB ports is leading to the northern part of Britain being increasingly fed from Continental hub ports; transhipment is a two-way street for Britain. While the majority of deep sea containers landed in Britain continue to be received directly, 'through tariffs' are relatively unaffected. Market rates continue to be based upon the cost of a direct call by a deep sea ship in a deep water GB port. The cost of feedering to Northern Britain ex-Continent has simply to equate with that of overland transport from a GB south-east port.

However, if a position emerges whereby the market rate to the Midlands is based upon a cost that includes feedering (due to a shortage of direct call port capacity), shippers may find that market rates will be higher to and from Britain as compared with the Continental mainland. This confers a commercial advantage to those GB ports that can exploit the relative scarcity of the existing container terminal capacity they control, but will be to the general disadvantage of the wider economy.

It is most important to recognise that the decision by a line to tranship, either in Britain, on the Continent or elsewhere, will be based upon its own particular circumstances. The availability of port capacity (over and above that required by domestic demand) of a given specification provides an opportunity for a line to tranship. Transhipment occurs when the shipping line finds it in its interests to do so when planning how best (most competitively) to organise door-to-door services for its clients. Cargo transfer between transport links will occur several times in a journey from, say, a Chinese manufacturer to a UK retailer's distribution centre. The journey may include several road, rail and sea legs. Containers may be transhipped between deep water vessels in the Middle East or Mediterranean to minimise ocean transport costs by using the largest possible size of vessel while serving as many individual ports as possible. For a journey from the Far East, transhipment to feeder vessel at Rotterdam, for example, may be a substitute for transhipment to another deep sea vessel (scheduled to call at different European ports) at Algeciras in Spain or Port Said in Egypt.

Shipping lines will face a relatively wide range of options in making such decisions. Their options, however, will be heavily influenced by the different offers that ports can make. Quite clearly, ports that are not congested and that are able to offer several berths with a wide tidal window and generous areas for stacking containers will be more attractive than congested ports because:

a) the implied excess of capacity over demand reduces the ports' bargaining power in setting tariffs; and

b) port congestion raises the risk of vessel delay, adding to the time that lines have to build into their schedules to allow for delay, at a cost of up to $50,000 per ship day for the larger vessels.

Transhipment and port capacity are clearly highly related issues. Lack of port capacity may reduce the amount of money earned by an economy from transport activities and raise costs to end users. In order to consider those impacts on the economy, DTZ Pieda have taken the outputs of transport cost modelling conducted by MDS Transmodal and interpreted their wider implications (see chapter 7).

***The wider economy: the position for shippers and receivers***

Transport economics has struggled to identify the wider, developmental impacts of changes in transport infrastructure and policy. However, it is normally accepted that the main mechanism for transport to impact on the economy is through a change in the cost of movement. In theory, measures that reduce transport costs can affect the economy in a range of ways. These are set out in the influential 1999 Standing Advisory Committee on Trunk Road Appraisal (SACTRA) report "Transport and the Economy":

The final incidence of these impacts can be seen through businesses passing the benefits of lower costs to customers, through reduced prices, or through the implementation of efficiency gains. The economy can also benefit if lower transport costs help stimulate easier transfers between jobs, or greater competition amongst firms.

The SACTRA report concluded, "the theoretical effects listed can exist in reality, but that none of them is guaranteed." The conclusion is that generalisations about the effects of transport on the economy are subject to strong dependence on specific local circumstances and conditions. SACTRA led to guidance as to how to assess the wider impacts of transport schemes in a coherent and straightforward manner. However, the guidance produced was only concerned with the economic impact on identifiable regeneration areas and not the national economy as a whole. In addition, the guidance does not propose a formalised method for estimating new jobs, rather it is stated to be an iterative process, based on developing a case and reviewing it in terms of what is feasible.

Given the difficulties encountered by SACTRA and its related studies, we consider the economic impact of changes in transhipment to be mediated through two direct effects. The first highlights potentially distributional effects of a change in shipping patterns, and the second factor concerns wider cost issues.

Firstly a change in the level of activity in the location and nature of port calls will have a knock-on effect on the economy. For example, a reduction in the number of calls at certain ports could reduce the amount of freight being handled at these ports and lead to a reduction in related employment in stevedoring companies. However, it must be noted that it is likely that there will be no reduction in the total volume of goods imported and exported from the UK (i.e. the goods will be moved by some means). In these circumstances, a reduction in the volume of goods brought in at one port as a result of changes in transhipment patterns will be accompanied by an increase in the volume of goods brought in at another. As a result, the impact being considered is a redistribution of economic activity (measured as output, gross value added and employment between the regions). Transhipment for third countries however, if not occurring in the UK, is a net loss of containers being handled by the UK ports system.

The second form of impact is meted out by changes in overall transport costs. For example, an increase in the cost of transporting goods into the UK as a result of fewer direct calls will have an impact on the costs to sectors importing these goods. In the case of shipping costs these could in turn be passed on to their customers, thereby impacting on various sectors throughout the economy.

In practice, many shippers take relatively little interest in the route taken by the containers they receive. Consequently, whether containers are transhipped en route is of little consequence; the main concern, apart from price, is to be able to call up containers as and when required to be delivered the next day. That is most easily achieved if import containers are landed directly at a GB port.

Shippers may be concerned if an increasing number of container lines cease to make direct calls at GB ports because there is inadequate capacity at the few deep water ports able to accommodate the larger ships. Tariffs may rise as feeding becomes the norm and therefore subject to an explicit charge. Furthermore, if lines cannot deliver anywhere in Britain from a port container stack on a next day basis, because containers are held at a port on the Continent, then receivers may prefer to operate distribution centres (warehouses) at Continental ports to serve Britain, rather than separately in Britain. That does further divert economic activity from Britain, because goods will be delivered directly from European Distribution Centres to retailer Regional Distribution Centres by ferry and accompanied trucks. Tariffs apart, it is important to understand how different transhipment strategies may affect supply chains and where value is added in those supply chains.

To summarise, the assessment of the value of transhipment to the GB economy cannot be done in isolation from the assessment of container port capacity. The volume of third country containers handled at GB ports will increase or decrease in direct proportion to the capacity available over and above that required to handle domestic cargo, which the pricing mechanism ensures takes preference. It is unlikely that a port owner would find it commercially attractive to invest in port capacity purely for third country transhipment business. The impacts of handling, or not handling, third country containers are more or less restricted to the port and the port region directly involved, through the employment and income that transhipment throughput generates. In the situation where GB ports have insufficient capacity to handle domestic traffic (from deep sea trades) directly, there will be a proportionate increase in feedering to GB regional ports. The positive impact of increased port throughput from transhipment is then transferred to feeder port regions. There is a knock-on impact in terms of the inland transport industry, where the overall length of haul is likely to be reduced as feeder ports will be closer to the point of origin or final destination, resulting in gains to the road haulage industry, but a fall in rail traffic because rail freight is more competitive over the longer hauls. In this instance there may be both an environmental ‘cost’, as a result of the increase in lorry miles (road hauls from a railhead will tend to be shorter than from a regional port because trains carry less containers than feeder services allowing for rail terminals to be ‘denser’ on the ground), and an economic loss in terms of economic activity. The overall cost of serving shippers and receivers also, in practice, will rise if the cost of feedering is added to the market rate for shipping of goods to or from Britain because there is inadequate deep water port capacity. Although feeder services to northern Britain through ports such as Liverpool or the Tees may already be reducing transport costs to their own regions as compared with taking long overland hauls, an extension of feedering into the North Midlands would imply a severe shortage of deep water capacity in southern Britain, a corresponding increase in port tariffs, and therefore a general increase in costs to GB end users.

One of the primary objectives of this study is to evaluate how these economic effects become redistributed and re-quantified under different circumstances of deep sea container port supply.

**Table 2.1: Transhipment impacts - summary**

| | **Increased third country transhipment in GB ports** | **Increased Continental transhipment of GB containers** |
|---|---|---|
| Deep Sea Ports | Positive impact on transhipment throughput related revenue and employment | Implies insufficient capacity to handle direct deep sea traffic and loss of revenue from transhipment activity, balanced by rising market rates for port services as supply is constrained |
| Regional feeder ports | No direct impact | Positive impact on throughput and revenue and employment |
| Road transport : | | |
| Tonne kilometres | No direct impact | Shorter haul lengths favour road transport options and overall road traffic could increase due to switch from rail distribution |
| Revenue | No direct impact | Positive impact |
| Rail transport: | | |
| Tonne kilometres | No direct impact | Shorter haul lengths disadvantage rail option. |
| Revenue | No direct impact | Negative impact |
| Cost to shippers/receivers | Attraction of deep sea lines may offer industrial location advantages. | Transport costs may rise as feeder cost is added to the market rate for shipping goods. Increased transit time and reliability issues |

*Source: MDS Transmodal Ltd*

In addition, there will be environmental impacts that can be measured through ‘Sensitive Lorry Miles’. These are values determined by the Strategic Rail Authority, and used by DfT, to assess grants to secure mode switch from road. Roads are subdivided into seven different types, varying from uncongested motorways (the lowest rated) to urban roads within the major conurbations (the highest rated). Chapter 6 describes how modal shifts in different scenarios have been assessed in terms of this important environmental test.

# 3. NORTH WEST EUROPEAN CONTAINER MARKET

***The prospects for the development of the UK transhipment market are inextricably linked to growth in the North West European deep sea container trades, and the development of capacity at Continental transhipment ports, relative to the capacity of the major British ports.***

*Note: some of the information contained in this section of the report is based on research carried out earlier in 2005 and therefore may not fully take account of subsequent events.*

## 3.1 Container market growth

The growth of the North West European container market and the related growth in the size of ships serving it are at the root of the development of the transhipment market.

**Table 3.1: North West European container trade by region**

| | **Year** | | | | **CAGR** | | |
|---|---|---|---|---|---|---|---|
| | **(Million TEU)** | | | | | | |
| **Imports** | **1996** | **2000** | **2002** | **2004** | **96-04** | **96-00** | **00-04** |
| Australasia & Oceania | 0.170 | 0.259 | 0.268 | 0.371 | 10.30% | 11.10% | 9.40% |
| East and Southern Africa | 0.233 | 0.307 | 0.460 | 0.447 | 8.50% | 7.10% | 9.90% |
| Far East | 2.615 | 4.514 | 5.391 | 6.719 | 12.50% | 14.60% | 10.50% |
| Latin America | 0.801 | 1.084 | 1.346 | 1.619 | 9.20% | 7.90% | 10.50% |
| Mediterranean | 0.766 | 1.041 | 1.254 | 1.417 | 8.00% | 8.00% | 8.00% |
| North America | 1.848 | 2.291 | 2.251 | 2.676 | 4.70% | 5.50% | 4.00% |
| North West Europe | 1.953 | 2.813 | 3.637 | 4.142 | 9.90% | 9.50% | 10.20% |
| West Africa | 0.201 | 0.314 | 0.400 | 0.474 | 11.30% | 11.80% | 10.80% |
| Gulf & ISC | 0.457 | 0.748 | 0.889 | 1.085 | 11.40% | 13.10% | 9.70% |
| | **9.045** | **13.371** | **15.897** | **18.950** | **9.70%** | **10.30%** | **9.10%** |
| **Exports** | | | | | | | |
| Australasia & Oceania | 0.200 | 0.262 | 0.313 | 0.383 | 8.50% | 7.00% | 9.90% |
| East and Southern Africa | 0.324 | 0.458 | 0.587 | 0.651 | 9.10% | 9.00% | 9.20% |
| Far East | 2.557 | 4.258 | 4.907 | 6.334 | 12.00% | 13.60% | 10.40% |
| Latin America | 0.721 | 1.189 | 1.423 | 1.725 | 11.50% | 13.30% | 9.80% |
| Mediterranean | 0.943 | 1.413 | 1.632 | 1.911 | 9.20% | 10.60% | 7.80% |
| North America | 1.608 | 2.261 | 2.504 | 2.853 | 7.40% | 8.90% | 6.00% |
| North West Europe | 1.953 | 2.813 | 3.637 | 4.142 | 9.90% | 9.50% | 10.20% |
| West Africa | 0.269 | 0.373 | 0.450 | 0.493 | 7.90% | 8.50% | 7.20% |
| Gulf & ISC | 0.564 | 0.809 | 1.170 | 1.318 | 11.20% | 9.40% | 13.00% |
| | **9.139** | **13.835** | **16.624** | **19.810** | **10.20%** | **10.90%** | **9.40%** |
| **Total** | **18.184** | **27.207** | **32.521** | **38.761** | **9.90%** | **10.60%** | **9.30%** |

*Source: MDS Transmodal Ltd – based on world trade database*

Table 3.1 shows the development of the North West European market over the period 1996-2004. In that period the market has more than doubled in size from 18.2 MTEU in 1996 to 38.8 MTEU in 2004 reflecting an annual average growth rate of almost 10%. The main origins and destinations of containerised trade for North West European economies are in the Far East and in North America. These form the major contributors to the European deep sea container trades and are a determining factor in the development of the largest container ships. (Intra European trade is also highly significant, although this is primarily carried by short sea shipping services). This growth has been driven by the rapid growth of NW European consumption which is satisfied by Far Eastern producers, balancing empty containers and by a gradual switch by the lines towards using 40' containers instead of 20' containers.

## 3.2 Ship size trends

The development of the world container fleet is well documented elsewhere and it is not the intention of this report to go into the detail of this. The following tables show the growth and the predicted development of the fully cellular fleet, taking into account the current orderbook and schedule of new ship deliveries. Table 3.2 indicates that following a near five-fold increase in capacity since 1990, the fleet is set to expand in total TEU capacity by a further 45% in the next three years (before any scrappage). Most of this expansion will be concentrated in the 5000+ TEU vessel size bands. Table 3.3 indicates the concentration of the largest ships in the Far East/Europe strings as well as transpacific. Maersk, MSC and CMA-CGM are already deploying 8,000 TEU vessels in these trades and lines are beginning to refer to these ships as the future 'unit of currency' in the major markets. The carrying capacity of new ships to be deployed by Maersk in 2006 could be more than 10,000 TEU.

The clear implication of this development for the ports industry is that those ports that have sufficient capacity to cater for ships of 8,000 TEU plus capacity will benefit. The increasing average size of ship on key routes into North West Europe also indicates that transhipment will become an increasingly large element of the market as lines seek to streamline the direct calling pattern of their largest ships.

**Table 3.2: Development of the world's fully cellular fleet, by TEU size band and year of build (including those on order and before scrappage)**

| TEU SIZE BAND | 1990 | 1995 | 2000 | 2004 | 2005 | 2007 | 2008 | % CHANGE 1990-2008 |
|---|---|---|---|---|---|---|---|---|
| **A) Number of vessels** | | | | | | | | |
| <=1000 | 720 | 719 | 959 | 1017 | 1093 | 1168 | 1175 | |
| 1001 – 2000 | 431 | 591 | 838 | 942 | 995 | 1144 | 1189 | |
| 2001 – 3000 | 212 | 299 | 415 | 547 | 604 | 715 | 742 | |
| 3001 – 4000 | 67 | 136 | 211 | 249 | 256 | 305 | 329 | |
| 4001 – 5000 | 6 | 77 | 173 | 254 | 309 | 388 | 447 | |
| 5001 – 6000 | - | - | 65 | 186 | 220 | 259 | 281 | |
| 6001 – 7000 | - | - | 27 | 98 | 103 | 142 | 167 | |
| 7001 – 8000 | - | - | - | 14 | 21 | 41 | 44 | |
| 8000+ | - | - | - | 13 | 42 | 144 | 180 | |
| **TOTAL** | **1436** | **1822** | **2688** | **3320** | **3643** | **4306** | **4554** | **217%** |
| **B) TEU (000s)** | | | | | | | | |
| <=1000 | 330 | 364 | 498 | 545 | 607 | 669 | 674 | |
| 1001 - 2000 | 620 | 834 | 1178 | 1322 | 1394 | 1611 | 1686 | |
| 2001 - 3000 | 548 | 760 | 1029 | 1360 | 1511 | 1811 | 1884 | |
| 3001 - 4000 | 232 | 470 | 726 | 856 | 876 | 1043 | 1126 | |
| 4001 – 5000 | 26 | 333 | 760 | 1104 | 1349 | 1691 | 1956 | |
| 5001 – 6000 | - | - | 357 | 1022 | 1206 | 1410 | 1529 | |
| 6001 - 7000 | - | - | 175 | 636 | 668 | 916 | 1080 | |
| 7001 - 8000 | - | - | - | 105 | 159 | 310 | 334 | |
| 8000+ | - | - | - | 107 | 349 | 1229 | 1547 | |
| **TOTAL** | **1756** | **2761** | **4723** | **7057** | **8119** | **10690** | **11817** | **573%** |

*Source : MDS Transmodal - Containership Databank*

Between 1990 and 2008, the total capacity of the world's fully cellular fleet will have grown by 573%, an annual average growth rate of 11.1%. That growth rate will have accelerated in the period 2000 – 2008 to an annual average of 12.1%. However, it is important to recognise that much of this growth is explained by a significant increase in average length of haul; twice as many ships of the same capacity are required to move a finite volume of containers from the Far East as across the Atlantic to NW Europe (8 ships per string instead of 4). Almost the entire Post-Panamax fleet (i.e. those ships too large to pass through the Panama Canal and typically of 4,000 TEU + capacity) is deployed on trades with the Far East. The following table describes their deployment by operator and route.

**Table 3.3: Deployment of the Post Panamax fleet (as at Quarter 4 2005)***

| Trade route | Alliance/carrier | Ships | Total TEU | Average TEU |
|---|---|---|---|---|
| Transpacific | Grand Alliance | 29 | 179456 | 6188 |
| | CHKY Alliance | 24 | 152754 | 6365 |
| | New World Alliance | 29 | 151662 | 5230 |
| | Evergreen/Hatsu | 8 | 48328 | 6041 |
| | China Shipping CL | 8 | 45434 | 5679 |
| | Maersk Sealand | 5 | 30600 | 6120 |
| | MSC | 3 | 24480 | 8160 |
| | CMA-CGM | 2 | 16400 | 8200 |
| | ***subtotal*** | 108 | 649114 | 6010 |
| Europe/Far East | Grand Alliance | 55 | 357873 | 6507 |
| | CHKY Alliance | 47 | 258854 | 5508 |
| | MSC | 26 | 188728 | 7259 |
| | Maersk Sealand | 26 | 176720 | 6797 |
| | New World Alliance | 30 | 169073 | 5636 |
| | CMA-CGM | 17 | 106500 | 6265 |
| | China Shipping CL | 15 | 98775 | 6585 |
| | Evergreen/LT | 8 | 54989 | 6874 |
| | CSAV (Norasia) | 3 | 16560 | 5520 |
| | ***subtotal*** | 227 | 1428072 | 6291 |
| Pendulum | Maersk Sealand | 11 | 72600 | 6600 |
| | Evergreen | 12 | 66384 | 5532 |
| | ***subtotal*** | 23 | 138984 | 6043 |
| Other | Maersk Sealand | 9 | 39300 | 4367 |
| | Hamburg-Sud | 6 | 33312 | 5552 |
| | APL/MOL | 5 | 23604 | 4721 |
| | MSC | 4 | 21648 | 5412 |
| | DAL | 1 | 4300 | 4300 |
| | ***subtotal*** | 25 | 122164 | 4887 |
| | **TOTAL** | **383** | **2338334** | **6105** |

Note : CHKY Alliance = Cosco, Hanjin, K-Line and Yang Ming
Grand Alliance = Hapag-Lloyd, MISC (Europe/Far East only), NYK, OOCL, and P&O Nedlloyd (up to Feb '2006)
New World Alliance = APL, Hyundai and MOL

*Table does not reflect outcomes of recent mergers between shipping lines.

*Source : MDS Transmodal - Containership Databank*

### 3.3 Deep Sea service patterns

The analysis below of deep sea service patterns into North West Europe underlines the concentration of service capacity on Far East trades:

**Table 3.4: NW Europe – Deep Sea Container Services, by Route** (as at Quarter 2 2005)

| Route | Number of services | Of which calling in Great Britain | Number of ships | Total TEU | Average TEU | Largest ship (TEU) | No of voyages per annum | Annual one way deployment (000 TEU) | Total port calls (NW Europe) per annum | UK port calls per annum |
|---|---|---|---|---|---|---|---|---|---|---|
| Pendulum/round the world (RTW) | 9 | 7 | 105 | 400,518 | 3,814 | 5,652 | 442 | 1,713.5 | 1,768 | 364 |
| Transatlantic | 15 | 11 | 71 | 212,710 | 2,996 | 5,050 | 780 | 2,459.5 | 2,860 | 676 |
| Far East | 30 | 24 | 244 | 1,378,837 | 5,651 | 8,468 | 1560 | 8,794.1 | 5,928 | 1,300 |
| Southern Africa | 4 | 4 | 25 | 71,621 | 2,865 | 4,900 | 182 | 550.0 | 806 | 208 |
| East Africa/Indian Ocean | 1 | 1 | 6 | 9,912 | 1,652 | 1,797 | 41 | 67.7 | 164 | 41 |
| West Africa | 14 | 5 | 55 | 56,534 | 1,028 | 2,200 | 461 | 498.5 | 1,577 | 220 |
| West Africa/ECSA | 3 | 2 | 17 | 26,094 | 1,535 | 2,478 | 133 | 208.3 | 548 | 97 |
| Middle East/Indian subcontinent | 6 | 5 | 37 | 109,510 | 2,960 | 4,322 | 272 | 861.4 | 856 | 260 |
| Australasia/South Pacific | 2 | 2 | 17 | 36,881 | 2,169 | 3,040 | 64 | 145.0 | 216 | 64 |
| Caribbean/Central America | 8 | 2 | 37 | 37,551 | 1,015 | 2,260 | 393 | 389.7 | 1,084 | 97 |
| South America - East Coast | 5 | 4 | 29 | 91,337 | 3,150 | 5,552 | 260 | 813.5 | 1,248 | 208 |
| South America - West Coast | 4 | 2 | 23 | 40,876 | 1,777 | 2,560 | 142 | 262.1 | 568 | 64 |
| **TOTAL** | **101** | **69** | **666** | **2,472,381** | | | **4,730** | **16,763.3** | **17,623** | **3,599** |

*Source: MDS Transmodal Containership Databank*

As at June 2005, 101 deep sea container services call at the major NW European ports, as detailed in table 3.4. Such services together produce an average of 3.73 port calls per rotation. The UK is well represented on all of the deep sea routes. As shown in the table, 68% of all deep sea container services calling in NW Europe include a direct call in the UK. This proportion increases to 80% of Far Eastern services, on which the largest container ships are deployed and 100% of Southern and East African and Australasian services.

Some 666 vessels are deployed on the deep sea services, with a total nominal TEU capacity rating of nearly 2.5 million slots. In mid 2005, these services provided 4,730 voyages in a year producing an annual one-way capacity of 16.8 million TEU, and generating 17,623 individual NW European port calls, of which 3,599 or 20.4%, are calls at UK ports.

Comparing individual ports, this data shows that, with 3,263 calls, Rotterdam currently accounts for 18.5% of all NW European port calls, followed by Antwerp, Hamburg and Le Havre with 15.9%, 15.2%, and 13.8% respectively. Felixstowe ranks fifth with 8.6%. Further details are described in Appendix 1.

### 3.4 Feeder services

Our analysis of shipping services reveals that 146 ships are employed in lo-lo services in the Western European feeder market. Services are described in detail in Appendix 2. They are summarised below:

**Table 3.5: West European short sea services** (as at Quarter 2 2005)

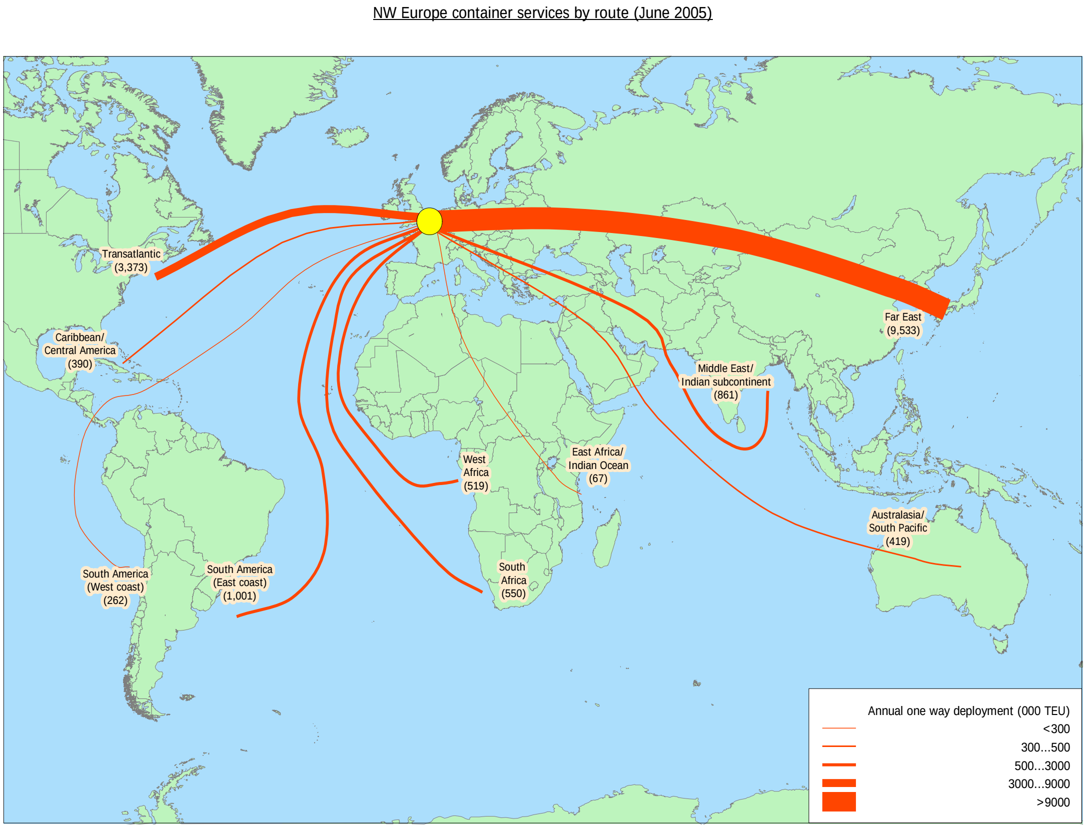
| Route | Number of Ships | Mean TEU | Annual round voyages (No.) | Annual round voyage capacity ('000s TEU) |
|---|---|---|---|---|
| Intra Irish Sea | 5 | 199 | 572 | 114 |
| Continent – Ireland | 30 | 542 | 1,560 | 846 |
| North Sea – Iberia | 38 | 591 | 1,137 | 672 |
| Intra North Sea | 27 | 366 | 2,028 | 742 |
| Intra North Continent | 2 | 300 | 208 | 63 |
| Continent – Scand/Baltic | 44 | 461 | 2,119 | 976 |
| **Total** | **146** | **448** | **7,624** | **3,413** |

*Source: MDST Containership Databank*

These services cater for both intra European trades and the distribution of deep sea feeder containers. They have an operating capacity of 3.4 million TEU per annum.

However, it is important to recognise that a substantial proportion of UK 'feeder' traffic is actually conducted by deep sea vessels operating between deep water ports. Maritime Statistics Directive data for 2003 shows that some 487,000 containers (say 789,000 TEU), rising to 511,000 containers (828,000 TEU) in 2004, moved between GB deep water container ports and deep water container ports on the Continent. A small proportion of this traffic will be transhipped in a GB port for the Continental mainland. However, the great majority can be largely explained by the fact that only around 76% of all deep sea container services to/from NW Europe make a UK port call. In many cases, lines will arrange for cargo for Britain to be carried on those services they control which do call in Britain. Alternatively, containers can be 'interlined' between ships at remote ports en route (anywhere between the Indian Ocean and the Western Mediterranean). However, it would appear that around 700,000 TEU of traffic per annum is currently transhipped between deep sea vessels on the Continent and landed at a GB port; effectively interlining takes place in a Benelux port and reaches Britain on another deep sea ship. Containers so carried effectively often enjoy a 'free ride' on another of a given shipping line's rotations that happens to include a GB port call. The main exception to that pattern appears to be a significant flow of traffic between Tilbury and Continental hub ports, presumably serving routes without a direct GB call and attracted to a well located port for onward distribution.

**Figure 3.1 Annual one way deployment of deep sea container service capacity to NW Europe (as of June 2005)**




*Source: MDS Transmodal Ltd*

## 3.5 Major Transhipment Ports

A list of container terminal facilities at the major transhipment ports (including GB ports) is summarised below. The table refers only to the main deep water terminals at these ports. The stated capacity of facilities is as reported by port operators. Further details are shown in Appendix 3.

The analysis shows that in 2005 the main transhipment ports offered some 54km of deep water berthage at terminals covering 2,200 hectares. Within the next ten years quay length will have increased by at least 10km, with major port expansions planned in many ports, but especially at Rotterdam, Antwerp and Le Havre. Mean throughput was only 630 TEU per quay metre. However, if French ports and Amsterdam are excluded (see below), mean productivity rises to 833 TEU per quay metre. Further details on port throughputs are described in Appendix 4.

**Table 3.6: Major NW European Deep Water Container Terminal Provision, 2005 (1) (Ushant – Kiel range)**

| Country | Port | Total quay metres | Total hectares | 2004 throughput (000 TEU)(2) | 2004 TEU/quay metres |
|---|---|---|---|---|---|
| Belgium | Antwerp | 11,520 | 500 | 6,064 | 526 |
| | Zeebrugge | 2,180 | 56 | 1,196 | 548 |
| | **Sub total** | **13,700** | **556** | **7,260** | **530** |
| France | Dunkirk | 1,590 | 1.5 | 200 | 125 |
| | Le Havre | 6,075 | 205.5 | 2,145 | 353 |
| | **Sub total** | **7,665** | **207** | **2,345** | **306** |
| Germany | Hamburg | 8,813 | 406 | 7,003 | 795 |
| | Bremen/Bremerhaven | 4,040 | 226 | 3,469 | 859 |
| | **Sub total** | **12,853** | **632** | **10,472** | **815** |
| Netherlands | Amsterdam | 4,710 | 78 | 45 | 10 |
| | Rotterdam | 8,430 | 425 | 8,281 | 982 |
| | **Sub Total** | **13,140** | **503** | **8.326** | **634** |
| NW Continent | **Sub Total** | **47,358** | **1,898** | **28,403** | **600** |
| UK | Felixstowe | 2,793 | 151 | 2,700 | 967 |
| | Liverpool | 1,097 | 48 | 616 | 561 |
| | Thamesport | 650 | 27 | 565 | 869 |
| | Tilbury | 1,175 | 34 | 616 | 524 |
| | Southampton | 1,357 | 76 | 1,441 | 1,062 |
| | **Sub Total** | **7,072** | **336** | **5,938** | **840** |
| **Total** | | **54,430** | **2,234** | **34,341** | **631** |

*(1) Deep water facilities only*
*(2) Includes transhipped containers*
*Source: MDS Transmodal Ltd, compiled from various sources*

## Rotterdam

Rotterdam is a port of call on 63 of the 101 deep sea services calling at NW European ports. With 3,263 calls per year, the port accounts for 18.5% of all NW European port calls on these services. It is particularly well represented in services to the Far East, being a port of call on 27 of the 30 services on that route and on all eight of the major pendulum services. All three of the services not calling at Rotterdam – one each for the CHKY Alliance, New World Alliance and MSC - call instead at Antwerp, whereas their other strings all call in Rotterdam. Rotterdam is less well represented in the transatlantic trades, the preferred Benelux port being Antwerp. Of the six North Atlantic services calling at Rotterdam, two are offered by Maersk Sealand, one each by the CHKY Alliance and the Grand Alliance plus the joint service to Canada by Maersk Sealand, MSC and P&O Nedlloyd. Each of the latter three services also calls at Antwerp.

Outside the main east-west trades, Rotterdam tends to be well represented in the trades in which the major carriers have a presence. For example it is a port of call in all the direct services to east coast South America and to west coast South America, but is particularly under represented in services to West Africa, for example, where niche operators predominate, and which tend to call at Antwerp.

From a carrier perspective, Rotterdam is a port of call on all the deep sea services offered by Evergreen, Maersk Sealand, China Shipping, and CSAV and its subsidiaries, and the majority of services offered by the New World Alliance, CMA-CGM, the CHKY Alliance and the Grand Alliance.

**Antwerp**

Antwerp, with 62 services, is represented in a similar number of services as Rotterdam, but as some of the services are less frequent than those calling at Rotterdam, Antwerp has fewer port calls in a year, 2,805, accounting for 15.9% of all NW European port calls. The port is particularly well represented in the transatlantic trades, being a port of call on 12 of the 15 services on the route. The only North Atlantic services not calling at Antwerp are those offered by Maersk Sealand and CP Ships' subsidiary, Italia. Two of the pendulum services with a direct transatlantic link, operated by the Grand Alliance and Evergreen, also call at Antwerp. Only a third of the Far Eastern services call at Antwerp, consisting of three of the CHKY Alliance's six services on the route, both of MSC's services, one of the New World Alliance's services and services offered by China Shipping (CSCL)/Zim and UASC plus the joint service inaugurated during 2004 by Asian newcomers to the trade, Wan Hai and Pacific International Lines (PIL).

Like Rotterdam, Antwerp is a port of call on every direct South American service, but additionally it is represented on all three of the South American services routed via West Africa. It is also the dominant port of call for direct services to West Africa, being represented in 12 of the 14 services on the route.

Antwerp is MSC's NW European hub, and is a port of call on all of the carrier's deep sea services. MSC operates a significant European feeder network that includes UK ports and with Scandinavian and Baltic ports in particular being served from Antwerp. All of Delmas' African services call at Antwerp as do those of Grimaldi Naples and the Canadian services of CP Ships' Canada Maritime and CAST.

**Amsterdam**

Currently Amsterdam is a port of call on three services to West Africa. However, as from August 2005 two Grand Alliance Far East services are due to call at the Ceres Paragon terminal. One service will be the Japanese string 1 service, deploying 6200 TEU vessels, and operated by NYK who hold a 50% share in the terminal. The other service will be the proposed string 7, deploying vessels of between 4000 and 6000 TEU. The Ceres Terminal has struggled to establish itself, partly because of the lack of container distribution services, including feeder links, at Amsterdam as compared with the major ports of Rotterdam and Antwerp, with which it competes.

**Zeebrugge**

Only eight deep sea services call at Zeebrugge, generating 416 port calls per annum. Five direct Far East services and one pendulum service with a direct Far East leg call at the port. All three of CMA-CGM's Far East services call at Zeebrugge as does the new service of CMA-CGM's previous collaborator on the route - CSAV's subsidiary Norasia. CMA-CGM was also involved in the other service calling at the port – the now designated New World Alliance SCX service, originally set up by CMA-CGM and APL, but from which CMA-CGM recently withdrew to be replaced by MOL. Evergreen's WAE pendulum service and the eastbound service of the ANZ consortium provide the other major calls at the port. Zeebrugge lacks the network of barge services offered by other Benelux ports, but is a major railhead.

**Hamburg**

Hamburg is a port of call on 56 deep sea services. With 2,675 port calls it accounts for 15.2% of calls at NW European ports. Like Rotterdam it is particularly well represented in Far East services, being a port of call on 24 of the 30 services on that route, and on six of the pendulum services. For transatlantic services Hamburg is less well represented, the preferred German port being Bremerhaven. The port is well represented in the South American services, calls being made on all those operating to the west coast and on those to the east coast routed via West Africa, and on three of the five operating directly to the east coast. One of the services not calling at Hamburg is operated by Maersk Sealand, which tends to use Bremerhaven. Three of the major services to the Middle East also call at Hamburg, whilst, again, Maersk Sealand's service calls at Bremerhaven.

From a carrier perspective, Hamburg is a port of call on all the deep sea services operated by CSAV and its subsidiaries, Grimaldi Naples and China Shipping, and more than half the services operated by the CHKY Alliance, Evergreen, the New World Alliance, CMA-CGM and the Grand Alliance.

**Bremerhaven**

With 25 deep sea services, Bremerhaven has less than half the number of services as Hamburg, generating 1352 port calls in a year, or 7.7% of all calls at NW European ports. The port is particularly well represented in transatlantic services, being a port of call on nine of the 15 services on the route, as well as on three of the major pendulum services with a direct transatlantic leg. It is a port of call for those services operated by MSC, Maersk Sealand, the Americana Ships (CP Ships) dominated strings of the joint services with the Grand Alliance, and individual services operated by ACL, CHKY Alliance, Grand Alliance, New World Alliance and Evergreen. Only six Far East services call at Bremerhaven, half of which are those operated by Maersk Sealand.

Apart from the main east-west trades, the only other route on which Bremerhaven has a substantial representation is Southern Africa, all three major services on the route calling at the port.

Of the global carriers, Maersk Sealand dominates the port, with seven of its independent deep sea services calling there, plus three services operated in conjunction with other carriers – the two SAECs consortium services to South Africa and the Canadian service operated with MSC and P&O Nedlloyd.

Both Hamburg and Bremerhaven are particularly strong in transhipment trade to Scandinavia and the Baltic, to which very few deep sea services provide direct services.

**Le Havre**

Half of the 101 deep sea services call at Le Havre, generating 2429 port calls in a year, or 13.8% of all NW European port calls. The port is represented in 12 services to the Far East and two pendulum services with a direct leg to the Far East. All the major carriers and alliances on the route call at the port, the CHKY Alliance with three strings and CMA-CGM and the Grand Alliance with two strings each being the more important. Ten transatlantic services call at Le Havre, including three pendulum services, however a notable absentee at the port for this route is Maersk Sealand, calling at Dunkirk instead.

Le Havre is fairly well represented in north-south services, being a port of call on all services to east coast South America both direct and via West Africa, MSC's Australian service, three of the four services to Southern Africa and five of the eight services to the Caribbean and Central America. All three of Delmas/OT Africa's services to West Africa also call at the port. Le Havre offers some feeder services but is generally speaking a port for France. Its main competitor for the French market is Antwerp.

**Felixstowe**

Felixstowe is the largest deep sea port in the UK in terms of the number of services calling at the port and the number of port calls, 29 services and 1523 port calls in a year, or 8.6% of total NW European port calls. Nearly half the services calling at the port cover trade with the Far East, consisting of the six CHKY Alliance's strings, two strings each operated by China Shipping and Maersk Sealand and single services operated by MSC and Norasia. Only four transatlantic services call at Felixstowe, again being those operated by the CHKY Alliance, Maersk Sealand and MSC. The only other route on which Felixstowe has a significant presence is Middle East and Indian subcontinent, four of the six services on the route calling at the port.

Of the major carriers and alliances, Felixstowe is the sole UK port of call for the CHKY Alliance and China Shipping, and the predominant port for Maersk Sealand and MSC. Felixstowe, Southampton and Thamesport are the only UK ports able to handle Post-Panamax container vessels.

**Southampton**

Ten deep sea services call at Southampton, involving 572 port calls per year. Apart from the transatlantic butterfly service operated by the Grand Alliance, all the other services calling at the port cover the Far East. These consist of the five Grand Alliance strings calling in the UK, the two CMA-CGM strings calling in the UK and two New World Alliance strings.

**Thamesport**

Ten deep sea services also call at Thamesport, generating 520 port calls per year. Nine of the services cover the major east-west trades and consist of Evergreen's three main services covering the Far East and transatlantic trades, the Grand Alliance's pendulum PAX service operated by Hapag-Lloyd, the New World Alliance's AEX service to the Far East operated by Hyundai, UASC's service to the Middle East and Far East and three transatlantic services operated by CP Ships' subsidiaries, Canada Maritime and Lykes. The only other service calling at Thamesport is Maersk Sealand's River Plate service to east coast South America, which was switched from Felixstowe around two years ago due to congestion at the latter port.

**Liverpool**

Only three main deep sea services call at Liverpool, all of which are transatlantic and comprise ACL, Independent Container Line and the Cast operated, CP Ships Canadian string. The transatlantic services normally use Panamax and not Post Panamax vessels. The ICL and CP ship services use smaller than Panamax vessels.

**Tilbury**

Tilbury differs from the other UK ports in that most of the 14 services calling at the port, generating 674 port calls per year, are north-south routed and for the most part are operated by more traditional consortial groupings of carriers, which include P&O Nedlloyd (acting outside the Grand Alliance) among their number (now taken over by Maersk). North-south trades tend to operate Panamax and not Post-Panamax vessels. Such services consist of both strings to Australasia operated by the ANZ consortium members, the EPIC3 consortium service to the Middle East and Indian subcontinent, the main SAECs string to South Africa, the New Caribbean Service (NCS) consortium to the Caribbean, the Eurosal consortium main service to west coast South America and the two strings operated by Alianca, Hamburg-Sud and P&O Nedlloyd to east coast South America.

Other services include MACS service to South Africa, MSC's service to east coast South America, Delmas/OT Africa's RO-RO service to West Africa, two Grimaldi Naples services, one to West Africa and the other to east coast South America via West Africa, and a similar service offered by CSAV, Montemar and TMM.

**Bristol**

The only other UK port serving deep sea services directly is Bristol, which accommodates the weekly SAECS string 2 service from South Africa at Royal Portbury Dock.

One other Panamax container terminal is available at **Greenock**, but it does not attract deep sea lines.

Two other port terminals, which could be relevant to the debate on transhipment in Britain, are Sines and Algeciras. Both represent alternative and complementary locations for transhipping NW European containers on the Iberian coast.

**Sines**

Although operational since 1997 the container terminal at Sines did not attract any services until 2004 when MSC added the port to its short-sea Vigo service which connects ports in Ireland, Antwerp, Atlantic Iberia, and Valencia.

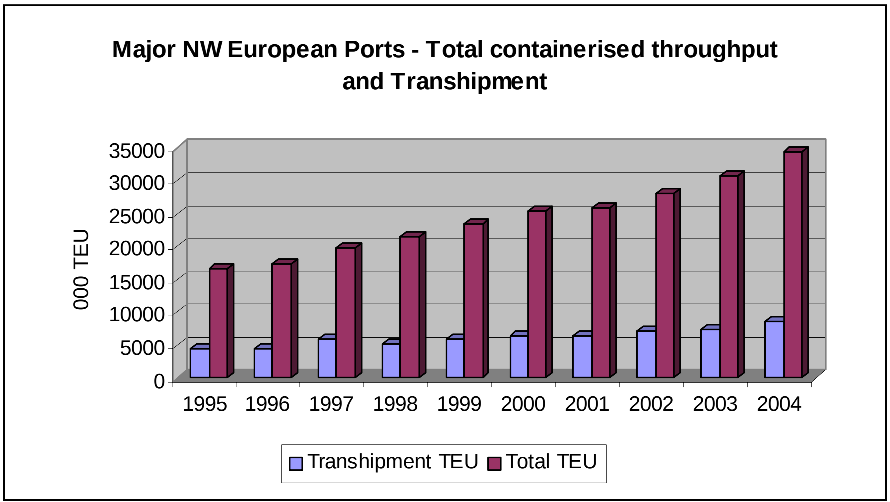
**Algeciras**

As well as being Maersk Sealand's hub port serving Atlantic Iberia, Mediterranean Spain and North Africa, Algeciras is also the carrier's relay port at which ships operating on east-west services can connect with those operating on north-south services and *vice versa,* thus allowing greater choice and frequency of service to a particular destination. Sixteen deep sea services operated by the carrier call at Algeciras, of which seven, mainly covering different regions of West Africa, start at the port. Thus, for example, the Med Gulf service from the Middle East en route to North America can connect with services to north Europe, West Africa and east coast South America at Algeciras.

### 3.6 Transhipment Port Throughputs

In the ten-year period from 1995 to 2004 total container throughput at the major European container ports increased at an average annual rate of 8% (See Appendix 4). In 2004 total throughput stood at approximately 34 million TEU of which transhipment represented about 25% or 8.7 million TEU. By far the most important ports for handling transhipment traffic are Hamburg and Rotterdam. A second tier of transhipment ports, all handling less than 1 million TEU of transhipment traffic per year, include Antwerp, Bremerhaven, Le Havre and Felixstowe. Taken together, the proportion of all these ports' throughput accounted for by transhipment has proved remarkably stable. Increasing ship sizes do not appear to have had any impact on the proportion transhipped. The shares of transhipment traffic have changed, however. Those shares will not only be directly influenced by the availability of capacity, but by the ownership of that capacity. Thus, for example, the vertical integration of some lines with stevedoring operations (e.g. at Antwerp) will influence at which ports lines choose to tranship.

**Figure 3.2**




*Source: MDS Transmodal Ltd*

**Table 3.7: Major NW Europe total and transhipment port traffics (000 TEUs)**

| Country | Port | Total traffic | | | Transhipment traffic | | |
|---|---|---|---|---|---|---|---|
| | | **1994** | **1999** | **2004** | **1994** | **1999** | **2004** |
| Belgium | Antwerp | 2,208 | 3,614 | 6,064 | 444 | 498 | 1,464 |
| Belgium | Zeebrugge | 610 | 850 | 1,196 | 97 | 135 | 190 |
| France | Dunkirk | 42 | 107 | 200 | 0 | 0 | 0 |
| France | Le Havre | 873 | 1,378 | 2,145 | 223 | 407 | 700 |
| Germany | Bremen/Bremerhaven | 1,503 | 2,201 | 3,469 | 306 | 571 | 900 |
| Germany | Hamburg | 2,726 | 3,738 | 7,003 | 982 | 1,400 | 2,623 |
| Netherlands | Amsterdam | 90 | 46 | 45 | 4 | 2 | 2 |
| Netherlands | Rotterdam | 4,540 | 6,342 | 8,281 | 1,273 | 1,778 | 2,322 |
| UK | Felixstowe | 1,734 | 2,697 | 2,700 | 698 | 906 | 340 |
| UK | Liverpool | 404 | 515 | 616 | 33 | 42 | 50 |
| UK | Southampton | 598 | 921 | 1,441 | 79 | 89 | 66 |
| UK | Thamesport | 241 | 489 | 565 | 28 | 57 | 50 |
| UK | Tilbury | 372 | 515 | 616 | 0 | 0 | 0 |
| **Total above ports** | | **15,941** | **23,413** | **34,341** | **4,167** | **5,885** | **8,719** |
| *Transhipment percentage* | | - | - | - | *26%* | *25%* | *25%* |

*Source: MDS Transmodal Ltd*

## 3.7 Planned Port Developments

Our research has identified plans and proposals for a total additional 17,170 quay metres at major Continental transhipment ports most (60%) of which is planned to be operational within the next five to ten years. However, some projects, such as Wilhelmhaven's Jade Port scheme and the further extension of Le Havre's "Port 2000" expansion, still require significant approvals, and (at the time of writing) are not guaranteed to go ahead. In theory these facilities could service the UK transhipment (and interlining) market, although in practice their capacity is planned principally for traffic for the Continental mainland. Further details are described in Appendix 5.

**Table 3.8: Planned capacity expansions at major transhipment ports (quay metres)**

| | Existing | New (1) | Potential(2) |
|---|---|---|---|
| Germany | 12,853 | 1,700 | 3,500 |
| Netherlands | 13,140 | 1,800 | 1,200 |
| Belgium | 13,700 | 4,170 | - |
| France | 7,665 | 2,700 | 2,100 |
| Total | 47,358 | 10,370 | 6,800 |

(1) Approved/under construction
(2) Significant approvals required
*Source: MDS Transmodal Ltd*

The additional capacity is all to be located at ports which are already popular or can be expected to be popular with lines and therefore to be intensively utilised. For modelling purposes (see Chapter 6) we assume a future quay productivity of 1,100 TEU per quay metre for modern facilities (i.e. actual mean productivity, which will be less than absolute capacity). These new facilities therefore can be expected to add 18.9m TEU per annum to NW European mainland port capacity. This adds 55% to 2004 throughput through these ports and can therefore be expected to deal with growth for around 10 years to 2015.

A common factor shared by all of these ports has been the report of increasing port congestion, with the possible exception of Zeebrugge, and the problems caused by delays over planned port projects which mainly are the result of environmental concerns, especially related to channel deepening.

A summary of these projects is provided in Appendix 5. This distinguishes between projects that are under construction or which represent the expansion of an existing facility and therefore are actually proceeding or are more likely to proceed and projects that represent new terminal developments and as such require significant approvals that may lead to delay. Those projects that have Suezmax capability (i.e. draught sufficient to accommodate post-Panamax generation vessels) are also identified. Some of the most relevant projects from the UK perspective are those being undertaken in Rotterdam, Antwerp and Le Havre. Further details about these projects in particular are outlined below.

**Rotterdam**

Container traffic at the Port of Rotterdam has been growing at an average rate of 6.3% since 1995 and reached 8.3 million TEU in 2004. The port has handled an extra 400,000 TEU per annum over this period. Approximately 28% of the port's throughput is accounted for by transhipment traffic. Growth in the last two to three years has been exceptional, reaching 10% in 2003, 16% in 2004 and 12% in 2005. Some of this growth has been explained by 'chronic congestion' at Rotterdam's main rival ports, Antwerp and Hamburg, and it is possible that the trend will flatten out as new projects at the competing ports become operational.

A number of existing terminals have been undergoing expansion in the last two years. Rotterdam's planned Euromax terminal, first announced in November 2000, is set to be the first purpose built Suezmax terminal, able to accommodate the largest container ships in the global fleet. Being developed by a joint venture between Rotterdam's ECT and P&O Nedlloyd, the first of six berths is due to come on stream in early 2007 with the full 1,800m facility planned to be completed by the end of 2007. The initial depth alongside will be 16.65m, with the capability to go to 19.65m with further dredging, if required. Following the Maersk takeover of P&O Nedlloyd, questions are arising over the future of the ownership and operation of the new terminal as Maersk essentially handles all of its own traffic at the APM Delta terminal and may subsume P&ONL's traffic at the alternative terminal.

In addition to its deep water capability, the Port of Rotterdam has agreed plans with ECT to construct a dedicated feeder/barge terminal. The Delta Barge Feeder Terminal (DBF) will have a quay of 800m and 11m depth and will be operational by 2008. Partly the development is being brought forward in recognition that berth occupancy elsewhere in the port by the deep sea vessels has led to congestion for feeder operators, over which the deep sea lines have berthing priority. Rotterdam is probably one of the few ports that is addressing the feeder issue in this way and also one of the few ports that has the space capacity to do so.

The new Euromax terminal will alleviate some of the port's congestion problems. However, the major Maasvlakte II project, which involves major land reclamation in the Schelde estuary, has suffered a number of delays and the initial construction stage, which was due to start in 2006, will now be delayed by at least another 18 months. Had the work started on schedule the first container berths would have been available in 2011. The present delay is due to the condemnation of environmental reports by the Dutch High court. The start of construction will now begin in 2008, provided the revised plans, which take greater account of the EU Habitats Directive, are accepted

Maasvlakte II will be constructed in the North Sea immediately to the west of the present port area. It will consist of 1000 hectares of commercial sites for container handling, chemicals and distribution. All of the major international terminal operators have formally expressed their interest in setting up operation in Maasvlakte II. The actual scope of new container terminals has yet to be determined.

**Antwerp**

Several port improvement projects are underway at Antwerp, but the major of these, the Deurganck dock or 'Atlantic Gateway' project on the left bank of the River Schelde, will ultimately provide 125 ha and six new berths over 2.5km of quay by 2010. The project will add 3.5 million TEU of new capacity

The first phase of the project is nearing completion. This adds initially 700m, and finally 1,650m of quay and 78ha providing an estimated 1.4 million TEU of additional handling capacity by the end of 2005. The first phase was originally planned to come on stream from 2002, but environmental opposition and delays in the issuing of construction licences have delayed the project. Phase two will be developed in 2006.

On the right bank of the Schelde, the MSC Home Terminal, a joint venture between MSC and PSA International, was also recently opened. The new terminal will be fully completed in 2006. MSC vessels were handled at an alternative terminal in Antwerp operated by P&O Ports, but the Home Terminal will provide the shipping line with its own dedicated facility, which also provides six berths over 2,140 quay metres.

Despite these plans Antwerp still suffers from inadequate draught. At present, the maximum draught for ships calling in Antwerp at all states of the tide is 11.9m. This affects post-Panamax vessels that are of at least 14.5m draught and therefore need to be light loaded or else need to await a suitable tidal window to enter the Port. After a number of years of negotiation permission has been given to dredge the tidal Western Scheldt to 13.1m although this work will not start until 2007 and will not be completed until 2009, yet the Port Authority wishes to dredge deeper to provide 14.5m at all states of the tide.

The Port Authority anticipates that the Deurganck Dock will be operating at maximum capacity by 2010 and is already conducting feasibility studies into the port's further expansion.

**Le Havre**

The growth in container throughput at Le Havre has averaged 9.6% over the last ten years. Total throughput reached 2.15 million TEU in 2004, of which 700,000 TEU, or 33%, was accounted for by transhipment.

The first phase of Le Havre's 'Port 2000' project will deliver six new deep water container berths with a total quay length of 2,100m. The first of these will be available in 2006 and will be operated by a CMA CGM/P&O Ports joint venture company. The terminal comprises two berths with a total quay length of 700m and stated operating capacity of 675,000 TEU. The project is expected to deliver two further berths in 2006 which will be operated by Maersk and its local partner Terminaux de Normandie. These two operators are then in line for the final two berths in the Phase I programme.

Originally all of these berths were planned to come on stream in 2005, and delays have been caused by construction difficulties and bad weather. Congestion at the port during 2004 led to Maersk shifting one of its Asia/Europe strings to Dunkirk.

Phase II of the project will add a further six new berths although the construction timetable has not been confirmed.

## 3.8 Future levels of container traffic demand

Our central forecasts for Europe deep sea container traffics are described in table 3.9 below. Overall, we anticipate that demand through the Continental mainland ports will grow by 34% between 2004 and 2010, and by a further 93% to 2030. Existing deep sea throughput can be taken as approximately 26m TEU (18.5m TEU of domestic traffic plus 7.4m TEU of feeder traffic given the second reloading move). On the basis that existing infrastructure can (just) deal with existing demand, the addition of 18.9m TEU of capacity through the new Continental port projects described above would raise effective capacity to around 45m TEU (26m in 2004 + 18.9m TEU of extra capacity).

**Table 3.9: European deep sea import + export maritime container traffic forecasts (exc UK) for 2004 – 2030 (M TEU)**

| Country | 2004 | 2010 | 2015 | 2020 | 2030 |
|---|---|---|---|---|---|
| ALBANIA | 0.05 | 0.06 | 0.07 | 0.08 | 0.11 |
| ANDORRA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AUSTRIA | 0.39 | 0.52 | 0.64 | 0.76 | 1.00 |
| BELGIUM | 1.80 | 2.77 | 3.43 | 4.07 | 5.35 |
| BULGARIA | 0.04 | 0.06 | 0.07 | 0.08 | 0.11 |
| CROATIA | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| CZECH REPUBLIC | 0.25 | 0.50 | 0.62 | 0.74 | 0.97 |
| FRANCE | 2.50 | 3.35 | 4.15 | 4.93 | 6.48 |
| FYR MACEDONIA | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 |
| GERMANY | 4.34 | 5.50 | 6.80 | 8.08 | 10.63 |
| GREECE | 0.26 | 0.34 | 0.42 | 0.50 | 0.65 |
| HUNGARY | 0.27 | 0.34 | 0.42 | 0.50 | 0.66 |
| ITALY | 2.79 | 3.69 | 4.57 | 5.42 | 7.14 |
| LIECHTENSTEIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| LUXEMBOURG | 0.03 | 0.05 | 0.06 | 0.07 | 0.09 |
| MOLDOVA | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 |
| NETHERLANDS | 2.95 | 3.71 | 4.59 | 5.45 | 7.17 |
| PORTUGAL | 0.33 | 0.45 | 0.56 | 0.67 | 0.88 |
| ROMANIA | 0.14 | 0.21 | 0.26 | 0.31 | 0.41 |
| SAN MARINO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SERBIA & | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| SLOVAKIA | 0.05 | 0.08 | 0.10 | 0.11 | 0.15 |
| SLOVENIA | 0.06 | 0.07 | 0.09 | 0.11 | 0.14 |
| SPAIN | 1.89 | 2.70 | 3.35 | 3.97 | 5.22 |
| SWITZERLAND | 0.27 | 0.33 | 0.41 | 0.48 | 0.64 |
| VATICAN CITY | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Continental mainland | 18.47 | 24.81 | 30.70 | 36.45 | 47.95 |
| BELARUS | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 |
| DENMARK | 0.42 | 0.55 | 0.67 | 0.80 | 1.05 |
| ESTONIA | 0.05 | 0.09 | 0.11 | 0.14 | 0.18 |
| FAROE ISLANDS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FINLAND | 0.54 | 0.72 | 0.91 | 1.10 | 1.47 |
| ICELAND | 0.03 | 0.04 | 0.04 | 0.05 | 0.06 |
| IRISH REPUBLIC | 0.27 | 0.37 | 0.44 | 0.52 | 0.66 |
| LATVIA | 0.02 | 0.03 | 0.03 | 0.04 | 0.06 |
| LITHUANIA | 0.02 | 0.04 | 0.05 | 0.06 | 0.08 |
| NORWAY | 0.23 | 0.31 | 0.39 | 0.47 | 0.62 |
| POLAND | 0.38 | 0.53 | 0.66 | 0.78 | 1.03 |
| RUSSIA | 0.83 | 1.11 | 1.41 | 1.69 | 2.26 |
| SWEDEN | 0.71 | 0.94 | 1.18 | 1.41 | 1.87 |
| UKRAINE | 0.17 | 0.28 | 0.34 | 0.40 | 0.53 |
| "Feeder" country subtotal | 3.69 | 5.03 | 6.30 | 7.51 | 9.93 |
| **Grand Total** | **22.16** | **29.84** | **37.00** | **43.96** | **57.89** |

*Source: MDS Transmodal Ltd*

At present, a quarter of container handling in the mainland ports is accounted for by transhipment. This is largely a reflection of the fact that deep sea vessels generally do not stray beyond the Le Havre – Hamburg range, so that markets to the south, in Ireland and particularly in Scandinavia and the Baltic are served by feedering. Table 3.10 summarises this particular feature to describe how continuing growth may lead to demand exceeding supply and squeezing out some of this transhipment market from the main Continental ports.

**Table 3.10: Forecast demand for mainland Continental ports (excluding transhipment to British Isles) (MTEU), MDST central forecast.**

| | 2004 | 2010 | 2015 | 2020 | 2030 |
|---|---|---|---|---|---|
| Continental mainland | 18.47 | 24.81 | 30.70 | 36.45 | 47.95 |
| Feeder countries | 7.37 | 10.05 | 12.59 | 15.01 | 19.86 |
| Total | 25.85 | 34.86 | 43.30 | 51.47 | 67.82 |

*Source: MDS Transmodal Ltd*

The table suggests that growth of underlying trade to just serve the Continental mainland, and non-GB feeder markets will be 25.6m TEU to 2020, in excess of the anticipated growth in capacity, which would allow these ports to handle around 45m TEU.

The table shows that by 2015, Continental mainland traffic alone will exceed the total traffic handled by ports in 2004, which implies that without further capacity, transhipment traffic will begin to be squeezed out. Even that capacity currently planned will be inadequate by 2020, implying that transhipment capacity will begin to be rationed by price. This is discussed in more depth in chapter 6 (Scenario 5). Growth in transhipment markets to Ireland, Bay of Biscay and Britain will further exacerbate this situation.

## 3.9 Transhipment Port Connectivity

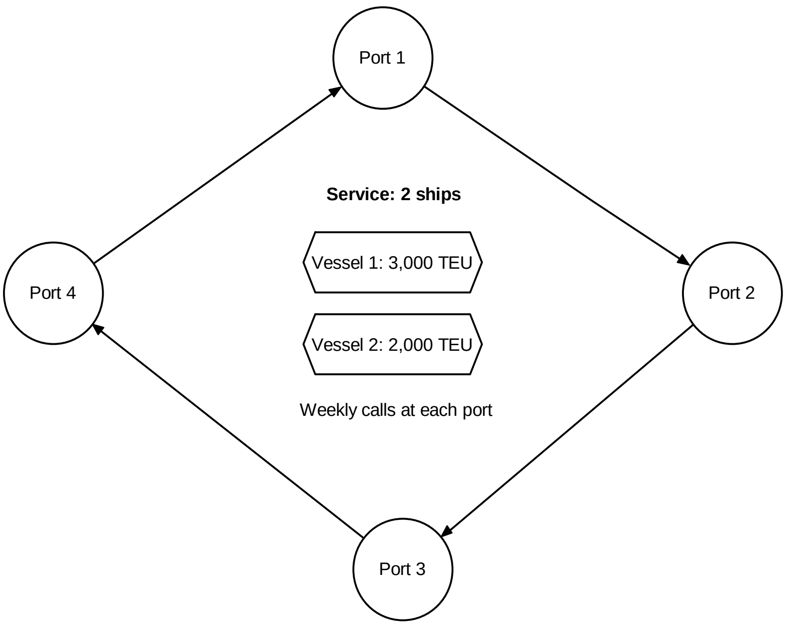
***Definition***

MDST has developed an index of port connectivity as a measure both of the number of ports that can be directly accessed from a given port via the services calling directly at it, and the capacity of the services providing those connections. The capacity of each connection is measured by the average TEU of the vessels deployed on a service, multiplied by the number of ship calls per year.

Port connectivity is based upon the actual schedules operated by the shipping lines. The connectivity rankings are based upon the number of connections from a given port, the average size of ship calling there, the frequency per connection per annum, and a total connectivity measure, taking into account all three factors.

This statistic is useful as a tool that provides a measure of the comparative performance of a port over time and between ports. The index is designed to provide insight into the way in which deep sea lines may compare ports in terms of the quality of onward connections each can offer, and the way that level of connectivity is changing. The method can be illustrated with a simple example:

**Figure 3.3 Port Connectivity**




In the example above, one weekly service consists of two ships on a four port rotation. One ship has capacity for 3,000 TEU, the other 2,000 TEU.

The connectivity statistics for each port in the rotation are the same. They are calculated according to these definitions:

***Port Links*** – The number of different ports directly accessible from a given port.
***Connections*** – The number of port/operator combinations accessible from a given port.
***Average Ship Size*** – The average TEU capacity of ships calling at a given port.
***Annual Frequency*** – The number of calls per *connection* per annum at a given port.
***Total Connectivity*** – The product of *connections*, *frequency* and *ship size* for a given port.

*Connectivity Statistics, Simplified Example*

| Connectivity Statistic | Result | Explanation |
|---|---|---|
| Number of Port Links | 3 | Each port is connected to three others. |
| Number of Connections | 3 | One service on each of the three links. |
| Average Ship Size | 2,500 TEU | Average of 2,000 and 3,000 |
| Annual Frequency | 52 | Frequency per Connection |
| Total Connectivity | 390,000 TEU | Connections * Frequency * Ship Size = 3 * 52 * 2,500 |

Note that if another line added an identical service, the number of port links would remain at 3, but the number of connections would double to 6, because it is treating a connection as being a unique combination of ports and service operators. Average ship size would remain 2,500 TEU, and frequency would not change either. So overall, because of the increase in the number of connections, total connectivity would double to 780,000 TEU.

If the same shipping line doubled its fleet on the same rotation, the number of port links and the number of service connections would both remain constant at three. Average ship size would remain at 2,500 TEU, but because the service frequency per connection would double from weekly to twice weekly (104 calls at each port per year), total connectivity would double to 780,000 TEU per annum.

Using a real example, based on the Port of Valencia in 2004:

*Connectivity Statistics, Valencia*

| Connectivity Statistic | Result | Explanation |
|---|---|---|
| Number of Port Links | 142 | Number of direct port connections |
| Number of Connections | 343 | Number of unique service and port combinations, so there are, on average, 2.41 service operators competing on each feasible link. |
| Average Ship Size | 2,579 TEU | The average vessel size |
| Annual Service Frequency | 45 | Frequency per connection |
| Total Connectivity | 39.807m TEU | 343 connections * 2579 TEU * 45 calls per annum |

The tables show that Valencia offers direct connections to 142 different ports, with an average of 2.41 operators competing for each destination, with 45 calls per year, per port and per operator, with an average ship size of 2,579 TEU.

Using the same technique for Algeciras:

*Connectivity Statistics, Algeciras*

| Connectivity Statistic | Result | Explanation |
|---|---|---|
| Number of Port Links | 103 | Number of direct port connections |
| Number of Connections | 161 | Number of unique service and port combinations, so there are, on average, 1.56 service operators competing on each feasible link. |
| Average Ship Size | 3,201 | The average vessel size |
| Annual Service Frequency | 48.6 | Frequency per connection |
| Total Connectivity | 25,022m TEU | 161 connections * 3,201 TEU * 48.6 calls per annum |

Algeciras's connectivity rating is lower than Valencia's even though the average ship size is 24% greater, and the average frequency per connection is 8% greater. These are outweighed by the smaller number of ports connected to, and the lower number of operators per connection.

### *Connectivity of NW European deep sea ports*

The development of the connectivity of NW European transhipment ports (covering **all** services, i.e. deep sea, short sea and feeder) is summarised in table 3.10 below. The more detailed breakdown of individual ports' connectivity by geographic region, comparing the 1996 and 2005 position, is presented in Appendix 6.

Table 3.11 also demonstrates the global ranking of these ports as well as their ranking relative to one another.

**Table 3.11: Connectivity of NW European Ports: indices compared**

| | 2005 | 2000 | 1996 | 1990 | % change 1996-2005 | 2005 | World 2000 | ranking 1996 | 1990 |
|---|---|---|---|---|---|---|---|---|---|
| **a) Number of connections** | | | | | | | | | |
| Rotterdam | 1052 | 1102 | 1178 | 1320 | -11 | 5 | 3 | 3 | 1 |
| Hamburg | 956 | 844 | 994 | 1153 | -4 | 6 | 8 | 5 | 4 |
| Antwerp | 912 | 909 | 1023 | 972 | -11 | 8 | 6 | 4 | 7 |
| Bremerhaven | 544 | 474 | 481 | 828 | 13 | 17 | 18 | 16 | 10 |
| Le Havre | 542 | 648 | 609 | 798 | -11 | 18 | 13 | 13 | 12 |
| Felixstowe | 447 | 625 | 685 | 590 | -35 | 24 | 14 | 12 | 14 |
| Tilbury | 182 | 158 | 238 | 261 | -24 | 78 | 80 | 69 | 40 |
| Algeciras | 170 | 178 | 112 | 89 | 91 | 82 | 72 | 118 | 127 |
| Thamesport | 132 | 135 | 161 | 17 | -18 | 104 | 101 | 79 | 312 |
| Southampton | 100 | 139 | 115 | 65 | -13 | 134 | 98 | 113 | 166 |
| Zeebrugge | 98 | 108 | 51 | 82 | 92 | 137 | 125 | 202 | 140 |
| **TOTAL** | **5135** | **5320** | **5647** | **5175** | **-9** | | | | |
| **b) Annual connectivity (million TEU) *** | | | | | | | | | |
| Rotterdam | 150.74 | 107.77 | 85.40 | 58.30 | 77 | 5 | 4 | 3 | 3 |
| Hamburg | 115.93 | 71.64 | 68.22 | 47.59 | 70 | 8 | 10 | 5 | 8 |
| Le Havre | 93.63 | 57.48 | 63.21 | 47.98 | 48 | 11 | 6 | 7 | 7 |
| Antwerp | 88.21 | 103.88 | 53.12 | 46.41 | 66 | 12 | 16 | 10 | 15 |
| Felixstowe | 74.50 | 63.97 | 51.88 | 32.39 | 44 | 15 | 12 | 12 | 16 |
| Bremerhaven | 69.40 | 53.96 | 36.78 | 35.73 | 89 | 18 | 18 | 18 | 14 |
| Southampton | 27.17 | 23.58 | 14.28 | 7.21 | 90 | 51 | 38 | 43 | 44 |
| Algeciras | 26.31 | 23.47 | 12.16 | 5.69 | 362 | 52 | 39 | 48 | 53 |
| Thamesport | 25.95 | 22.38 | 18.94 | 1.34 | 37 | 54 | 40 | 29 | 152 |
| Zeebrugge | 20.80 | 14.66 | 2.86 | 4.71 | 627 | 68 | 61 | 141 | 65 |
| Tilbury | 19.93 | 7.97 | 6.18 | 4.83 | 222 | 70 | 104 | 86 | 63 |

**Number of connections x average TEU of vessels on service x service frequency*

*Source : MDS Transmodal - Containership Databank*

This analysis demonstrates that:

- In the last ten years a reduction in the number of connections has been common to most ports, while their annual connectivity for the most part has grown. The reduction in total connections is the result of the reduction in the number of services calling at a port and/or a reduction in the number of ports served by some services as lines have consolidated to maximise maritime scale despite parallel growth in the size of the market available.

- Rotterdam remains the dominant NW European port, followed by Hamburg and Le Havre. Le Havre ranks third in terms of annual connectivity as, although it has fewer direct international connections than Antwerp and Bremerhaven, it is better represented by services to the Far East, which employ the largest container vessels (hence greater annual capacity).

- In the last ten years both Le Havre and Bremerhaven have risen above Felixstowe in these connectivity rankings.

- Felixstowe, the UK's leading container port, demonstrates less than half the connectivity of Rotterdam. The annual capacity of services calling at Felixstowe is currently approximately 75 million TEU per annum compared with 150 million TEU per annum at Rotterdam.

- Services calling at Southampton and Thamesport offer around one-third of the capacity of services calling at Felixstowe.

- Tilbury actually ranks second to Felixstowe in the UK in terms of connectivity, by virtue of the geographical range of services calling there and therefore the greater number of port links possible. Deep sea services calling at Thamesport are also more geographically diverse than those calling at Southampton, whose market is primarily focussed on the Far East. Southampton's connectivity ranks above Thamesport because of the greater average size of ships deployed on services calling at Southampton.

It is difficult, therefore, to avoid the conclusion that the lack of expansion of GB container ports at an earlier stage and the fact that GB demand for deep sea container handling is divided between several different sites means that the role of British ports in third country transhipment may be limited. The success in third country transhipment that Rotterdam, Antwerp and Hamburg enjoy is based upon their respective domination of domestic markets, associated scale and the lines having confidence that further infrastructure expansion is on the way. It is also clear that, with one exception, third country transhipment in 'Atlantic' Europe takes place at ports that lines will call at in any case for domestic traffic reasons. That one exception, Algeciras, owes its success to a unique 'cross roads' geographical position that NW European ports cannot replicate.

# 4. GB CONTAINER PORT TRAFFIC

***LoLo container traffic through GB ports has been growing at a compound annual growth rate of 4.7% over the recent period. Excluding containers transhipped for third countries in GB ports, the growth rate in the GB domestic market is 5.6% (number of units) and 6.7% (TEU).***

***The forecast growth rate to 2030 for the domestic market is of 3.75% compound annual growth (number of units) and 4.02% (TEU). The rate of growth varies by trade area, being higher for West and East Asia, Mediterranean and East European countries and lower for trade with especially Nordic countries and North America.***

## 4.1 The UK container handling market

Lo-lo container traffic volumes through GB ports grew by approximately 73% between 1992 and 2004, a compound growth rate of 4.7% per annum. In absolute terms, traffic grew by 163,000 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 would be 5.6% (91% growth over the period), or 6.7% per annum (118% overall) if measured as TEU, an absolute average growth rate of 319,000 TEU per annum.

Reconciliation between these results (for 2004) and DfT published statistics is explained in Appendix 7.

Our central forecast is that UK deep sea container traffic (measured in TEU) will grow by 39% between 2004 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 in chapter 6. However, we have considered a range of forecast levels in our forecast exercise for the DfT. Our 'low level' forecast reduces import volumes on the basis of ability to pay. It assumes that the current gap between import and export goods traffic grows no wider, implying that any increase in UK earnings from services (invisibles) remains in step with trends in visible exports. Our central forecast volumes of imports are based upon GDP, exchange rates and the trend of globalisation since 1992 (falling trade barriers). This implies a significant increase in invisible earnings (let us call that 'central invisibles'). Our high forecast extrapolates the more recent trend from 2004, but also introduces a constraint whereby eventually the ability to pay does 'control' imports such that the import – export gap is never more than twice 'central invisibles'. Forecast overall unit volumes are, inevitably, import volumes doubled. 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 44% between 2004 and 2010 and by a further 118% between 2010 and 2030.

**Table 4.1: GB port container traffic 1992-2004**

('000s unit loads)

| | 1992 | 1995 | 1997 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | % CAGR 1992-2004 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Major South East Ports** | | | | | | | | | | |
| Felixstowe | 1,057 | 1,345 | 1,600 | 1,826 | 1,857 | 1,855 | 1,715 | 1,585 | 1,711 | |
| Southampton | 322 | 471 | 591 | 603 | 684 | 734 | 791 | 846 | 880 | |
| Thamesport | 129 | 210 | 257 | 320 | 324 | 308 | 325 | 314 | 377 | |
| London ** | 329 | 296 | 344 | 464 | 333 | 400 | 374 | 397 | 506 | |
| **Sub-total** | **1,837** | **2,322** | **2,792** | **3,213** | **3,198** | **3,297** | **3,205** | **3,142** | **3,474** | |
| **Other Ports:** | | | | | | | | | | |
| Liverpool | 229 | 262 | 303 | 325 | 334 | 331 | 309 | 356 | 378 | |
| Forth | 51 | 58 | 64 | 66 | 79 | 90 | 103 | 111 | 125 | |
| Hull | 175 | 174 | 146 | 142 | 163 | 128 | 88 | 153 | 172 | |
| Goole | 20 | 41 | 69 | 69 | 70 | 70 | 51 | 18 | 27 | |
| Greenock | 6 | 16 | 17 | 22 | 29 | 31 | 33 | 45 | 36 | |
| Tees | 80 | 182 | 168 | 148 | 28 | 48 | 74 | 82 | 82 | |
| Bristol | 16 | 52 | 19 | 27 | 32 | 48 | 55 | 58 | 66 | |
| Immingham &Gr.** | 91 | 126 | 158 | 171 | 15 | 19 | 61 | 46 | 50 | |
| Other | 362 | 233 | 138 | 128 | 153 | 167 | 183 | 173 | 222 | |
| **Total** | **2,865** | **3,466** | **3,873** | **4,311** | **4,101** | **4,229** | **4,162** | **4,184** | **4,632** | **4.1** |
| Of which: | | | | | | | | | | |
| Coastwise* | 163 | 132 | 137 | 132 | 153 | 218 | 205 | 189 | 184 | 1.0 |
| Short Sea* | 1,204 | 1,469 | 1,538 | 1,716 | 1,619 | 1,605 | 1,523 | 1,527 | 1,683 | 2.8 |
| Deep Sea | 1,498 | 1,865 | 2,198 | 2,463 | 2,220 | 2,284 | 2,319 | 2,368 | 2,636 | 4.8 |
| Unspecified: | | - | | - | 109 | 122 | 115 | 100 | 129 | |
| Sub Total (DfT) | 2,865 | 3,466 | 3,873 | 4,311 | 4,101 | 4,229 | 4,162 | 4,184 | 4,632 | 4.1 |
| of which lo-lo ** | 2,671 | 3,227 | 3,486 | 3,898 | 4,101 | 4,229 | 4,162 | 4,184 | 4,632 | 4.7 |
| Estimated transhipped*** | (411) | (625) | (744) | (710) | (697) | (614) | (508) | (343) | (305) | |
| Net domestic GB lo-lo containers | 2,260 | 2,602 | 2,742 | 3,188 | 3,404 | 3,615 | 3,654 | 3,841 | 4,327 | 5.6 |
| **Net domestic TEU** | **3,254** | **3,825** | **4,086** | **4,910** | **5,242** | **5,676** | **5,882** | **6,222** | **7,086** | **6.7** |
| *TEU container ratio* | *1.44* | *1.47* | *1.49* | *1.54* | *1.54* | *1.54* | *1.61* | *1.62* | *1.64* | *1.1* |
| *Transhipment as % of domestic* | *18%* | *24%* | *27%* | *22%* | *20%* | *17%* | *14%* | *9%* | *7%* | - |

***TEU equivalent***

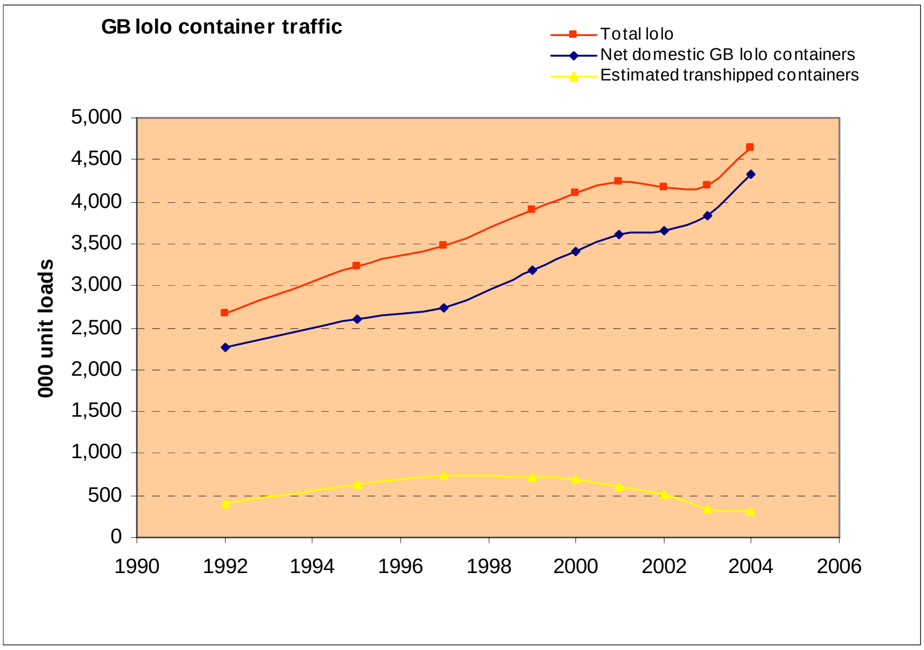
**coastwise traffic is estimated by determining the proportion of NI port traffic which is with GB ports and deducting this from the UK coastwise total. A corresponding adjustment is made to short sea traffics to remove NI ports traffic recorded under a UK total. In this context, coastwise is taken to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

**** 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*

**Figure 4.1**




*Source: MDS Transmodal Ltd*

## 4.2 UK Transhipment market

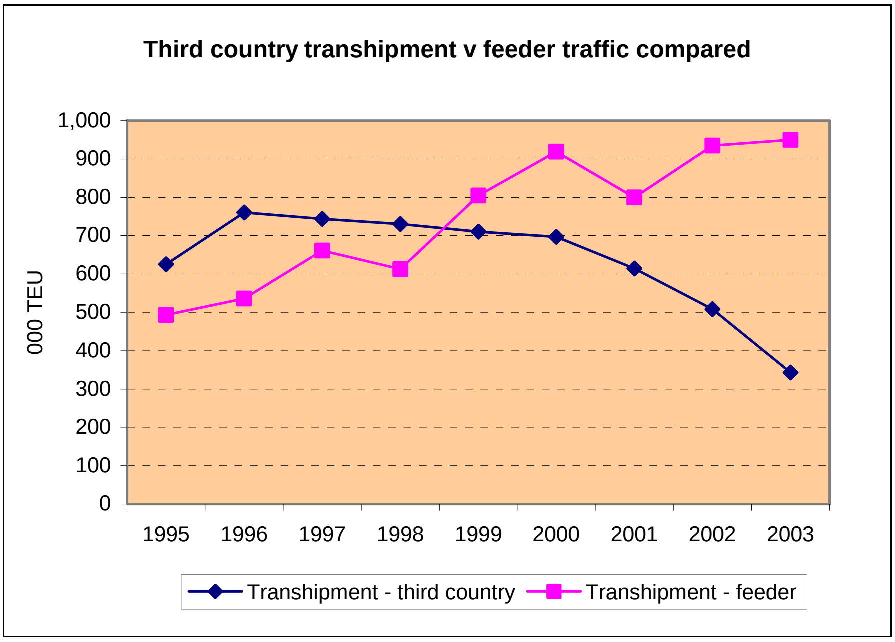
Third country transhipment at GB ports has declined since 2000 as overall volumes through the major ports have grown. We estimate that transhipment as a percentage of domestic handling reached over 25% in 1997 but has since fallen to less than 10%.

It follows from the above that:

- In 2004, transhipment added approximately 6.5% to total GB ports domestic lo-lo traffic, representing around 7% of total lo-lo throughput
- 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 change in the balance of the volume of containers being transhipped in GB ports for third countries and the volume of containers being transhipped on the Continent for Great Britain. (Figure 4.2)

**Figure 4.2**




*Source: MDS Transmodal Ltd*

## 4.3 Forecast container growth

Our forecasts are that total GB ports (and Eurotunnel) unitised growth will be 120% between 2004 and 2030 as measured in tonnes. Growth will be highest in imports of miscellaneous manufactures (SITC chapter 8) at around 149%. Growth in containerised tonnes will be higher at 140%, reflecting, particularly, the strength of traffic from Asia. Measured in TEU, we estimate growth will be 161% overall, with growth in traffic from Asia reaching 200%.

The following tables 4.2-4.3 present these forecasts in terms of unitised tonnes, containerised tonnes, TEU and number of units.

**Table 4.2: Forecast Unitised Tonnes 2004-2030, by Commodity Sector**
('000 tonnes)

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 | Growth 04/30 |
|---|---|---|---|---|---|---|---|
| **Exports** | | | | | | | |
| Food | 6,323 | 8,119 | 9,289 | 11,076 | 13,480 | 15,351 | 3.47% |
| Beverages & Tobacco | 1,792 | 2,914 | 3,208 | 3,506 | 3,811 | 4,116 | 3.25% |
| Crude Materials | 5,603 | 7,003 | 8,438 | 10,423 | 12,231 | 14,553 | 3.74% |
| Mineral Fuels | 562 | 741 | 1,129 | 1,207 | 1,331 | 1,426 | 3.65% |
| Oils Fats | 316 | 434 | 532 | 632 | 733 | 833 | 3.80% |
| Chemicals | 10,011 | 12,908 | 14,669 | 18,107 | 20,621 | 22,421 | 3.15% |
| Basic Manufactures | 12,656 | 15,668 | 18,816 | 21,233 | 23,370 | 25,120 | 2.67% |
| Machinery | 5,515 | 6,814 | 7,913 | 9,024 | 10,448 | 11,851 | 2.99% |
| Misc Manufactures | 1,934 | 2,634 | 3,222 | 3,815 | 4,712 | 5,575 | 4.16% |
| Commodities n.e.s. | 6 | 8 | 9 | 10 | 12 | 13 | 3.00% |
| Total | 44,718 | 57,243 | 67,225 | 79,032 | 90,748 | 101,261 | 3.19% |
| **Imports** | | | | | | | |
| Food | 16,177 | 20,350 | 23,256 | 27,187 | 31,408 | 34,103 | 2.91% |
| Beverages & Tobacco | 3,473 | 4,185 | 5,014 | 6,116 | 6,589 | 7,067 | 2.77% |
| Crude Materials | 5,295 | 6,247 | 6,710 | 7,356 | 8,918 | 10,223 | 2.56% |
| Mineral Fuels | 746 | 999 | 1,210 | 1,421 | 1,911 | 2,671 | 5.03% |
| Oils Fats | 945 | 1,149 | 1,612 | 1,739 | 2,476 | 2,557 | 3.90% |
| Chemicals | 12,076 | 15,786 | 18,182 | 20,879 | 23,554 | 27,869 | 3.27% |
| Basic Manufactures | 21,477 | 25,568 | 29,672 | 33,351 | 37,176 | 41,692 | 2.58% |
| Machinery | 8,641 | 10,778 | 12,873 | 15,213 | 17,535 | 20,609 | 3.40% |
| Misc Manufactures | 7,040 | 8,905 | 10,691 | 12,186 | 14,295 | 17,533 | 3.57% |
| Commodities n.e.s. | 3 | 4 | 5 | 6 | 6 | 7 | 3.40% |
| Total | 75,874 | 93,971 | 109,224 | 125,456 | 143,868 | 164,331 | 3.02% |
| | | | | | | | |
| **Total Trade** | **120,592** | **151,214** | **176,449** | **204,488** | **234,616** | **265,592** | **3.08%** |

*Source: MDS Transmodal Ltd*

**Table 4.3: Forecast Containerised Tonnes 2004-2030, by World Region**
('000 tonnes)

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 | Growth 04/30 |
|---|---|---|---|---|---|---|---|
| **Exports** | | | | | | | |
| Ireland | 1,178 | 1,874 | 2,160 | 2,492 | 2,721 | 2,850 | 3.46% |
| NW Europe | 1,661 | 2,299 | 2,781 | 3,333 | 3,822 | 4,056 | 3.49% |
| Nordic | 122 | 385 | 435 | 547 | 598 | 665 | 6.73% |
| Mediterranean | 1,610 | 2,075 | 2,378 | 2,673 | 3,007 | 3,410 | 2.93% |
| E Europe | 28 | 44 | 56 | 68 | 81 | 94 | 4.72% |
| Africa Excl Med | 758 | 924 | 1,064 | 1,211 | 1,395 | 1,579 | 2.86% |
| N America | 2,004 | 2,475 | 2,868 | 3,270 | 3,667 | 4,070 | 2.76% |
| C&S America | 615 | 824 | 999 | 1,182 | 1,398 | 1,605 | 3.76% |
| W Asia | 1,715 | 2,222 | 2,645 | 3,373 | 3,831 | 4,844 | 4.07% |
| E Asia | 4,591 | 6,231 | 7,860 | 9,483 | 11,455 | 13,289 | 4.17% |
| Oceania | 340 | 400 | 450 | 500 | 556 | 615 | 2.31% |
| Total | 14,623 | 19,753 | 23,695 | 28,133 | 32,529 | 37,075 | 3.64% |
| **Imports** | | | | | | | |
| Ireland | 498 | 725 | 942 | 1,028 | 1,109 | 1,290 | 3.73% |
| NW Europe | 3,400 | 4,641 | 5,445 | 6,043 | 7,100 | 7,765 | 3.23% |
| Nordic | 1,503 | 2,157 | 2,225 | 2,616 | 2,359 | 2,626 | 2.17% |
| Mediterranean | 2,003 | 2,529 | 2,867 | 3,323 | 3,994 | 4,930 | 3.52% |
| E Europe | 95 | 138 | 166 | 224 | 254 | 279 | 4.25% |
| Africa Excl Med | 1,382 | 1,649 | 1,872 | 2,107 | 2,725 | 2,979 | 3.00% |
| N America | 3,211 | 3,634 | 3,986 | 4,486 | 5,140 | 6,198 | 2.56% |
| C&S America | 2,270 | 2,667 | 2,997 | 3,361 | 3,769 | 4,152 | 2.35% |
| W Asia | 1,831 | 2,375 | 2,828 | 3,282 | 3,778 | 4,242 | 3.28% |
| E Asia | 7,786 | 10,286 | 12,883 | 14,892 | 17,505 | 21,344 | 3.95% |
| Oceania | 708 | 834 | 939 | 1,045 | 1,191 | 1,306 | 2.38% |
| Total | 24,687 | 31,635 | 37,152 | 42,408 | 48,924 | 57,114 | 3.28% |
| | | | | | | | |
| **Total Trade** | **39,310** | **51,388** | **60,847** | **70,540** | **81,453** | **94,189** | **3.42%** |

*Source: MDS Transmodal Ltd*

**Table 4.4: Forecast Containerised Traffic, 2004-2030, by World Region**
TEU ('000s)

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 | Growth 04/30 |
|---|---|---|---|---|---|---|---|
| Ireland | 120 | 190 | 253 | 281 | 308 | 362 | 4.34% |
| NW Europe | 907 | 1,328 | 1,597 | 1,808 | 2,155 | 2,380 | 3.78% |
| Nordic | 350 | 543 | 575 | 692 | 635 | 713 | 2.77% |
| Mediterranean | 519 | 734 | 855 | 1,013 | 1,241 | 1,548 | 4.29% |
| E Europe | 73 | 115 | 142 | 190 | 219 | 244 | 4.77% |
| Africa Excl Med | 349 | 469 | 546 | 627 | 810 | 896 | 3.69% |
| N America | 830 | 1,035 | 1,165 | 1,338 | 1,555 | 1,894 | 3.23% |
| C&S America | 523 | 681 | 780 | 886 | 1,006 | 1,115 | 2.95% |
| W Asia | 539 | 765 | 931 | 1,101 | 1,283 | 1,454 | 3.89% |
| E Asia | 2,722 | 3,944 | 5,063 | 5,960 | 7,108 | 8,774 | 4.60% |
| Oceania | 153 | 206 | 238 | 271 | 314 | 348 | 3.22% |
| | | | | | | | |
| **Total TEU** | **7,086** | **10,009** | **12,146** | **14,167** | **16,633** | **19,728** | **4.02%** |
| **Total Container Units** | **4,327** | **5,881** | **6,941** | **8,095** | **9,505** | **11,273** | **3.75%** |

*Source: MDS Transmodal Ltd*

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; and

(iii) a gradual fall in the tonnes of goods carried per container.

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

(i) the Asian trades, representing 46% of UK containerised trade in 2004;

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

(ii) the North American trade; and

(iii) 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, largely as a consequence of the sustained growth observed between 1999 and 2004 measured in TEU (+44.3% overall or 7.6% 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 grow to over 5m tonnes per annum in the years to 2030.

The public inquiries held concerning the Dibden Bay proposals, London Gateway, Bathside Bay and Felixstowe South used forecasts of between 3% and 5% per annum over the period to 2015 or 2020. For example,

**At the Dibden Inquiry* 1999 - 2015**

| | |
|---|---|
| MDST (for ABP, the developer): | + 119% |
| Ocean Shipping Consultants (for Hampshire C.C. the objector): | + 136% |

* excluding transhipment

**At the London Gateway Inquiry, 1999 - 2015**

| | |
|---|---|
| Drewry Shipping Consultants (for P & O Ports): | + 105% |

**At the Bathside Bay and Felixstowe South inquiries**

| | |
|---|---|
| Ocean Shipping Consultants: | + 112% |

**For RSPB/English Nature**

| | |
|---|---|
| MDST: | + 115%* |

* 2000 base adjusted to 1999

**As compared with this study which equates to a 1999 – 2015 growth of 147% (4.9m TEU rising to 12.1m TEU).**

For the period 2015 – 2020, there was more variation in forecasts, depending to some extent on assumptions made on levels of transhipment.

**At the Dibden Inquiry (2015 to 2020)**

| | |
|---|---|
| MDST: | + 22%(exc. transhipment) |

**For RSPB/English Nature (2015 – 2020)**

| | |
|---|---|
| MDST: | + 32% (inc. transhipment) |

**At the Bathside Bay and Felixstowe south inquiry (2015 – 2020)**

| | |
|---|---|
| Ocean Shipping Consultants (supplied by Hutchison): | +27% (major ports) |

**At the London Gateway Inquiry**

| | |
|---|---|
| Drewry Shipping Consultants | +21%<br>(deep sea exc. transhipment) |

**As compared with this study which equates to a 2015 – 2020 growth of 17%**

There is, therefore, a reasonable level of consensus in these forecasts.

## 4.4 Intra European traffic

Throughout the exercise, we have concentrated on deep sea lo-lo container traffic. 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 instead of visiting different ‘mother ship’ berths at Continental hub ports to ‘fill-up’ with deep sea transhipped goods. This intra European market is also expected to grow and to therefore require further capacity in the future. At present, we estimate that intra Western European lo-lo container traffic through GB ports amounts to around 1.38m TEU per annum (see table 4.4).

It is not the purpose of this report to allocate short-sea 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 1.45m TEU of GB port throughput will rise to 3.70m TEU, leading to a need to accommodate an extra 2.25m 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 2,922 quay metres would be required for short sea vessels serving intra European markets.

Let us assume that intra North-European demand is divided between 10% to the west coast (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:

**Table 4.5: Estimated demand (2030) for extra intra-European lolo port capacity**

| Port Region | '000s TEU Equivalent | Quay metres |
|---|---|---|
| South West/South Wales | 75 | 97m |
| South East/Haven | 900 | 1169m |
| North West | 150 | 195m |
| North East/Humber | 900 | 1169m |
| Scotland | 225 | 293m |
| Total | 2250 | 2922m |

*Source: MDS Transmodal Ltd*

To complete this overall demand picture, we have also to take account of the capacity required for those deep sea traffics which the model, described in chapter 5, does not cater for - the existing deep sea container market share served at Bristol (1%) and at Liverpool (6%).

On the basis that Liverpool's trade is predominantly North American, we would expect its deep sea traffic to grow by around 450,000 TEU, requiring an extra 414 quay metres. On the basis that Bristol's trade is African, we would expect its deep sea traffic to grow by around 120,000 TEU, requiring an extra 110 quay metres.

We estimate that the different port ranges have the following extra capacity available to handle the larger feeder vessels. Based upon existing traffic levels, the following further container capacities can be estimated at existing container terminals (using feeder/short-sea vessels). In several cases, these capacities, based on quay metres, imply the need to purchase extra equipment.

**Table 4.6: Estimated feeder/short-sea capacity at existing ports**

| Port range | Port | Assumed spare capacity available ('000 TEU) | Equivalent quay metres implied |
|---|---|---|---|
| **South West/South Wales** | Cardiff | 50 | |
| | Bristol | 500 | |
| | | **550** | **714** |
| **South East/Haven** | Southampton | - | |
| | Tilbury (enclosed) | 100 | |
| | Harwich | 100* | |
| | Ipswich | 100 | |
| | | **300** | **429** |
| **North West** | Liverpool | **350** | **455** |
| **North East/Humber** | Tyne | 50 | |
| | Tees | 500** | |
| | Humber | 150 | |
| | | **700** | **909** |
| **Scotland** | Greenock | 200 | |
| | Grangemouth | 100 | |
| | | **300** | **390** |
| | **Overall total** | **2200** | **2897** |

* Lost if Bathside Bay proceeds

** reduced to 100,000 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 therefore describe the following net differences between supply and demand at short sea ports and non-south-east deep sea ports before analysing deep sea container services that either use south-east ports or tranship from the Continent. The net ‘shortfall’ of 549 metres of quay equates to around 450-460,000 TEU of capacity shortfall.

**Table 4.7: Estimated 2030 supply demand position to carry forward to analysis of deep-sea traffic currently accommodated by south-east ports and feeder services (quay metres)**

| | Apparent (quasi) supply (m) | Forecast Intra European demand (m) | Forecast deep sea demand via Bristol and Liverpool (m) | Net quay metres (demand less supply) required to carry forward |
|---|---|---|---|---|
| South West/South Wales | 714 | 97 | 110 | +507 |
| South East/Haven | 429 | 1,169 | - | -740 |
| North West | 455 | 195 | 414 | -154 |
| North East/Humber | 909 | 1,169 | - | -260 |
| Scotland | 390 | 292 | - | +98 |
| **Total** | **2,897** | **2,922** | **524** | **-549** |

*Source: MDS Transmodal Ltd.*

This analysis suggests that residual capacity will be available in the Bristol Channel and Scotland to handle additional feeder traffics. That will not be the case in the north west or along the length of the English east coast.

We have also conducted forecasts of deep sea container traffic for other West European markets. Trade with the smaller countries in particular represents an opportunity to develop third country transhipment traffics within GB ports where adequate capacity is available. Maritime costs to (say) Norway or Ireland are more or less identical whether such transhipment takes place in Southampton or Le Havre, or in Felixstowe or Rotterdam.

Given that lines typically make 3.7 direct port calls in NW Europe in each rotation, the principal determinant of port choice for transhipment will be handling charges at different ports. In the event that capacity at the Continental ports is limited, we have tested whether opportunities may arise for GB ports beyond the south-east to enter this third country market.

# 5. MEASURING THE IMPACT OF PORT CAPACITY ENHANCEMENT

***Discussion of the methodology and assumptions applied in the modelling of container transhipment under five scenarios of port supply.***

## 5.1 Approach and methodology

We have shown in chapter 4 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 port handling costs and 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. However, this can only be achieved by increasing the total amount of port capacity available. There is an obvious trade off between investment in port and 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 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; 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 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 5.1: Key assumptions in determining the transhipment cost model**

**Vessel costs**

| Vessel TEU | Charter/day (£) | Bunker cost/mile at | Speed (knots) |
|---|---|---|---|
| 1000 | 12,000 | 22 | 16.0 |
| 3000 | 27,000 | 38 | 20.0 |
| 5000 | 35,000 | 49 | 24.0 |
| 8000 | 45,000 | 63 | 24.9 |
| 10000 | 50,000 | 70 | 25.4 |
| 12000 | 55,000 | 77 | 26.0 |
| 15000 | 61,000 | 86 | 26.9 |

**Stevedoring charges** Handling/container: deep sea ports : £70
short sea ports : £50
transhipment : £80

**Gross Port entry costs** £4/TEU of ship capacity

**Inland transport costs** Road : £80 + £0.62/km
Rail : £178* + £0.25/km
* including £89 drayage plus £62 terminal lifts on and off rail

*Source: MDS Transmodal Ltd*

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 (otherwise defined as 'system cost' per TEU). Thus, for example, a deep sea vessel serving the Asian market and making a direct call at Southampton in delivering a container to Manchester would face the following costs:

**Table 5.2: Illustration of modelled costs using direct call: to Manchester ***

| | | | |
|---|---|---|---|
| Diversion cost of the ship | : | £ 16,576 | (of 5,000 TEU capacity) |
| Bunker costs | : | £ 1,623 | |
| Port entry costs | : | £ 20,000 | |
| Handling at deepsea port | : | £ 70,000 | |
| Total maritime cost (1000 units) | : | £108,199 | |
| Maritime costs/unit | : | £ 108.20 | |
| Fixed rail costs per unit | : | £ 177.55 | |
| Variable rail costs to Manchester | : | £ 93.63 | |
| Overall 'delivery' costs per unit | : | £ 379.38 | |
| Delivery cost per TEU | : | £ 234.19 | |

* assumes 18% share of load for UK at 90% load factor

*Source: MDS Transmodal Ltd*

An alternative approach might be for the line to avoid a GB port call and to use a feeder vessel between Rotterdam and Hull, delivering onwards by road, as shown in table 5.3.

**Table 5.3: Illustration of modelled costs using feeder via Humber: to Manchester**

| | |
|---|---|
| Transhipment cost/units : | £ 80.00 |
| Feeder ship cost/unit: | £ 89.57 |
| Handling at feeder port: | £ 50.00 |
| Road haulage cost to Manchester: | £177.35 |
| Overall delivery cost per unit : | £396.92 |
| Delivery cost per TEU | £245.00 |

*Source: MDS Transmodal Ltd*

In this simple example, it will be seen that the cost per unit of a direct call are lower, and the model that has been developed for this exercise would therefore allocate the appropriate volume of traffic to the 'south-east' port, as this offers the 'least cost' option. However, if shortage of capacity led to south-east port capacity being rationed through an increase in price of around 25% (+£17.50 per container or £10.80 per TEU), a routeing via Hull would become cost effective. Quite clearly, traffic to Leeds (equidistant to south-east ports but closer to east coast ports) would switch for a lower price increase in a south-east port.

Our model does not seek to distinguish between the different south-east ports but instead allocates traffic pro-rata to the current capacities of the different ports involved. We have defined the different deep water port capacities as follows, based upon existing or committed infrastructure and productivity improvements. Additional capacity from Felixstowe South, Bathside and London Gateway are not included in table 5.4.

**Table 5.4: Deep water Port capacity assumed without further infrastructure**

(Thousand TEUs)

| Port | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Felixstowe | 2793 | 3100 | 3100 | 3100 | 3100 | 3100 |
| Thamesport | 553 | 613 | 613 | 613 | 613 | 613 |
| Tilbury | 472 | 524 | 524 | 524 | 524 | 524 |
| Southampton | 1357 | 1657 | 1657 | 1657 | 1657 | 1657 |
| Avonmouth | 504 | 559 | 559 | 559 | 559 | 559 |
| Liverpool | 878 | 974 | 974 | 974 | 974 | 974 |
| Clyde | 301 | 334 | 334 | 334 | 334 | 334 |

* 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 Tees, Cardiff, Immingham and Grangemouth. However, given (as we have seen) that these do not represent minimum cost solutions when capacity is not constrained, it is self-evident that market equilibrium will only be achieved if lift 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 is being fed from a Continental port. Our modelling assumes that the typical market lift 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. It will follow, for example, 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. However, there remains scope for growth in rail volumes between the south-east and the Midlands. 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. ‘Delivery cost’ is defined as the extra cost of delivering containers to a GB inland destination over and above that of the cost of a container moving from its deep sea origin to the hold of a ship in the English Channel en route to Rotterdam.

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.

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 also 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 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, Newport 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 lolo traffic will also need to be catered for. The analysis in chapter 4 suggested that an additional 549 quay metres would be required to service growth in intra European lolo traffic.

The development of this model has highlighted the fact that the location where containers are handled is effectively determined by the infrastructure provided. While shipping lines will not operate their ships in such a way as to reduce their competitiveness, in the short to medium term they 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 (typically to Antwerp). The agent of that transition was the pricing mechanism.

This 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
- the environmental impact as reflected in Sensitive Lorry Miles.

Transhipment 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 clothing he imports will be sold in Northern or Southern Britain when cargo is landed, when he can see how sales are going. He would then only at the last moment inform the shipping line to which distribution building it must deliver. 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 within or near ports to minimise onward haulage. B&Q have adopted this approach at Immingham 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). 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.

## 5.2 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 some projects in the south-east will have particularly severe impacts on inland road and rail congestion. By contrast, the lines have tended to express a strong preference for more capacity in 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. 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 given 'minded to' approval for the London Gateway, and approval to the Felixstowe South and Bathside Bay projects. 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 '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 principal objective of this study to determine whether, in principle, transhipment within or beyond Great Britain was in the broad interests of the economy. As indicated in chapter 4, the model seeks to consider the 93% of direct deepsea container traffic **currently** using south-east ports and not the traffic currently passing through Liverpool and Bristol.

Accordingly, the five scenarios considered were designed to reflect generic issues. They are:

**Scenario 1:**
To build no additional deep water container terminals at all. This would lead to a need for a massive increase in feeder port capacity beyond the south-east. We have not tested whether, in practice, locations for sufficient lengths of feeder quays actually could be found.

**Scenario 2(a)**
The construction of Bathside Bay terminal (1,400 quay metres) and the Felixstowe South terminal (net increase of 910 quay metres). This would be adequate to serve demand for around a decade, but thereafter considerable numbers of further short-sea berths would be required.

**Scenario 2(b)**
A variation of 2(a) including the construction of London Gateway (2,300 quay metres) in addition to Bathside Bay and Felixstowe South giving total additional capacity of 4,610 quay metres in the south-east.

**Scenario 3**
Instead of further construction of deep water ports in the south-east, the construction of 4 'non south-east' projects, being:

| | | |
|---|---|---|
| Avonmouth | : | 1,200 quay metres |
| Liverpool | : | 800 quay metres |
| Hunterston | : | 800 quay metres |
| Teesport | ; | 1,000 quay metres |

which would offer an extra capacity of around 4.2m TEU per annum.

In each case, the model allocated traffic through different ports, varying the price charged in the south-east, until an equilibrium position was reached for each freight unit moving between (say) Shanghai and Manchester or Singapore and Birmingham.

**Scenario 4(a)**
On the basis of the lessons drawn from Scenario 3 (see chapter 6), a fourth scenario was drawn up which included Bathside Bay, Felixstowe South, Avonmouth, Liverpool and Teesport. It became clear (chapter 6) that the latter three ports are the more effective substitutes for south-east ports insofar as shipping line cost structures are concerned. This is because of the higher proportion of the British market that can be served within a daily round trip for an HGV. As will be seen, provided there is adequate capacity on the Continent to tranship UK containers, the lines will find it cheaper to serve the GB market by a mixture of direct calls and transhipment via feeder services to Northern Britain than to make direct calls at these non south-east ports.

**Scenario 4(b)**
As for Scenario 2(b) above, this variation includes new terminal facilities at London Gateway in addition to Bathside Bay and Felixstowe South.

**Scenario 5(a)**
The above 4 scenarios are predicated on there being, for practical purposes, more or less infinite capacity on the Continental mainland to serve the demand for the transhipment of UK containers. However, this circumstance may change. Chapter 3 describes current plans to expand capacity. It is clear that these plans will only address demand growth to around 2015 at the latest. Beyond that date, it is quite likely that unless further capacity is created that 'local' demand on the Continent will begin to squeeze out UK and other transhipment traffic. Transhipment rates will rise and thereby

a) render the development of third country transhipment projects in Britain more attractive, and
b) make it more likely that some deep sea liner services will attempt to serve most of the UK through (say) the Tees or even by domestic transhipment from the Clyde.

**Scenario 5(b)**

A variation of Scenario 5 including the development of London Gateway in addition to Bathside Bay and Felixstowe South.

It is not for this study to assess the viability of different 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 of several different port projects will depend on whether other projects proceed. 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 other lower (shipping + port + inland transport) cost solutions are denied to them, some lines might choose to patronise deep water ports in northern or western Britain. They could serve southern Britain overland, by feeder services or by direct calls through lines exchanging containers en route at ports such as Algeciras. For example, a ship loading containers for NW 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.

In summary, therefore, these different 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 impact of such transhipment on the UK economy.

The modelling exercise had inevitably to make a number of simplifications. An important one concerns the direct call by deep sea vessels to Liverpool and Bristol. Five services operated by ACL, MSC, CMA-CGM/China Shipping, CP and ICL, call at Liverpool and one (SAECS) at Bristol. Our 'generic' modelling does not reflect these calls because in that model we assume that each line attracts cargo on the basis of the whole cargo distribution in the UK; in these four cases, lines have been able to develop regional clients who justify the larger ship diversions involved to reach Bristol and Liverpool instead of ports in the south-east. On the basis of DfT Maritime Statistics, approximately 350,000 TEU (7% of total GB non Western European domestic container trade) is represented by containers moving directly between these two ports and ports beyond Western Europe. The modelling exercise should therefore be interpreted as representing 93% of GB deep sea traffic. We assume, implicitly, that the remaining 7% of traffic will continue to patronise the west coast ports, retaining existing market shares.

Our exercise also assumes 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 76% of the deep sea vessels serving NW Europe serve GB by direct calls. It is not clear how the remaining 24% serve Britain indirectly. 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 actually encourage 'feeding' to a deep water port. Firstly, the line in question may have other deep sea vessels on services which can offer a 'free-ride' between, say, Rotterdam and 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 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 between 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 2004 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 instead of lines making direct calls or interlining before ships reach the North Atlantic. 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. 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). The containers 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 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 around £10 per TEU to the mean ‘delivery’ cost of containers to Britain. From the view of port capacity utilisation, given that most such containers arrive on ‘another’ deep sea vessel, the effect is neutral. 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 Atlantic.

The modelling exercise should therefore be regarded as one in which feedering (mainly) by deep sea vessels between deep water hub ports is effectively a neutral event, adding around £10 per TEU (+5%) to incremental delivery costs for deep sea containers overall.

The various GB port schemes proposed (or that already exist) are listed in table 5.5.

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 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.

**Table 5.5: Deep water ports and schemes considered within the model and capacity assumed**

| Port | Status | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Felixstowe | Existing quays | (m) | 2,793 | 2,793 | 2,793 | 2,793 | 2,793 | 2,793 | 2,793 |
| | Existing productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Proposed quays | (m) | | | 910 | 910 | 910 | 910 | 910 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 2,793,000 | 2,877,418 | 3,099,797 | 3,099,797 | 3,099,797 | 3,099,797 | 3,099,797 |
| Thamesport | Existing quays | (m) | 650 | 650 | 650 | 650 | 650 | 650 | 650 |
| | Existing productivity | (TEU/m) | 850 | 876 | 943 | 943 | 943 | 943 | 943 |
| | Proposed quays | (m) | | | | | | | |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 552,500 | 569,199 | 613,189 | 613,189 | 613,189 | 613,189 | 613,189 |
| Tilbury | Existing quays | (m) | 590 | 590 | 590 | 590 | 590 | 590 | 590 |
| | Existing productivity | (TEU/m) | 800 | 824 | 888 | 888 | 888 | 888 | 888 |
| | Proposed quays | (m) | | | | | | | |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 472,000 | 486,266 | 523,847 | 523,847 | 523,847 | 523,847 | 523,847 |
| Southampton | Existing quays | (m) | 1,357 | 1,357 | 1,357 | 1,357 | 1,357 | 1,357 | 1,357 |
| | Existing productivity | (TEU/m) | 1,000 | 1,030 | 1,221 | 1,221 | 1,221 | 1,221 | 1,221 |
| | Proposed quays | (m) | | | | | | | |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 1,357,000 | 1,398,015 | 1,656,666 | 1,656,666 | 1,656,666 | 1,656,666 | 1,656,666 |
| Bathside Bay | Existing quays | (m) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Existing productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Proposed quays | (m) | | | | 1,400 | 1,400 | 1,400 | 1,400 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | | | | | | | |
| London Gateway | Existing quays | (m) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Existing productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Proposed quays | (m) | | | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bristol | Existing quays | (m) | 630 | 630 | 630 | 630 | 630 | 630 | 630 |
| | Existing productivity | | 800 | 824 | 888 | 888 | 888 | 888 | 888 |
| | Proposed quays | (m) | | | | 1,200 | 1,200 | 1,200 | 1,200 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 504,000 | 519,233 | 559,362 | 559,362 | 559,362 | 559,362 | 559,362 |
| Liverpool | Existing quays | (m) | 1,097 | 1,097 | 1,097 | 1,097 | 1,097 | 1,097 | 1,097 |
| | Existing productivity | (TEU/m) | 800 | 824 | 888 | 888 | 888 | 888 | 888 |
| | Proposed quays | (m) | | | | 800 | 800 | 800 | 800 |
| | Proposed productivity | (TEU/m) | 500 | 515 | 555 | 555 | 555 | 555 | 555 |
| | Capacity | (TEU) | 877,600 | 904,125 | 974,000 | 974,000 | 974,000 | 974,000 | 974,000 |
| Clyde | Existing quays | (m) | 376 | 376 | 376 | 376 | 376 | 376 | 376 |
| | Existing productivity | (TEU/m) | 800 | 824 | 888 | 888 | 888 | 888 | 888 |
| | Proposed quays | (m) | | | | 800 | 800 | 800 | 800 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 300,800 | 309,892 | 333,841 | 333,841 | 333,841 | 333,841 | 333,841 |
| Teesport | Existing quays | (m) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Existing productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Proposed quays | (m) | | | | 1,000 | 1,000 | 1,000 | 1,000 |
| | Proposed productivity | (TEU/m) | 1,000 | 1,030 | 1,110 | 1,110 | 1,110 | 1,110 | 1,110 |
| | Capacity | (TEU) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Total South** | | **5,174,500** | **5,330,899** | **5,893,498** | **5,893,498** | **5,893,498** | **5,893,498** | **5,893,498** |
| | **Total North** | | **1,682,400** | **1,733,251** | **1,867,203** | **1,867,203** | **1,867,203** | **1,867,203** | **1,867,203** |

*Source: MDS Transmodal Ltd*

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

Because a line already has options to tranship at several other ports, 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. Only if a GB port in the south-east offered lower 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 containers. As we show in chapter 6, if there is inadequate capacity to handle all the GB traffic on offer by direct services, available capacity will be rationed by price.

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

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.

# 6. COMPARATIVE IMPACTS OF PORT CAPACITY OPTIONS

***This Chapter presents the results of the modelling exercise. The driver is taken to be the provision of port capacity in Britain and abroad. Outputs are described in terms of the response of the lines in the way that they direct the volumes of containers transhipped, the consequences insofar as impacts on the road and rail networks and the need for feeder port capacity are concerned, GB transport industry revenue and the wider impact on user (delivery) costs and on the UK economy. Further impacts in terms of port revenue, employment and GVA are considered in Chapter 7.***

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## 6.1 Introduction

We have assessed the economic impact of transhipment through transport cost modelling and through the impact of changes that modelling indicates on the wider economy.

In section 6.2 below, we describe a number of different scenarios of port development to assess how they will impact upon:

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, and consequent knock on impacts on the economy

iii) Changes in the overall cost of delivery of containers to GB receivers (and collection from shippers) and consequent further impacts on the economy.

In each case, the driver is taken as the decision to construct GB port capacity and the outcome is taken as volumes of (different forms of) transhipment and the associated economic consequences. 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.

### 6.2 Scenarios tested

The modelling exercise has tested 5 scenarios, being:

**1.** **No further deep sea capacity** in Great Britain

**2(a)** **The development of south-east capacity,** at both Bathside Bay and Felixstowe South terminals

**2(b)** As above, but in addition **including London Gateway**

**3.** Instead**, the development of deep sea terminals in the north east, north west and south west regions**

**4(a)** **The development of both south-east and regional deep water terminals** at Bathside Bay, Felixstowe South and terminals in the north west, north east and south west

**4(b)** As above, but in addition **including London Gateway.**

**5(a)** As a variation on Scenario 4, modelling **constrained capacity on the Continent,** reflecting a significant increase in the rate charged for Continental transhipment from £80 to £120 per container, reflecting a shortfall in capacity on the Continent from 2020 onwards.

**5(b)** As above, but in addition **including London Gateway.**

**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.

By 2030, the model suggests that only 33% of deep sea containers will 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 69% by 2030 from a 'base case' reference rate of £70, as a consequence of a 184% growth in demand and no additional capacity in the south-east.

Table 6.1 summarises results for Scenario 1 for the years 2004-2030 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 2004 (as shown in table 4.7) is presented in table 6.2. The key features to note are:

- The volume of third country containers transhipped at GB ports would fall to more or less zero by 2010 but would then grow modestly to 0.6m TEU by 2030. Only a minority of lines would serve GB directly by that year, leaving some capacity for transhipment.

- 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 33%.

- The delivery cost of containers to the GB economy rises from £205 in 2004 to £212 per TEU in 2030 (around £38-39 per tonne of cargo). While traffic growth does lead to small economies of scale through the use of larger deep sea vessels, costs 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 415 million to 457 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 187 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 652,000 TEU in 2004 to 10,779,000 TEU by 2030, which, at approximately 770 TEU per quay metre in 2030, will require some 14,000 additional feeder quay metres by 2030 covering an area of at least 400 hectares (includes some short sea growth). This is an area corresponding to more than Felixstowe and Southampton Container Terminals combined. Note that we have already shown in chapter 4 that remaining capacity in the main container ports in northern and western Britain corresponds approximately to forecast demand for intra-European traffics. This means that the output from this exercise can be taken as indicating the overall absolute need for more deep sea or feeder port capacity in Great Britain. Table 6.2 indicates how, nominally, these additional quay lengths would be distributed as in 2030 (to cater for deep sea traffics).

- The model suggests that no further deep sea services would be diverted to northern and western ports.

**Table 6.1 Results for Scenario 1: No further deep sea capacity**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| **Demand (1000 TEUs)** | **5,635** | **7,834** | **9,578** | **11,196** | **13,317** | **16,029** |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 5,893 | 5,893 | 5,893 | 5,893 | 5,893 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 1,867 | 1,867 | 1,867 | 1,867 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,581 | £1,964 | £2,316 | £2,804 | £3,390 |
| Delivery cost/TEU (£) | £205 | £202 | £205 | £207 | £211 | £212 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 5,796 | 5,672 | 5,666 | 5,336 | 5,250 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Deep Sea Ports | 4,983 | 5,796 | 5,672 | 5,666 | 5,336 | 5,250 |
| Transhipment Potential (SE) | 277 | 97 | 221 | 228 | 557 | 643 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 190 | 358 | 455 | 854 | 1,241 |
| Southeast Feeder Ports | 98 | 656 | 1,235 | 1,569 | 2,693 | 4,107 |
| Northwest Feeder Ports | 31 | 209 | 695 | 1,520 | 1,969 | 2,399 |
| Northeast Feeder Ports | 169 | 529 | 1,067 | 1,348 | 1,706 | 2,117 |
| Scotland Feeder Ports | 326 | 454 | 550 | 639 | 760 | 914 |
| Total Feeder Ports | 652 | 2,038 | 3,906 | 5,530 | 7,981 | 10,779 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 2,038 | 3,906 | 5,530 | 7,981 | 10,779 |
| **Revenues** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £279 | £332 | £351 | £372 | £381 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Lift | £20 | £60 | £112 | £158 | £228 | £308 |
| Total UK Port Lift | £233 | £339 | £443 | £509 | £600 | £689 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £72 | £67 | £67 | £64 | £63 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Entry | £2 | £5 | £10 | £14 | £20 | £27 |
| Total UK Port Entry | £69 | £77 | £76 | £81 | £84 | £89 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £351 | £398 | £419 | £436 | £444 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Total | £22 | £65 | £121 | £172 | £248 | £335 |
| Total UK Port Total | £302 | £416 | £520 | £590 | £684 | £778 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £81 | £82 | £97 | £89 | £81 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Maritime | £45 | £125 | £243 | £355 | £503 | £669 |
| Total UK Maritime | £133 | £206 | £325 | £452 | £593 | £750 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £2 | £5 | £5 | £13 | £15 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £0 | £0 |
| Total UK Transhipment | £7 | £2 | £5 | £5 | £13 | £15 |
| | | | | | | |
| UK SE Deep Sea Rail Distribution | £127 | £134 | £100 | £67 | £54 | £54 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Rail Distribution | £0 | £1 | £1 | £2 | £3 | £4 |
| Total UK Rail Distribution | £128 | £135 | £101 | £68 | £57 | £58 |

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| UK SE Deep Sea Road Distribution | £509 | £572 | £547 | £547 | £516 | £507 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Road Distribution | £50 | £156 | £292 | £405 | £591 | £804 |
| Total UK Road Distribution | £559 | £728 | £839 | £952 | £1,107 | £1,311 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £96 | £179 | £253 | £365 | £493 |
| Total revenue earned by GB transport industry | £988 | £1,291 | £1,461 | £1,611 | £1,847 | £2,147 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,548 | 8,561 | 10,486 | 12,717 | 15,414 |
| Rail (1000 TEUs) | 1,161 | 1,286 | 1,017 | 710 | 600 | 615 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,011 | 1,147 | 1,244 | 1,401 | 1,628 |
| Rail (million TEUkm) | 426 | 465 | 354 | 232 | 191 | 194 |
| Total (million TEUkm) | 1,197 | 1,476 | 1,500 | 1,476 | 1,592 | 1,822 |
| | | | | | | |
| Rail % of deep sea throughput | 23% | 22% | 18% | 13% | 11% | 12% |

*Source: MDS Transmodal Ltd*

**Table 6.2: 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 feeder quay metres (m) |
|---|---|---|---|
| South West/S.Wales | 1,612 | -507 | 1,105 |
| South East/Haven | 5,334 | +740 | 6,074 |
| North West | 3,116 | +154 | 3,270 |
| North East/Humber | 2,749 | +260 | 3,009 |
| Scotland | 1,188 | -98 | 1,090 |
| **Total** | **13,998** | **+549** | **14,547** |

* see table 4.7 (includes some deep sea traffic served directly at Bristol and Liverpool)
*Source: MDS Transmodal Ltd*

### Scenario 2: The development of south-east capacity

The detailed results for Scenarios 2(a) and 2(b) are set out in tables 6.3 and 6.4.

Scenario 2(a) would provide sufficient capacity to reduce the volume of GB containers transhipped on the Continent relative to the ‘do nothing’ scenario and offer the potential to handle third country transhipment, but only in the short term and the situation would reverse after 2015 as domestic demand increases and port supply tightens.

By comparison with Scenario 1 (do nothing in GB deep sea ports):

- The volume of containers transhipped on the Continent would fall in 2030 from 10.8m TEU to 8.0m TEU7

- GB transport revenue would rise in 2030 by £172m to £2.4 billion per annum.

- Delivery costs in 2030 would be reduced from £212 to £207 per TEU, saving £67m per annum for end users by reduced delivery costs.

- Rail TEU km would rise reaching approximately 0.7 billion in 2015-20 as compared with 0.4 billion in 2004, but would fall back to 0.3 billion by 2030 as a result of tightened port supply in the south east and the increase in feedering to regional ports.

- The potential for handling third country transhipment business for GB ports would fluctuate between 0.2m to 0.4m TEU over the period to 2030.

The addition of a new container port at London Gateway (2b) would:

- Reduce the volume of GB containers transhipped on the Continent to 5.2m TEU compared with 8m TEU in Scenario 2(a);

- Significantly increase the potential capacity available for third country transhipment to 2.9m TEU by 2015, but this would then decrease rapidly to 0.2m TEU by 2030;

- Reduce delivery costs per TEU by £8 per TEU compared with Scenario 2(a) and £13 per TEU compared with Scenario 1 (£206 million per annum by 2030);

- Substantially increase rail industry revenue (£236m per annum in 2030 compared with £101m in scenario 2(a) and only £58m in Scenario 1);

- Net feeder demand by region (2030) would be as shown in table 6.5. This scenario would still require extensive further feeder/short sea berths to be built in the south-east as well as on the Humber or Tees and the Mersey and to a lesser extent in Scotland. The addition of new quays in London Gateway (2b) has the greatest impact on the need for feeder quay metres in the North West. Note that the outcome under Scenarios 2 and 4 is identical in this respect.

**Table 6.3: Results for Scenario 2(a) – additional SE capacity (Bathside Bay & Felixstowe South)**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 6,903 | 8,457 | 8,457 | 8,457 | 8,457 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 1,867 | 1,867 | 1,867 | 1,867 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,536 | £1,838 | £2,203 | £2,728 | £3,323 |
| Delivery cost/TEU (£) | £205 | £196 | £192 | £197 | £205 | £207 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,698 | 8,025 | 8,306 | 8,295 | 8,058 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Deep Sea Ports | 4,983 | 6,698 | 8,025 | 8,306 | 8,295 | 8,058 |
| | | | | | | |
| Transhipment Potential (SE) | 277 | 206 | 432 | 151 | 162 | 399 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 65 | 105 | 276 | 485 | 647 |
| Southeast Feeder Ports | 98 | 223 | 362 | 951 | 1,671 | 2,227 |
| Northwest Feeder Ports | 31 | 71 | 116 | 303 | 673 | 2,267 |
| Northeast Feeder Ports | 169 | 323 | 418 | 712 | 1,431 | 1,916 |
| Scotland Feeder Ports | 326 | 454 | 552 | 647 | 762 | 914 |
| Total Feeder Ports | 652 | 1,136 | 1,553 | 2,890 | 5,022 | 7,971 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1,136 | 1,553 | 2,890 | 5,022 | 7,971 |
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £275 | £322 | £385 | £481 | £507 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Lift | £20 | £33 | £44 | £83 | £143 | £228 |
| Total UK Port Lift | £233 | £309 | £367 | £467 | £624 | £735 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £88 | £107 | £106 | £100 | £97 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Entry | £2 | £3 | £4 | £7 | £12 | £20 |
| Total UK Port Entry | £69 | £91 | £111 | £113 | £112 | £117 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £364 | £430 | £490 | £581 | £604 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Total | £22 | £36 | £48 | £90 | £156 | £247 |
| Total UK Port Total | £302 | £400 | £478 | £580 | £736 | £852 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £102 | £113 | £100 | £100 | £126 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Maritime | £45 | £72 | £98 | £178 | £307 | £513 |
| Total UK Maritime | £133 | £174 | £211 | £278 | £407 | £639 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £5 | £10 | £3 | £4 | £9 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £0 | £0 |
| Total UK Transhipment | £7 | £5 | £10 | £3 | £4 | £9 |

*(cont'd)*

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| UK SE Deep Sea Rail Distribution | £127 | £162 | £192 | £195 | £170 | £99 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Rail Distribution | £0 | £1 | £1 | £1 | £2 | £2 |
| Total UK Rail Distribution | £128 | £163 | £193 | £196 | £172 | £101 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £663 | £774 | £802 | £804 | £784 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Road Distribution | £50 | £84 | £112 | £214 | £379 | £583 |
| Total UK Road Distribution | £559 | £747 | £886 | £1,016 | £1,182 | £1,367 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £53 | £71 | £132 | £230 | £364 |
| | | | | | | |
| Total revenue earned by GB transport industry | £988 | £1,309 | £1,557 | £1,792 | £2,091 | £2,320 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,291 | 7,702 | 9,279 | 11,619 | 14,984 |
| Rail (1000 TEUs) | 1,161 | 1,543 | 1,876 | 1,917 | 1,698 | 1,045 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,067 | 1,300 | 1,457 | 1,644 | 1,791 |
| Rail (million TEUkm) | 426 | 562 | 685 | 698 | 606 | 345 |
| Total (million TEUkm) | 1,197 | 1,629 | 1,985 | 2,155 | 2,250 | 2,136 |
| | | | | | | |
| Rail % of deep sea throughput | 23% | 23% | 23% | 23% | 20% | 13% |

*Source: MDS Transmodal Ltd*

**Table 6.4: Results for Scenario 2(b) – additional SE capacity (London Gateway, Felixstowe South & Bathside Bay)**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 9,456 | 11,010 | 11,010 | 11,010 | 11,010 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 1,867 | 1,867 | 1,867 | 1,867 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,521 | £1,820 | £2,124 | £2,540 | £3,184 |
| Delivery cost/TEU (£) | £205 | £194 | £190 | £190 | £191 | £199 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Deep Sea Ports | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| | | | | | | |
| Transhipment Potential (SE) | 277 | 2,714 | 2,854 | 1,730 | 312 | 179 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 57 | 91 | 139 | 217 | 520 |
| Southeast Feeder Ports | 98 | 198 | 312 | 480 | 749 | 1,790 |
| Northwest Feeder Ports | 31 | 63 | 99 | 153 | 239 | 571 |
| Northeast Feeder Ports | 169 | 318 | 365 | 496 | 649 | 1,396 |
| Scotland Feeder Ports | 326 | 456 | 555 | 648 | 765 | 921 |
| Total Feeder Ports | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £277 | £326 | £371 | £447 | £566 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Lift | £20 | £32 | £41 | £55 | £75 | £149 |
| Total UK Port Lift | £233 | £309 | £367 | £426 | £522 | £715 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £89 | £110 | £125 | £144 | £134 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Entry | £2 | £3 | £4 | £5 | £6 | £13 |
| Total UK Port Entry | £69 | £92 | £113 | £130 | £150 | £146 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £366 | £436 | £497 | £591 | £700 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Total | £22 | £35 | £44 | £59 | £81 | £161 |
| Total UK Port Total | £302 | £401 | £480 | £556 | £672 | £861 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £109 | £121 | £130 | £135 | £119 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Maritime | £45 | £70 | £90 | £121 | £163 | £317 |
| Total UK Maritime | £133 | £178 | £211 | £250 | £298 | £435 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £64 | £65 | £40 | £7 | £4 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £0 | £0 |
| Total UK Transhipment | £7 | £64 | £65 | £40 | £7 | £4 |
| | | | | | | |
| UK SE Deep Sea Rail Distribution | £127 | £158 | £191 | £214 | £248 | £233 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Rail Distribution | £0 | £1 | £1 | £1 | £1 | £2 |
| Total UK Rail Distribution | £128 | £158 | £192 | £215 | £249 | £236 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £651 | £770 | £876 | £1,011 | £1,024 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Road Distribution | £50 | £81 | £102 | £139 | £191 | £390 |
| Total UK Road Distribution | £559 | £732 | £872 | £1,015 | £1,202 | £1,414 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £51 | £65 | £88 | £120 | £238 |
| Total revenue earned by GB transport industry | 988 | 1,291 | 1,544 | 1,786 | 2,123 | 2,511 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,329 | 7,709 | 9,095 | 10,886 | 13,710 |
| Rail (1000 TEUs) | 1,161 | 1,505 | 1,869 | 2,101 | 2,431 | 2,319 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,028 | 1,262 | 1,459 | 1,719 | 1,962 |
| Rail (million TEUkm) | 426 | 544 | 680 | 761 | 882 | 831 |
| Total (million TEUkm) | 1,197 | 1,572 | 1,942 | 2,221 | 2,601 | 2,794 |
| | | | | | | |
| Rail % of deep sea port throughput | 23% | 22% | 23% | 23% | 23% | 21% |

*Source: MDS Transmodal Ltd*

**Table 6.5: Implied need for further feeder and short sea berths, Scenario 2 (2030)**

**2(a) Excluding London Gateway**

| Port region | Net intra European position | Additional feeder demand for quay metres | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S. Wales | -507 | 840 | 333 |
| South East/Haven | +740 | 2,892 | 3,632 |
| North West | +154 | 2,944 | 3.098 |
| North East/Humber | +260 | 2,488 | 2,748 |
| Scotland | -98 | 1,158 | 1,060 |
| **Total** | **+549** | **10,352** | **10,901** |

**2(b) Including London Gateway**

| Port Region | Net intra European position | Additional feeder demand for quay metres | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S. Wales | -507 | 675 | 168 |
| South East/Haven | +740 | 2,325 | 3,065 |
| North West | +154 | 741 | 895 |
| North East/Humber | +260 | 1,813 | 2,073 |
| Scotland | -98 | 1,197 | 1,099 |
| **Total** | **+549** | **6,751** | **7,300** |

*Source: MDS Transmodal Ltd*

**Scenario 3: The development of deep sea terminals in the north east, north west and south west regions**

The detailed results for Scenario 3 are presented in table 6.6.

Scenario 3 would provide deep sea container port capacity in locations beyond the south-east. However, this would only provide a useful function (for deep sea vessels) if the lines found it more cost effective to divert vessels, for which there was inadequate capacity in south-east ports, to the Tees, Bristol, the Mersey or the Clyde instead of avoiding Britain altogether and transhipping from the Continent. Of course, deep water port capacity beyond the south-east might well be put to use as feeder berths if deep sea vessels should not be attracted.

Scenario 3 can be taken as one in which no more south-east development is permitted, and that some 3,800 additional deep water quays are built in the north east or on the west coast, adding to the 2,103 metres of deep water quay already in Bristol, Liverpool and Greenock.

The model indicates that lines will find it cost effective to divert some deep sea vessels to non south-east locations from 2015 onwards as prices in the south-east rise, reducing the amount of traffic transhipped on the Continent. However, the case for such diversion is marginal. The model suggests that continuing market growth will lead to continually increasing ship sizes while the proportion of cargo bound from GB falls. The deep sea vessels attracted to 'northern ports' would be lost to continental transhipment.

Scenario 3 leads to:

- The volume of deep sea traffic being handled at non south-east ports increasing steadily up to 1.7 m TEU in 2020. After 2025 the volume of traffic and sizes of vessels involved sees the cost balance shift in favour of feedering rather than direct calls to these ports.

- In this case, by 2030 the same volume of traffic is transhipped on the Continent as in Scenario 1.

- GB transport revenue increases marginally during 2020-2025 as compared with Scenario 1, but is less than in Scenario 2.

- Delivery costs per TEU are marginally less than in Scenario 1 during 2015-2025, but as a result of the return to feedering by 2030, delivery costs are the same as Scenario 1 by 2030.

- Compared with Scenarios 2(a) and 2(b) the volume of rail TEU kilometres generated is significantly reduced.

- The scope for third country transhipment is greater than in Scenario 2(a) as deep sea capacity in the south-east is 'freed up' by the diversion of some deep sea traffic to the alternative ports. Note that the model only 'permits' third country transhipment in GB ports if deep sea shipping economics succeeds in attracting vessels for GB cargo (i.e. providing deepsea vessel calls on which third country transhipped containers can be carried). Scenario 2(b) offers greater potential for third country transhipment during 2010-2020 as new capacity in the south-east comes on stream.

- The requirement for feeder and short-sea berths in 2030 is identical to Scenario 1.

**Table 6.6: Results of Scenario 3 (Non-SE capacity enhancements)**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 5,893 | 5,893 | 5,893 | 5,893 | 5,893 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 5,641 | 5,641 | 5,641 | 5,641 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,581 | £1,945 | £2,277 | £2,799 | £3,390 |
| Delivery cost/TEU (£) | £205 | £202 | £203 | £203 | £210 | £212 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 5,796 | 5,418 | 5,395 | 4,979 | 5,250 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 752 | 1,716 | 1,620 | 0 |
| Total Deep Sea Ports | 4,983 | 5,796 | 6,170 | 7,111 | 6,599 | 5,250 |
| | | | | | | |
| Transhipment Potential (SE) | 277 | 97 | 476 | 498 | 915 | 643 |
| Transhipment Potential (Non-SE) | 0 | 0 | 1,139 | 175 | 271 | 0 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 190 | 358 | 410 | 625 | 1,241 |
| Southeast Feeder Ports | 98 | 656 | 1,235 | 1,413 | 2,152 | 4,107 |
| Northwest Feeder Ports | 31 | 209 | 435 | 673 | 1,703 | 2,399 |
| Northeast Feeder Ports | 169 | 529 | 828 | 949 | 1,476 | 2,117 |
| Scotland Feeder Ports | 326 | 454 | 552 | 640 | 762 | 914 |
| Total Feeder Ports | 652 | 2,038 | 3,408 | 4,085 | 6,718 | 10,779 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 2,038 | 3,408 | 4,085 | 6,718 | 10,779 |
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £279 | £302 | £307 | £344 | £381 |
| UK Non-SE Port Lift | £0 | £0 | £30 | £69 | £83 | £0 |
| Feeder Port Lift | £20 | £60 | £97 | £117 | £192 | £308 |
| Total UK Port Lift | £233 | £339 | £400 | £493 | £619 | £689 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £72 | £63 | £64 | £59 | £63 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £21 | £20 | £0 |
| Feeder Port Entry | £2 | £5 | £8 | £10 | £17 | £27 |
| Total UK Port Entry | £69 | £77 | £72 | £95 | £96 | £89 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £351 | £366 | £371 | £403 | £444 |
| UK Non-SE Port Total | £0 | £0 | £0 | £89 | £103 | £0 |
| Feeder Port Total | £22 | £65 | £106 | £127 | £209 | £335 |
| Total UK Port Total | £302 | £416 | £472 | £587 | £715 | £778 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £81 | £70 | £74 | £85 | £81 |
| UK Non-SE Maritime | £0 | £0 | £0 | £38 | £33 | £0 |
| Feeder Maritime | £45 | £125 | £208 | £253 | £426 | £669 |
| Total UK Maritime | £133 | £206 | £278 | £364 | £545 | £750 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £2 | £11 | £11 | £21 | £15 |
| UK Non-SE Port Transhipment | £0 | £0 | £26 | £4 | £6 | £0 |
| Total UK Transhipment | £7 | £2 | £37 | £15 | £27 | £15 |

(cont'd)

| **Year** | **2004** | **2010** | **2015** | **2020** | **2025** | **2030** |
|---|---|---|---|---|---|---|
| UK SE Deep Sea Rail Distribution | £127 | £139 | £113 | £104 | £54 | £54 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £33 | £31 | £0 |
| Feeder Rail Distribution | £0 | £1 | £1 | £2 | £2 | £4 |
| Total UK Rail Distribution | £128 | £140 | £114 | £139 | £87 | £58 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £567 | £519 | £515 | £479 | £507 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £179 | £170 | £0 |
| Feeder Road Distribution | £50 | £156 | £257 | £305 | £497 | £804 |
| Total UK Road Distribution | £559 | £723 | £776 | £1,000 | £1,145 | £1,311 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £96 | £156 | £187 | £307 | £493 |
| Total revenue earned by GB transport industry | £988 | £1,279 | £1,361 | £1,726 | £1,948 | £2,147 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,548 | 8,300 | 9,800 | 12,400 | 15,414 |
| Rail (1000 TEUs) | 1,161 | 1,286 | 1,278 | 1,396 | 917 | 615 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,011 | 1,195 | 1,396 | 1,516 | 1,628 |
| Rail (million TEUkm) | 426 | 465 | 451 | 484 | 295 | 194 |
| Total (million TEUkm) | 1,197 | 1,476 | 1,647 | 1,879 | 1,810 | 1,822 |
| | | | | | | |
| Rail % of deep sea port throughput | 23% | 22% | 21% | 20% | 14% | 12% |

*Source: MDS Transmodal Ltd*

**Table 6.7: Implied need for further feeder and short sea berths, Scenario 3 (2030)**

| Region | Additional feeder demand for quay metres | Net Intra-European position | Implied need for additional quay metres |
|---|---|---|---|
| South West/S.Wales | 1,612 | -507 | 1,105 |
| South East/Haven | 5,334 | +740 | 6,074 |
| North West | 3,116 | +154 | 3,270 |
| North East/Humber | 2,749 | +260 | 3,009 |
| Scotland | 1,188 | -98 | 1,090 |
| **Total** | **13,998** | **+549** | **14,548** |

*Source: MDS Transmodal Ltd.*

### Scenario 4: The development of both south-east and regional deep water terminals

The results of the Scenario 4 modelling are presented in tables 6.8 and 6.9.

Scenario 4(a) would provide capacity in both the south-east and elsewhere in the country. A total of 5,300 quay metres of additional deep sea capacity would be available and 6,100 quay metres in Scenario 4(b).

The implied need for additional feeder quay metres to accommodate containers fed from the Continent is summarised in table 6.10.

**Table 6.8: Results for Scenario 4(a) – development of SE and regional deep water ports.**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 6,903 | 8,457 | 8,457 | 8,457 | 8,457 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 4,753 | 4,753 | 4,753 | 4,753 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,536 | £1,838 | £2,203 | £2,685 | £3,283 |
| Delivery cost/TEU (£) | £205 | £196 | £192 | £197 | £202 | £205 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,698 | 8,025 | 8,306 | 7,381 | 8,328 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 1,348 | 1,660 |
| Total Deep Sea Ports | 4,983 | 6,698 | 8,025 | 8,306 | 8,728 | 9,988 |
| | | | | | | |
| Transhipment Potential (SE) | 277 | 206 | 432 | 151 | 1,077 | 129 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 0 | 543 | 231 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 65 | 105 | 276 | 485 | 562 |
| Southeast Feeder Ports | 98 | 223 | 362 | 951 | 1,671 | 1,936 |
| Northwest Feeder Ports | 31 | 71 | 116 | 303 | 546 | 1,155 |
| Northeast Feeder Ports | 169 | 323 | 418 | 712 | 1,126 | 1,470 |
| Scotland Feeder Ports | 326 | 454 | 552 | 647 | 761 | 919 |
| Total Feeder Ports | 652 | 1,136 | 1,553 | 2,890 | 4,589 | 6,041 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1,136 | 1,553 | 2,890 | 4,589 | 6,041 |
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £275 | £322 | £385 | £396 | £491 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £54 | £77 |
| Feeder Port Lift | £20 | £33 | £44 | £83 | £131 | £173 |
| Total UK Port Lift | £233 | £309 | £367 | £467 | £581 | £740 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £88 | £107 | £106 | £88 | £100 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £17 | £21 |
| Feeder Port Entry | £2 | £3 | £4 | £7 | £11 | £15 |
| Total UK Port Entry | £69 | £91 | £111 | £113 | £116 | £136 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £364 | £430 | £490 | £484 | £591 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £71 | £98 |
| Feeder Port Total | £22 | £36 | £48 | £90 | £142 | £188 |
| Total UK Port Total | £302 | £400 | £478 | £580 | £697 | £876 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £102 | £113 | £100 | £84 | £104 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £27 | £31 |
| Feeder Maritime | £45 | £72 | £98 | £178 | £279 | £378 |
| Total UK Maritime | £133 | £174 | £211 | £278 | £391 | £513 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £5 | £10 | £3 | £25 | £3 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £12 | £5 |
| Total UK Transhipment | £7 | £5 | £10 | £3 | £37 | £8 |

(cont'd)

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| UK SE Deep Sea Rail Distribution | £127 | £162 | £192 | £195 | £162 | £157 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £26 | £32 |
| Feeder Rail Distribution | £0 | £1 | £1 | £1 | £2 | £2 |
| Total UK Rail Distribution | £128 | £163 | £193 | £196 | £190 | £192 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £663 | £774 | £802 | £712 | £804 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £141 | £174 |
| Feeder Road Distribution | £50 | £84 | £112 | £214 | £345 | £449 |
| Total UK Road Distribution | £559 | £747 | £886 | £1,016 | £1,197 | £1,426 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £53 | £71 | £132 | £210 | £276 |
| Total revenue earned by GB transport industry | £988 | £1,309 | £1,557 | £1,792 | £2,084 | £2,494 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,291 | 7,702 | 9,279 | 11,434 | 14,111 |
| Rail (1000 TEUs) | 1,161 | 1,543 | 1,876 | 1,917 | 1,883 | 1,918 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,067 | 1,300 | 1,457 | 1,689 | 1,980 |
| Rail (million TEUkm) | 426 | 562 | 685 | 698 | 667 | 670 |
| Total (million TEUkm) | 1,197 | 1,629 | 1,985 | 2,155 | 2,357 | 2,650 |
| | | | | | | |
| Rail % of deep sea throughput | 23% | 23% | 23% | 23% | 22% | 19% |

*Source: MDS Transmodal Ltd*

**Table 6.9: Results for Scenario 4(b) – development of SE and regional deep water ports (including London Gateway)**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 9,456 | 11,010 | 11,010 | 11,010 | 11,010 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 4,753 | 4,753 | 4,753 | 4,753 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,521 | £1,820 | £2,124 | £2,540 | £3,184 |
| Delivery cost/TEU (£) | £205 | £194 | £190 | £190 | £191 | £199 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Deep Sea Ports | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| Transhipment Potential (SE) | 277 | 2,714 | 2,854 | 1,730 | 312 | 179 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 57 | 91 | 139 | 217 | 520 |
| Southeast Feeder Ports | 98 | 198 | 312 | 480 | 749 | 1,790 |
| Northwest Feeder Ports | 31 | 63 | 99 | 153 | 239 | 571 |
| Northeast Feeder Ports | 169 | 318 | 365 | 496 | 649 | 1,396 |
| Scotland Feeder Ports | 326 | 456 | 555 | 648 | 765 | 921 |
| Total Feeder Ports | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |

(cont'd)

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £277 | £326 | £371 | £447 | £566 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Lift | £20 | £32 | £41 | £55 | £75 | £149 |
| Total UK Port Lift | £233 | £309 | £367 | £426 | £522 | £715 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £89 | £110 | £125 | £144 | £134 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Entry | £2 | £3 | £4 | £5 | £6 | £13 |
| Total UK Port Entry | £69 | £92 | £113 | £130 | £150 | £146 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £366 | £436 | £497 | £591 | £700 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Port Total | £22 | £35 | £44 | £59 | £81 | £161 |
| Total UK Port Total | £302 | £401 | £480 | £556 | £672 | £861 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £109 | £121 | £130 | £135 | £119 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Maritime | £45 | £70 | £90 | £121 | £163 | £317 |
| Total UK Maritime | £133 | £178 | £211 | £250 | £298 | £435 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £64 | £65 | £40 | £7 | £4 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £0 | £0 |
| Total UK Transhipment | £7 | £64 | £65 | £40 | £7 | £4 |
| | | | | | | |
| UK SE Deep Sea Rail Distribution | £127 | £158 | £191 | £214 | £248 | £233 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Rail Distribution | £0 | £1 | £1 | £1 | £1 | £2 |
| Total UK Rail Distribution | £128 | £158 | £192 | £215 | £249 | £236 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £651 | £770 | £876 | £1,011 | £1,024 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £0 | £0 |
| Feeder Road Distribution | £50 | £81 | £102 | £139 | £191 | £390 |
| Total UK Road Distribution | £559 | £732 | £873 | £1,015 | £1,202 | £1,414 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £51 | £65 | £88 | £120 | £238 |
| Total revenue earned by GB transport industry | £988 | £1,291 | £1,544 | £1,786 | £2,123 | £2,511 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,329 | 7,709 | 9,095 | 10,886 | 13,710 |
| Rail (1000 TEUs) | 1,161 | 1,505 | 1,869 | 2,101 | 2,431 | 2,319 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,028 | 1,262 | 1,459 | 1,719 | 1,962 |
| Rail (million TEUkm) | 426 | 544 | 680 | 761 | 882 | 831 |
| Total (million TEUkm) | 1,197 | 1,572 | 1,942 | 2,221 | 2,601 | 2,794 |
| | | | | | | |
| Rail % of deep sea port throughput | 23% | 22% | 23% | 23% | 23% | 21% |

*Source: MDS Transmodal Ltd*

**Table 6.10: Implied need for further feeder and short sea berths, Scenario 4 (2030)**

**4(a) Excluding London Gateway**

| Port region | Net intra Europea position | Additional feeder demand for quay metres | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S. Wales | -507 | 730 | 223 |
| South East/Haven | +740 | 2,514 | 3,254 |
| North West | +154 | 1,500 | 1,654 |
| North East/Humber | +260 | 1,909 | 2,169 |
| Scotland | -98 | 1,194 | 1,096 |
| **Total** | **+549** | **7,848** | **8,397** |

**4(b) Including London Gateway**

| Port Region | Net intra European position | Additional feeder demand for quay metres | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S. Wales | --507 | 675 | 168 |
| South East/Haven | +740 | 2,325 | 3,065 |
| North West | +154 | 741 | 895 |
| North East/Humber | +260 | 1,813 | 2,073 |
| Scotland | -98 | 1,197 | 1,099 |
| **Total** | **+549** | **6,751** | **7,300** |

*Source: MDS Transmodal Ltd*

In comparison with Scenario 1:

- Scenario 4(a) delivers greater potential for transhipment of third country containers at GB ports, including some potential for transhipment at non south-east ports.
- In Scenario 4(b) all potential for handling of transhipment containers is confined to south-east ports.
- Transhipment of GB containers on the Continent is reduced to 6m TEU in Scenario 4(a) and 5.2m TEU in Scenario 4(b) compared with 10.8m TEU in Scenario 1.
- GB transport industry revenue rises steadily and by 2030 is 16% greater per annum in Scenario 4(a), 17 % in Scenario 4(b). Rail industry earnings are substantially increased. (between 300%-400% greater in 2030 in comparison with the do nothing Scenario).

### Scenario 5: Constrained capacity on the Continent

Modelling results for Scenario 5 are shown in tables 6.11 and 6.12.

Scenario 5 implies that an increasing shortage of container port capacity on the Continent would lead to rising rates for Continental port transhipment which, in turn, would divert more traffic to non south-east deep sea ports. More third country transhipment traffic to non south-east deep water container ports would also be attracted. Rising rates on the Continent would lead to rising transhipment revenue in GB ports.

Lines could therefore reduce transhipment cost in port by diverting deep sea container ships to GB ports beyond the south-east charging lower rates to use 'spare' capacity; effectively, the net diversion costs to such ports would fall because the price of the next best alternative, Continental transhipment, would have risen.

Transhipment is at present dominated by the Continental ports in the Benelux and North German areas. In the event that these ports do become congested (see chapter 3), it is self-evident that the deep sea liner industry will seek substitute solutions. One alternative would be to tranship on the Iberian Peninsula or even in North Africa. While this might keep down transhipment rates, it would be at the expense of longer feeder journeys, which would raise delivery costs. At the rates we have used in this study, we estimate that as compared with transhipment on the Near Continent that costs per container moved would be approximately £25 more to serve feeder destinations in the British Isles from an Iberian hub and by as much as £50 more to serve Scandinavia and Baltic ports. On that basis, the rate for transhipment in Continental mainland ports would have to rise to around £120 (an increase of £40 in real terms) to represent a price signal that deterred further growth in transhipment traffic on the near Continent. This would be consistent with our estimated rate for stevedoring domestic containers at deep sea ports at £70 for one lift across the quay plus 2 lifts within the stack (a transhipment move involves 2 lifts across the quay plus 2 lifts within the stack).

Feeder sailing costs from Britain to North European transhipment markets can be expected to be higher than from north German ports, by around £20 per container (longer sailing distances).

In the event that a GB port had the capacity to target the major third country transhipment markets in Scandinavia and the Baltic in the knowledge that Continental mainland ports were full and charging £120 per transhipment, it would therefore follow that lines would regard the net worth of transhipping a container at a GB east coast port at around £100 (£120-£20). On that basis, if the GB port was charging a long-run break even rate of £80, the shipping line would derive a saving of £20 per container (£100 – £80) by transhipping to a third country by using a GB port. This saving could be offset against the extra costs of that ship diverting to the GB port in the first place.

In testing Scenario 5, we have therefore included this potential benefit, in order in effect to test whether ports such as the Tees, Liverpool, Avonmouth or Hunterston can thereby present an attractive and viable option to deep sea lines to provide the dual function of:

a) serving the GB domestic market, albeit involving a longer diversion and, in some cases, facing higher inland GB transport costs; and

b) serving a substantial third country transhipment market at £80 per container because Continental mainland ports are full and charging £120 per transhipped container.

**Table 6.11: Results for Scenario 5(a) – constrained capacity on the Continent**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 6,903 | 8,457 | 8,457 | 8,457 | 8,457 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 4,753 | 4,753 | 4,753 | 4,753 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,536 | £1,838 | £2,327 | £2,960 | £3,649 |
| Delivery cost/TEU (£) | £205 | £196 | £192 | £208 | £222 | £228 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,698 | 8,025 | 8,259 | 7,612 | 8,328 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 1,788 | 1,742 | 1,660 |
| Total Deep Sea Ports | 4,983 | 6,698 | 8,025 | 10,047 | 9,354 | 9,988 |
| | | | | | | |
| Transhipment Potential (SE) | 277 | 206 | 432 | 198 | 845 | 129 |
| Transhipment Potential (Non-SE) | 0 | 0 | 0 | 103 | 149 | 231 |
| | | | | | | |
| Southwest Feeder Ports | 28 | 65 | 105 | 56 | 417 | 562 |
| Southeast Feeder Ports | 98 | 223 | 362 | 194 | 1,437 | 1,936 |
| Northwest Feeder Ports | 31 | 71 | 116 | 62 | 471 | 1,155 |
| Northeast Feeder Ports | 169 | 323 | 418 | 299 | 874 | 1,470 |
| Scotland Feeder Ports | 326 | 454 | 552 | 538 | 763 | 919 |
| Total Feeder Ports | 652 | 1,136 | 1,553 | 1,149 | 3,963 | 6,041 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1,136 | 1,553 | 1,149 | 3,963 | 6,041 |
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £275 | £322 | £458 | £559 | £681 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £72 | £102 | £115 |
| Feeder Port Lift | £20 | £33 | £44 | £33 | £113 | £173 |
| Total UK Port Lift | £233 | £309 | £367 | £563 | £774 | £968 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £88 | £107 | £118 | £94 | £100 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £22 | £22 | £21 |
| Feeder Port Entry | £2 | £3 | £4 | £3 | £10 | £15 |
| Total UK Port Entry | £69 | £91 | £111 | £143 | £126 | £136 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £364 | £430 | £576 | £653 | £781 |
| UK Non-SE Port Total | £0 | £0 | £0 | £94 | £124 | £136 |
| Feeder Port Total | £22 | £36 | £48 | £36 | £123 | £188 |
| Total UK Port Total | £302 | £400 | £478 | £705 | £900 | £1,104 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £102 | £113 | £124 | £87 | £104 |
| UK Non-SE Maritime | £0 | £0 | £0 | £36 | £35 | £31 |
| Feeder Maritime | £45 | £72 | £98 | £74 | £243 | £378 |
| Total UK Maritime | £133 | £174 | £211 | £233 | £365 | £513 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £5 | £10 | £5 | £19 | £3 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £2 | £3 | £5 |
| Total UK Transhipment | £7 | £5 | £10 | £7 | £23 | £8 |

(cont'd)

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| UK SE Deep Sea Rail Distribution | £127 | £162 | £192 | £203 | £177 | £157 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £47 | £34 | £32 |
| Feeder Rail Distribution | £0 | £1 | £1 | £1 | £2 | £2 |
| Total UK Rail Distribution | £128 | £163 | £193 | £251 | £212 | £192 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £663 | £774 | £796 | £733 | £804 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £182 | £182 | £174 |
| Feeder Road Distribution | £50 | £84 | £112 | £81 | £296 | £449 |
| Total UK Road Distribution | £559 | £747 | £886 | £1,058 | £1,211 | £1,426 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £53 | £71 | £79 | £272 | £414 |
| Total GB transport industry revenue | £988 | £1,309 | £1,557 | 2,015 | 2,324 | 2,722 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,291 | 7,702 | 8,772 | 11,217 | 14,111 |
| Rail (1000 TEUs) | 1,161 | 1,543 | 1,876 | 2,424 | 2,100 | 1,918 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,067 | 1,300 | 1,581 | 1,734 | 1,980 |
| Rail (million TEUkm) | 426 | 562 | 685 | 905 | 749 | 670 |
| Total (million TEUkm) | 1,197 | 1,629 | 1,985 | 2,485 | 2,483 | 2,650 |
| | | | | | | |
| Rail % of deep sea port throughput. | 23% | 23% | 23% | 24% | 22% | 19% |

**Table 6.12: Results for Scenario 5(b) – constrained capacity on the Continent (including London Gateway)**

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Demand (1000 TEUs) | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| UK SE Deep Sea Supply (1000 TEUs) | 5,259 | 9,456 | 11,010 | 11,010 | 11,010 | 11,010 |
| UK Non-SE Deep Sea Supply (1000 TEUs) | 1,708 | 1,867 | 4,753 | 4,753 | 4,753 | 4,753 |
| | | | | | | |
| Delivery cost (£m) | £1,153 | £1,521 | £1,820 | £2,144 | £2,788 | £3,517 |
| Delivery cost/TEU (£) | £205 | £194 | £190 | £191 | £209 | £219 |
| **Port Throughputs (1000 TEUs)** | | | | | | |
| UK Deep Sea SE Ports | 4,983 | 6,742 | 8,156 | 10,606 | 10,222 | 10,181 |
| UK Deep Sea Non-SE Ports | 0 | 0 | 0 | 0 | 1,418 | 1,652 |
| Total Deep Sea Ports | 4,983 | 6,742 | 8,156 | 10,606 | 11,640 | 11,833 |
| | 277 | 2,714 | 2,854 | | | |
| Transhipment Potential (SE) | 0 | 0 | 0 | 404 | 788 | 829 |
| Transhipment Potential (Non-SE) | | | | 0 | 473 | 239 |
| | 28 | 57 | 91 | | | |
| Southwest Feeder Ports | 98 | 198 | 312 | 0 | 98 | 389 |
| Southeast Feeder Ports | 31 | 63 | 99 | 0 | 339 | 1,338 |
| Northwest Feeder Ports | 169 | 318 | 365 | 0 | 108 | 427 |
| Northeast Feeder Ports | 326 | 456 | 555 | 0 | 447 | 1,117 |
| Scotland Feeder Ports | 652 | 1,092 | 1,422 | 590 | 685 | 926 |
| Total Feeder Ports | 652 | 1,092 | 1,422 | 590 | 1,677 | 4,196 |
| | | | | | | |
| Continental Transhipment Ports (Transhipment Lifts) | 652 | 1092 | 1,422 | 590 | 1,677 | 4,196 |

(Cont'd)

| Year | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| **Revenues (£m)** | | | | | | |
| UK SE Deep Sea Port Lift | £213 | £277 | £326 | £424 | £613 | £741 |
| UK Non-SE Port Lift | £0 | £0 | £0 | £0 | £61 | £94 |
| Feeder Port Lift | £20 | £32 | £41 | £17 | £48 | £120 |
| Total UK Port Lift | £233 | £309 | £367 | £441 | £722 | £954 |
| | | | | | | |
| UK SE Deep Sea Port Entry | £67 | £89 | £110 | £150 | £145 | £132 |
| UK Non-SE Port Entry | £0 | £0 | £0 | £0 | £18 | £21 |
| Feeder Port Entry | £2 | £3 | £4 | £1 | £4 | £10 |
| Total UK Port Entry | £69 | £92 | £113 | £152 | £167 | £163 |
| | | | | | | |
| UK SE Deep Sea Port Total | £280 | £366 | £436 | £574 | £758 | £873 |
| UK Non-SE Port Total | £0 | £0 | £0 | £0 | £79 | £115 |
| Feeder Port Total | £22 | £35 | £44 | £18 | £52 | £130 |
| Total UK Port Total | £302 | £401 | £480 | £593 | £889 | £1,118 |
| | | | | | | |
| UK SE Deep Sea Maritime | £88 | £109 | £121 | £156 | £146 | £121 |
| UK Non-SE Maritime | £0 | £0 | £0 | £0 | £26 | £31 |
| Feeder Maritime | £45 | £70 | £90 | £42 | £107 | £258 |
| Total UK Maritime | £133 | £178 | £211 | £197 | £279 | £410 |
| | | | | | | |
| UK SE Deep Sea Port Transhipment | £7 | £64 | £65 | £9 | £18 | £19 |
| UK Non-SE Port Transhipment | £0 | £0 | £0 | £0 | £11 | £5 |
| Total UK Transhipment | £7 | £64 | £65 | £9 | £29 | £24 |
| | | | | | | |
| UK SE Deep Sea Rail Distribution | £127 | £158 | £191 | £281 | £240 | £222 |
| UK Non-SE Rail Distribution | £0 | £0 | £0 | £0 | £38 | £32 |
| Feeder Rail Distribution | £0 | £1 | £1 | £0 | £1 | £2 |
| Total UK Rail Distribution | £128 | £158 | £192 | £281 | £278 | £256 |
| | | | | | | |
| UK SE Deep Sea Road Distribution | £509 | £651 | £770 | £993 | £963 | £960 |
| UK Non-SE Road Distribution | £0 | £0 | £0 | £0 | £144 | £173 |
| Feeder Road Distribution | £50 | £81 | £102 | £39 | £119 | £313 |
| Total UK Road Distribution | £559 | £732 | £873 | £1,032 | £1,227 | £1,446 |
| | | | | | | |
| Continental Transhipment Lifts | £32 | £51 | £65 | £40 | £115 | £288 |
| Total revenue earned by GB transport industry | £988 | £1,291 | £1,544 | £1,906 | £2,394 | £2,819 |
| **Inland Distribution** | | | | | | |
| Road (1000 TEUs) | 4,474 | 6,329 | 7,709 | 8,527 | 10,619 | 13,490 |
| Rail (1000 TEUs) | 1,161 | 1,505 | 1,869 | 2,669 | 2,698 | 2,539 |
| | | | | | | |
| Road (million TEUkm) | 771 | 1,028 | 1,262 | 1,515 | 1,790 | 2,054 |
| Rail (million TEUkm) | 426 | 544 | 680 | 1,023 | 994 | 899 |
| Total (million TEUkm) | 1,197 | 1,572 | 1,942 | 2,538 | 2,784 | 2,954 |
| | | | | | | |
| Rail % of deep sea port throughput | 23% | 22% | 23% | 25% | 23% | 21% |

*Source: MDS Transmodal ltd*

Net feeder demand by region would be as follows.

**Table 6.13: Implied need for further feeder and short sea berths, Scenario 5 (2030)**

**5(a) excluding London Gateway**

| Region | Additional feeder demand for quay metres | Net Intra-European position | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S.Wales | 730 | -507 | 223 |
| South East/Haven | 2,514 | +740 | 3,254 |
| North west | 1,500 | +154 | 1,654 |
| North East/Humber | 1,909 | +260 | 2,169 |
| Scotland | 1,194 | -98 | 1,096 |
| Total | **7,846** | **+549** | **8,395** |

**5(b) including London Gateway**

| Region | Additional feeder demand for quay metres | Net Intra-European position | Implied need for further feeder quay metres |
|---|---|---|---|
| South West/S.Wales | 505 | -507 | - |
| South East/Haven | 1,738 | +740 | 2,478 |
| North west | 554 | +154 | 708 |
| North East/Humber | 1,450 | +260 | 1,710 |
| Scotland | 1,203 | -98 | 1,105 |
| **Total** | **5,450** | **+549** | **6,001** |

*Source: MDS Transmodal Ltd*

Scenario 5 significantly reduces the need for further feeder berths, relying as it does on a higher level of direct calls. Two thirds of the deep sea container volumes considered would be handled directly in a GB port.

Quite clearly, such an exercise is somewhat hypothetical. However, it is important to establish whether GB ports beyond the south-east can develop a transhipment business in a highly competitive environment, and deliver net worth to the UK economy. Note that this scenario only differs from Scenario 4 from 2020 onwards, reflecting the first year when we assume Continental ports have inadequate capacity.

We do not anticipate that the conditions that could produce Scenario 5 would emerge until 2020, so that in the summary tables below, Scenario 5 follows Scenario 4 until that year.

It is self evident that if the rates available can cover the cost of construction and operation, developing terminals to handle this business at suitable deep water ports will be principally a matter of gaining the relevant consents. Scenario 5 demonstrates that a point can be reached where rising charges for Continental transhipment and in south east GB ports do render non-south east ports competitive.

Model results show that:

- The supply of an additional 3,000 deep water quay metres at the non south-east ports vessels would attract1.8m TEU in 2020 and 1.7m TEU in 2030. The addition of London Gateway in Scenario 5(b) would delay the transfer of deep sea traffic to non-south east ports until 2025.

- A capacity-constrained Continent produces greater potential for transhipment in the medium term as compared with Scenario 2(a) of which a small volume is implied at non south-east ports from 2020 onwards. The addition of the London Gateway increases this potential, but the potential for handling transhipment traffic at non south-east ports is delayed until 2025.

- As compared with Scenario 1, fewer TEU would be transhipped on the Continent in 2030 (4.7m TEU fewer in Scenario 5(a) and 6.6m TEU fewer in 5(b)), making a corresponding reduction in the need for feeder berths in Britain.

- GB transport revenue is greatest under this scenario compared with any other scenario.

- Delivery costs rise in 2030 to £228 (5a) or £219 per TEU (5b) as compared with £207 and £199 per TEU respectively under Scenario 2.

- A greater volume of rail TEU kilometres is generated under Scenario 5(b) as compared with other scenarios as a consequence of feeder traffic to regional ports being reduced.

## 6.3 Transport Industry Impacts

Tables 6.14 (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, further deep water capacity will not be demanded beyond the south-east unless Continental ports run out of capacity to tranship.

- 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 5.4m TEU in Scenario 5.

- GB transport revenue is minimised under Scenario 1.

- Delivery costs are minimised under Scenario 2 (and Scenario 4 in 2030) where more south-east capacity is built. To some extent, this conclusion is predicated on there being adequate network capacity to allow rail to deliver containers from south-east ports to the

M62 corridor at a lower cost than road haulage or transhipment on the Continent. Shortage of transhipment capacity on the Continent raises delivery costs in Scenario 5.

- Rail activity is minimised under Scenarios 1 and 3 and maximised under Scenario 2.

- Third country transhipment is effectively opportunistic and will be predicated by a port capturing domestic traffic in the first place. It will be maximised under Scenario 5 assuming non south-east ports construct adequate capacity.

The following figures 6.1-6.8 show the distribution of GB deep sea container traffic between south-east, non-south-east and continental ports under the five scenarios.

**Table 6.14: Model results compared [1]**

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

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1 | 6,967 | 7,760 | 7,760 | 7,760 | 7,760 | 7,760 |
| 2(a) | 6,967 | 8,770 | 10,324 | 10,324 | 10,324 | 10,324 |
| 2(b) | 6,967 | 11,323 | 12,877 | 12,877 | 12,877 | 12,877 |
| 3 | 6,967 | 7,760 | 11,534 | 11,534 | 11,534 | 11,534 |
| 4(a) | 6,967 | 8,770 | 13,210 | 13,210 | 13,210 | 13,210 |
| 4(b) | 6,967 | 11,323 | 15,763 | 15,763 | 15,763 | 15,763 |
| 5(a) | 6,967 | 8,770 | 13,210 | 13,210 | 13,210 | 13,210 |
| 5(b) | 6,967 | 11,323 | 15,763 | 15,763 | 15,763 | 15,763 |

**(b) Demand ('000 TEU)**

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Forecast Demand | 5,635 | 7,834 | 9,578 | 11,196 | 13,317 | 16,029 |
| Via south-east deep sea ports ('000s TEU) | | | | | | |
| Scenario 1 | 4,983 | 5,796 | 5,672 | 5,666 | 5,336 | 5,250 |
| 2(a) | 4,983 | 6,698 | 8,025 | 8,306 | 8,295 | 8,058 |
| 2(b) | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| 3 | 4,983 | 5,796 | 5,418 | 5,395 | 4,979 | 5,250 |
| 4(a) | 4,983 | 6,698 | 8,025 | 8,306 | 7,361 | 8,328 |
| 4(b) | 4,983 | 6,742 | 8,156 | 9,280 | 10,698 | 10,831 |
| 5(a) | 4,983 | 6,698 | 8,025 | 8,259 | 7,612 | 8,328 |
| 5(b) | 4,983 | 6,742 | 8,156 | 10,606 | 10,222 | 10,181 |
| Via non south-east deep sea ports ('000s TEU) | | | | | | |
| Scenario 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2(a) | 0 | 0 | 0 | 0 | 0 | 0 |
| 2(b) | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 752 | 1,716 | 1,620 | 0 |
| 4(a) | 0 | 0 | 0 | 0 | 1,348 | 1,660 |
| 4(b) | 0 | 0 | 0 | 0 | 0 | 0 |
| 5(a) | 0 | 0 | 0 | 1,788 | 1,742 | 1,660 |
| 5(b) | 0 | 0 | 0 | 0 | 1,418 | 1,652 |

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

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1 | 652 | 2,038 | 3,906 | 5,530 | 7,981 | 10,779 |
| 2(a) | 652 | 1,136 | 1,553 | 2,890 | 5,022 | 7,971 |
| 2(b) | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |
| 3 | 652 | 2,038 | 3,408 | 4,085 | 6,718 | 10,779 |
| 4(a) | 652 | 1,136 | 1,553 | 2,890 | 4,589 | 6,041 |
| 4(b) | 652 | 1,092 | 1,422 | 1,916 | 2,619 | 5,198 |
| 5(a) | 652 | 1,136 | 1,553 | 1,149 | 3,963 | 6,041 |
| 5(b) | 652 | 1,092 | 1,422 | 590 | 1,677 | 4,196 |

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

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1 | 277 | 97 | 221 | 228 | 557 | 643 |
| 2(a) | 277 | 206 | 432 | 151 | 162 | 399 |
| 2(b) | 277 | 2,714 | 2,854 | 1,730 | 312 | 179 |
| 3 | 277 | 97 | 1,615 | 673 | 1,186 | 643 |
| 4(a) | 277 | 206 | 432 | 151 | 1,620 | 360 |
| 4(b) | 277 | 2,714 | 2,854 | 1,730 | 312 | 179 |
| 5(a) | 277 | 206 | 432 | 298 | 994 | 360 |
| 5(b) | 277 | 2,714 | 2,854 | 404 | 1,261 | 1,068 |

**(e) GB transport revenue (£m)**

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1 | 988 | 1,279 | 1,461 | 1,611 | 1,847 | 2,147 |
| 2(a) | 988 | 1,309 | 1,557 | 1,792 | 2,091 | 2,320 |
| 2(b) | 988 | 1,291 | 1,544 | 1,786 | 2,123 | 2,511 |
| 3 | 988 | 1,279 | 1,361 | 1,726 | 1,948 | 2,147 |
| 4(a) | 988 | 1,309 | 1,557 | 1,792 | 2,084 | 2,494 |
| 4(b) | 988 | 1,291 | 1,544 | 1,786 | 2,123 | 2,511 |
| 5(a) | 988 | 1,309 | 1,557 | 2,015 | 2,324 | 2,722 |
| 5(b) | 988 | 1,291 | 1,544 | 1,906 | 2,394 | 2,819 |

**(f) Delivery cost (£/TEU)**

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1 | 205 | 202 | 205 | 207 | 211 | 212 |
| 2(a) | 205 | 196 | 192 | 197 | 205 | 207 |
| 2(b) | 205 | 194 | 190 | 190 | 191 | 199 |
| 3 | 205 | 202 | 203 | 203 | 210 | 212 |
| 4(a) | 205 | 196 | 192 | 197 | 202 | 205 |
| 4(b) | 205 | 194 | 190 | 190 | 191 | 199 |
| 5(a) | 205 | 196 | 192 | 208 | 222 | 228 |
| 5(b) | 205 | 194 | 190 | 191 | 209 | 219 |

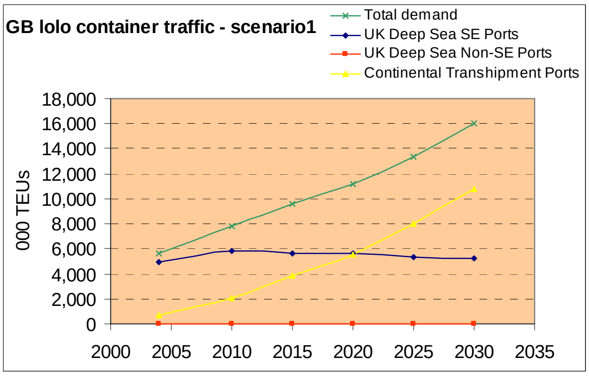
(1) Key to Scenarios:

Scenario 1 No more deep sea capacity
Scenario 2 (a) plus Felixstowe South and Bathside Bay
Scenario 2 (b) Felixstowe South and Bathside Bay plus London Gateway,
Scenario 3 Regional deep sea expansion
Scenario 4 (a) South East (2a) plus regional expansion (excl. London Gateway)
Scenario 4 (b|) South East (2b) plus regional expansion (incl. London Gateway)
Scenario 5 (a) as 4(a) Continent constrained
Scenario 5 (b) as 4(b) Continent constrained

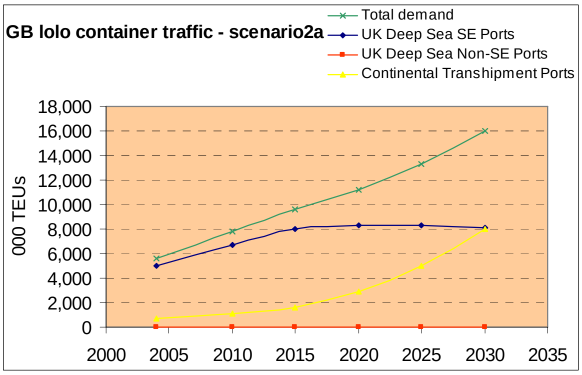
*Source: MDS Transmodal Ltd*

## Distribution of forecast GB deep sea lolo port traffic

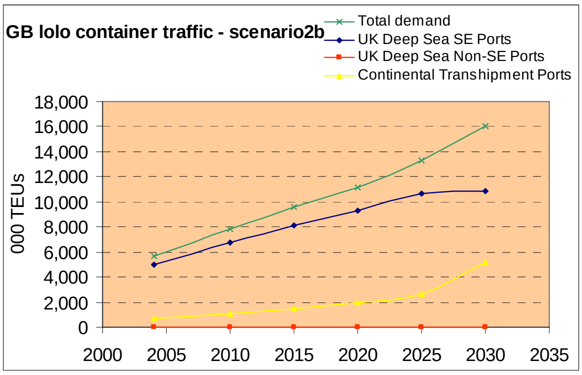
### Figure 6.1




### Figure 6.2




### Figure 6.3

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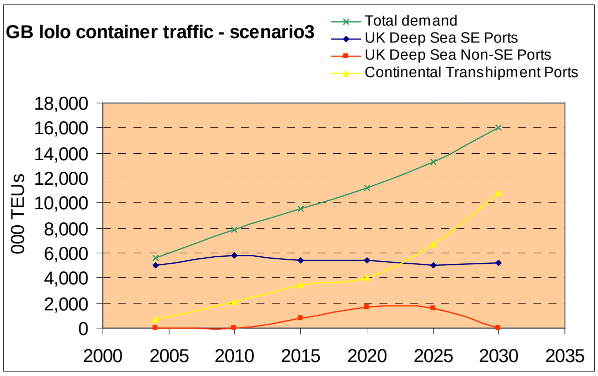


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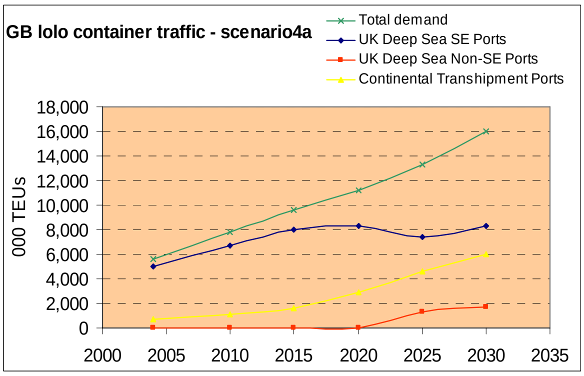


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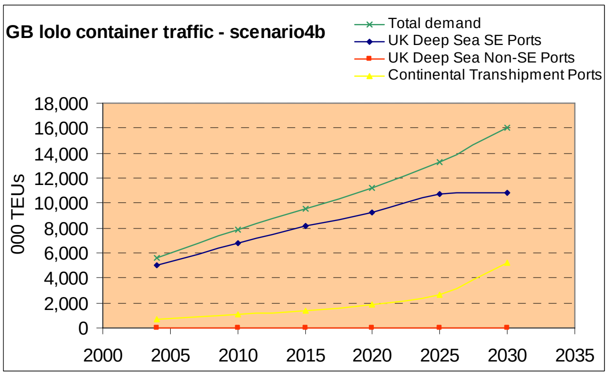
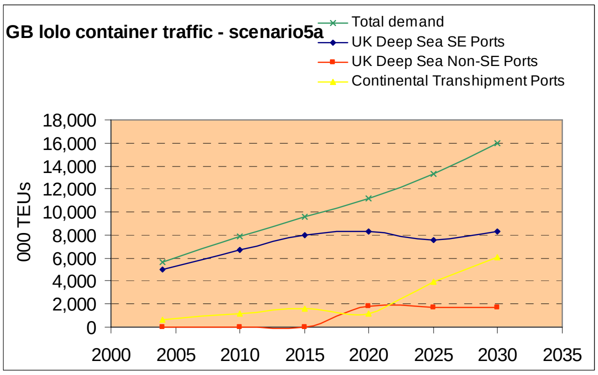
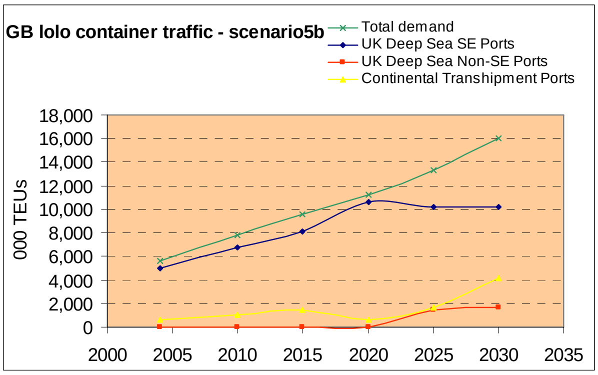



### Figure 6.7




### Figure 6.8



### 6.4 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. The strategy described in Scenario 5 does appear to offer, in the long term, the prospect of a higher proportion of container traffic passing via northern and west coast ports and a positive comparative environmental impact as measured by Sensitive Lorry Miles. However, this strategy depends entirely upon restricting both south-east GB and Continental deep water port capacity and does raise overall user costs.

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 6.15 summarises the TEU km of road and rail freight and the Sensitive Lorry Mile impact by scenario. Scenario 5 performs best because the roads used are less congested. The worst performers in terms of Sensitive Lorry Miles are Scenarios 1, 2 and 3.

To simply force traffic to use feeder services to reach regional ports tends to divert traffic from rail and not from road. It is important to note that of the 1.2m TEU of containers currently moved to and from Northern England, around 60% are already landed at local ports and some 30% arrive or depart by rail. Long distance road haulage between south-east ports and Northern England is the exception rather than the rule. Regional ports tend to have wider road served hinterlands than rail terminals, adding to road freight overall, and higher ‘SLMs’. More details are shown in Appendix 8. Road and rail assignments by scenario are represented in the maps in Appendices 9 and10.

Detailed breakdowns of these inland unit km and SLM values disaggregated according to Government Office Region are provided in Appendix 11. 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 6.15: Scenarios compared by road and rail TEU km and SLMs [1]

**(a) Rail TEU km (m)**

| Scenario | **2004** | **2010** | **2015** | **2020** | **2025** | **2030** |
|---|---|---|---|---|---|---|
| 1 | 426 | 465 | 354 | 232 | 191 | 194 |
| 2(a) | 426 | 562 | 685 | 698 | 606 | 345 |
| 2(b) | 426 | 544 | 680 | 761 | 882 | 831 |
| 3 | 426 | 465 | 451 | 484 | 295 | 194 |
| 4(a) | 426 | 562 | 685 | 698 | 667 | 670 |
| 4(b) | 426 | 544 | 680 | 761 | 882 | 831 |
| 5(a) | 426 | 562 | 685 | 905 | 749 | 670 |
| 5(b) | 426 | 544 | 680 | 1029 | 994 | 899 |

**(b) Road TEU km (m)**

| **Scenario** | **2004** | **2010** | **2015** | **2020** | **2025** | **2030** |
|---|---|---|---|---|---|---|
| 1 | 771 | 1011 | 1147 | 1244 | 1401 | 1628 |
| 2(a) | 771 | 1067 | 1300 | 1457 | 1644 | 1791 |
| 2(b) | 771 | 1028 | 1262 | 1459 | 1719 | 1962 |
| 3 | 771 | 1011 | 1195 | 1396 | 1516 | 1628 |
| 4(a) | 771 | 1067 | 1300 | 1457 | 1689 | 1980 |
| 4(b) | 771 | 1028 | 1262 | 1459 | 1719 | 1962 |
| 5(a) | 771 | 1067 | 1300 | 1581 | 1734 | 1980 |
| 5(b) | 771 | 1028 | 1262 | 1515 | 1790 | 2054 |

**(c) SLMs (£m)**

| **Scenario** | **2004** | **2010** | **2015** | **2020** | **2025** | **2030** |
|---|---|---|---|---|---|---|
| 1 | 142 | 181 | 202 | 224 | 254 | 296 |
| 2(a) | 142 | 192 | 232 | 261 | 296 | 330 |
| 2(b) | 142 | 182 | 220 | 255 | 301 | 348 |
| 3 | 142 | 181 | 199 | 224 | 252 | 296 |
| 4(a) | 142 | 192 | 232 | 261 | 284 | 336 |
| 4(b) | 142 | 182 | 220 | 255 | 301 | 348 |
| 5(a) | 142 | 192 | 232 | 260 | 288 | 336 |
| 5(b) | 142 | 182 | 220 | 265 | 296 | 342 |

(1) Key to Scenarios:
Scenario 1 No more deep sea capacity
Scenario 2 (a) plus Felixstowe South and Bathside Bay
Scenario 2 (b) plus, Felixstowe South, Bathside Bay and London Gateway
Scenario 3 Regional deep sea expansion
Scenario 4 (a) South East (2a) plus regional expansion (excl. London Gateway)
Scenario 4 (b|) South East (2b) plus regional expansion (incl. London Gateway)
Scenario 5 (a) as 4(a) Continent constrained
Scenario 5 (b) as 4(b) Continent constrained
*Source: MDS Transmodal Ltd*

*Note:*
The overall mean length of inland haul shown for 2004 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, albeit at a marginally higher cost. This small difference does not materially affect our conclusions.

## 6.5 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 capacity can be indefinitely extended. However, this is clearly not the case. In the most extreme 'feedering' scenario, an extra 14 kilometres of feeder port quay metres are required by 2030, which would require at least 100 container cranes; four times the present number at Felixstowe. This length would need to be complemented by no less than 9.8 km of additional quays 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 6.16 for the years 2015 and 2030 and illustrated in figures 6.9 to 6.13.

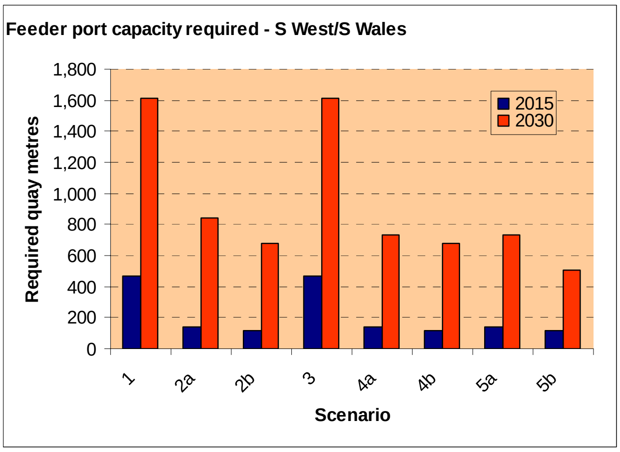
**Table 6.16: Feeder and transhipment port capacity required by scenario (2015 and 2030)** (required quay metres)

| | Scenario | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **2015** | **1** | **2a** | **2b** | **3** | **4a** | **4b** | **5a** | **5b** |
| South West/S.Wales | 466 | 137 | 118 | 466 | 137 | 118 | 137 | 118 |
| South East/Haven | 1,604 | 471 | 405 | 1,604 | 471 | 405 | 471 | 405 |
| North west | 902 | 150 | 129 | 566 | 150 | 129 | 150 | 129 |
| North East/Humber | 1,386 | 543 | 475 | 1,075 | 543 | 475 | 543 | 475 |
| Scotland | 715 | 717 | 721 | 717 | 717 | 721 | 717 | 721 |
| Total | 5,072 | 2,017 | 1,848 | 4,426 | 2,017 | 1,848 | 2,017 | 1,848 |
| Continental Port requirement | 3,551 | 1,412 | 1,293 | 3,098 | 1,412 | 1,293 | 1,412 | 1,293 |
| **2030** | **1** | **2a** | **2b** | **3** | **4a** | **4b** | **5a** | **5b** |
| South West/S.Wales | 1,612 | 840 | 675 | 1,612 | 730 | 675 | 730 | 505 |
| South East/Haven | 5,334 | 2,892 | 2,325 | 5,334 | 2,514 | 2,325 | 2,514 | 1,738 |
| North west | 3,116 | 2,944 | 741 | 3,116 | 1,500 | 741 | 1,500 | 554 |
| North East/Humber | 2,749 | 2,488 | 1,813 | 2,749 | 1,909 | 1,813 | 1,909 | 1,450 |
| Scotland | 1,188 | 1,188 | 1,197 | 1,188 | 1,194 | 1,197 | 1,194 | 1,203 |
| Total | 13,998 | 10,352 | 6,751 | 13,998 | 7,847 | 6,751 | 7,847 | 5,450 |
| Continental Port requirement | 9,799 | 7,246 | 4,726 | 9,799 | 5,492 | 4,726 | 5,492 | 3,815 |

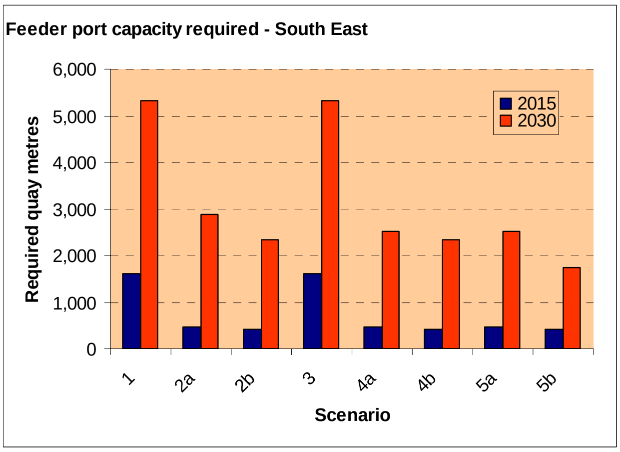
* based upon discharge rate of 1100 TEU/quay metre per annum with deep sea vessel and 770 TEU/quay metre per annum with feeder vessel. Does not include intra European demand

*Source: MDS Transmodal Ltd*

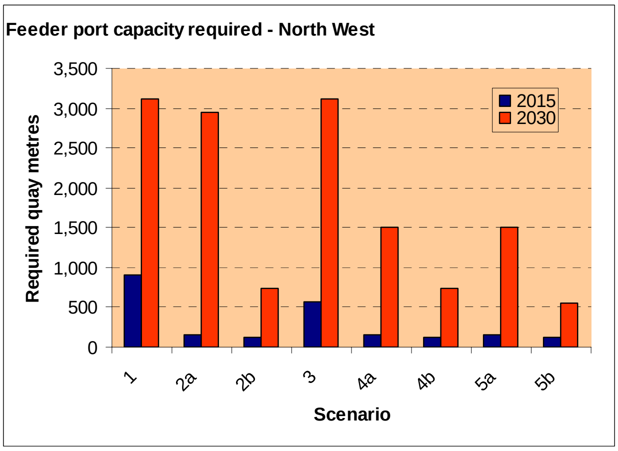
## Figure 6.9



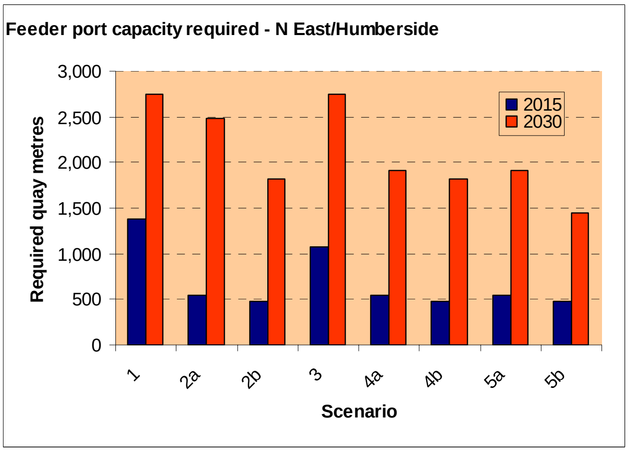

## Figure 6.10



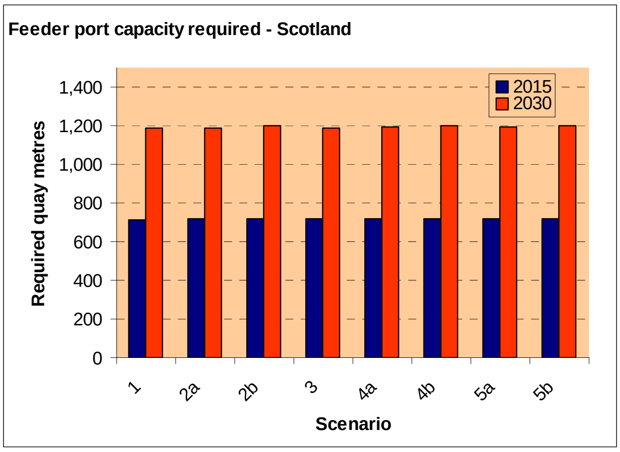

## Figure 6.11




## Figure 6.12




## Figure 6.13



### 6.6 Alternative shipping strategies

The scenarios considered above all assume that the established practice of the deep sea container shipping industry of serving NW Europe by a mixture of 3 or 4 direct port calls per ship per voyage, supported by feeder services, is maintained. It is possible that alternative strategies will emerge to address changing environments. These could include:-

a) developing more synergies with 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.

b) congestion at NW European ports which encourages remote interlining terminals to be developed.

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

In the case of (a), 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 Bristol, Liverpool or the Clyde by adding on an extra 6 days to overall round voyage time. Substantial volumes of North Atlantic cargo already use the Port of Liverpool. This effectively involves adding one ship to a vessel string 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. That is, we assumed that such a service would 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 described in some detail in Appendix 12 and are summarised in table 6.17. Four different 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 consequence loss of scale economies. 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, in this case operated 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 £2m per annum overall, assuming 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 £4m versus the base reference case and to serve Liverpool saves £9m. Given that our modelling suggests that stevedoring rates in GB south-east ports are likely to rise in the future by more than this margin, 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. In other words, it allows lines to divert traffic from existing congested ports at no net cost and, indeed, a small saving.

The costs of serving the Clyde instead of Liverpool or Bristol are higher than the base reference case by £11m 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 6.17: The concept of diverting Asia – N. America Post Panamax services to Great Britain – comparative costs* by port**

| | Maritime costs £m | Port entry £m | Inland costs Great Britain £m | Total £m | Incremental savings per GB TEU* |
|---|---|---|---|---|---|
| Base case | 588 | 60 | 82 | 730 | - |
| Via Southampton | 586 | 59 | 82 | 728 | £5 |
| Via Bristol | 587 | 59 | 80 | 726 | £11 |
| Via Mersey | 589 | 59 | 73 | 721 | £24 |
| Via Clyde | 588 | 59 | 94 | 741 | (£29) |

* 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.

In the case of (b), the failure of the major deep water Continental ports to expand to address their inland hinterland growth would have more profound impacts upon the way NW Europe is served by the lines than can be thoroughly examined in this report. In the event, for example, that the industry does not expand port capacity beyond the level indicated in chapter 3 (table 3.8), then we estimate that by 2020 that the major Benelux, North German and French deep water ports would only have capacity for their own ‘mainland’ traffic, with no net capacity to serve its existing and extensive transhipment market, which, in turn, is likely to have grown to around 15m TEU by 2020 as shown in table 3.10.

If we take the view that this market would remain a transhipment market, then one obvious position for the lines to adopt would be to tranship at GB ports. If we also take the view that ports in south-east Britain will face similar congestion and pressures as on the Continental mainland and have failed to expand quay lengths further through environmental constraints, then a quite different scenario emerges; one in which remote interlining could concentrate GB cargo from several origins onto one well placed port between the Arabian Gulf and the Iberian peninsula.

The concept we have tested is one where an Asia – NW Europe service interlines with a service from a smaller market (Southern Africa) en route at Sines in Portugal. All the southern African cargo for Continental mainland ports is transhipped to the larger vessel from Asia and the Asian traffic to Great Britain to the smaller vessel. Actual service strings have been used to model the concept, and it is assumed, as is now the case, that the GB port served is Bristol.

However, our conclusion is that the extensive interlining undertaken at the remote port so adds to cost that the savings made, principally in ships’ time and port entry charges, do not compensate. Costs rise significantly (see Appendix 12, test E).

**Note:**

The exercise described in table 6.1 (above) and table 5.7 of the 'forecasting' report(2) have been undertaken using compatible base year data. They seek to achieve different objectives, however. This transhipment study seeks (amongst other objectives) to establish the gap between supply and demand for GB deep sea port capacity to determine how much capacity is available in GB ports for third country transhipment containers and how much capacity is required in Continental mainland ports from which to feed GB deep sea domestic traffic. The forecasting study is based upon tonnages (not TEU) and unconstrained demand taking 2004 cargo mix as its base year, and therefore assuming base year (pro-rata) levels of third country transhipment in GB ports remain constant. However, the overall results are very similar because the exercise in the forecasting report attempts to use up every possible element of port capacity available.

Scenario 2(b) shows that in 2030 GB deep sea port throughput would be 10.831m TEU versus 2004 capacity of 5,259 m TEU, implying a need for extra capacity equivalent to 5.572m TEU by 2030. Extra feeder port capacity would have to rise from 0.652m TEU to 5.198m TEU – an extra 4.546m TEU. From chapter 4 we anticipated an extra 2.25m TEU of demand from intra European lolo traffic. Taken together 5.572m+4.546m+2.25m equates to a capacity shortfall of 12.3m TEU excluding transhipment.

The port forecasting(2) exercise shows a 2030 shortfall (forecasting(2) table 5.7) of 67.4m tonnes of lolo container freight. In TEU terms this is equivalent to 13.5 m TEU (67.4/mean of 5 tonnes per TEU) including the assumption that transhipment traffic rises in line with domestic demand (277,000 TEU x 2.84 = 0.787m TEU). In this exercise a mean of 5 tonnes per TEU was assumed as a constant between 2010 and 2030, so, net of transhipment, the anticipated shortfall in domestic port capacity would be 12.7m TEU in 2030.

The two approaches therefore produce more or less equal results. The results will vary according to the scenario chosen because mean quay productivity will be lower the higher the proportion of containers handled in feeder ships.

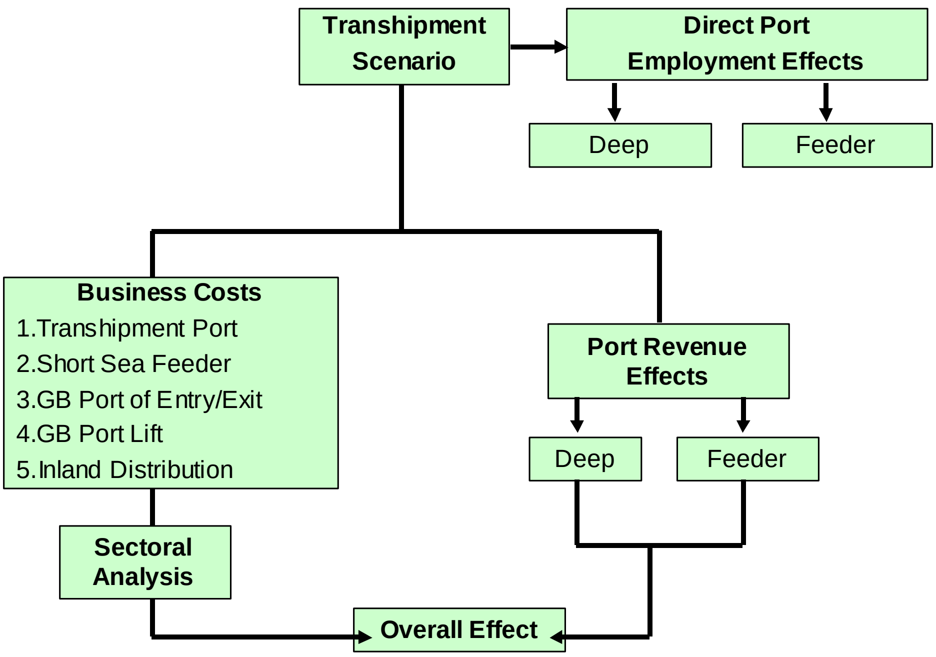
[2] UK Port Demand Forecasts to 2030; report for Department for Transport, May 2006

# 7. MODELLING THE WIDER ECONOMIC EFFECTS OF DIFFERENT SCENARIOS

***When comparing different scenarios, the study finds that differences in the level of employment are reasonably small, but there is nonetheless likely to be a different pattern of activity in different ports. Revenue figures are virtually identical for scenarios 1-4, but differ markedly for Scenario 5 where assumptions regarding Continental charges have been changed. UK business costs are remarkably similar, although Scenarios 2 and 4 deliver the lowest business costs compared with Scenario 1 (the reference case). Although differences between scenarios are relatively small, the overall impact of adding further deep water capacity is generally positive, lowering business costs and increasing transport revenue relative to the do-nothing scenario.***

## 7.1 Approach and methodology

We have modelled the wider economic effects of the five transhipment scenarios by employing the following conceptual framework:



Just as national income accounting provides three different measures of income accounting (expenditure, income and output), this framework describes three different effects of the different levels of transhipment on the UK economy. These are

- The direct port employment effects, expressed as fulltime equivalent jobs created by different levels of activity in ports.
- The effects on business costs, expressed as gross value added (GVA) foregone as the result of potentially higher charges in accessing imports and exports.
- The port revenue effect, which considers the impact on port income of differing levels of transhipment /direct shipping under the different scenarios.

These three effects should not be viewed as cumulative. They simply describe different aspects of the five scenarios. We consider each aspect in turn.

## 7.2 Port Employment Effects

The effects of transhipment under the different scenarios can best be understood by distinguishing between direct, indirect, associated and induced employment.

Direct employment relates to employment directly associated with port activity, and includes the following categories:

Port management and administration
Cargo handling, storage, warehousing (on port)
Berthing
Mooring
Towing
Technical support and maintenance
Lock operations
Shipping operators (with on port employment)
Pilots
Tug operators
Lighter operators
Line/ shipping agents
Forwarding agents (for sea or mainly sea transport)
Bunkering
Ship chandlers
Ship repair and maintenance
Tank cleaning
Waste disposal waste oil reception
Police, security (on port)
Customs and immigration

Veterinary, health and safety, environmental protection
Marine surveys
Salvage activities
Dredging
Importers/exporters (with storage or other facilities on port)
Fishing (company classed as based on port)
Ship brokers
Ship classification
Marine engineers
Ship surveyors
Diving/underwater maintenance and engineering
Specialist equipment hire/sales
Fuel supply
Charterers

In the container ports industry, levels of direct employment are usually taken as a function of port throughput (TEU). In order to estimate direct employment for each of the scenarios, we have used a multiplier which relates forecast TEU to direct jobs. This multiplier is based on a consideration of multipliers estimated for the Bathside Bay and Felixstowe expansion, which in turn were based on analysis prepared for the Dibden Bay enquiry. Given that there are only a small number of deep ports handling containerised traffic in the UK, we believe that these studies provide the best available evidence for estimating direct employment. It should also be clear to most observers that containerised traffic represents only one activity in the majority of UK ports. Other activities that create direct employment include bulk, RoRo, semi-bulk, oil, etc. This current study is only concerned with direct employment related to containerised traffic.

It is also important to realise that this study is designed to measure differential employment impact *between* scenarios, rather than the quantum of employment generated by container traffic. Viewed in these terms, the key requirement is to adopt a consistent methodology of employment estimation between scenarios rather than estimating the total of direct jobs created. Accordingly we have used a multiplier of 1,127 TEUs per employee, which we regard as a conservative estimate[3]. Results are reported for employment related by direct deep sea calls to the UK; feeder ship calls to the UK (Europe to UK transhipment); and transhipment from the UK.

[3] This estimate is based on analysis provided by Ian Chadney for the Bathside Bay Public Inquiry. His paper stated that the Port of Felixstowe employed 2,508 persons in 2003 handling 2,487,400 TEUs at a rate of 992 TEU/person. Excluding gatemen and employers engaged in ro-ro and warehousing operations, this equates to 1,127 TEU/person. In the absence of any formal port employment audit, we are confident this represents a reasonable nationwide proxy for TEU per employee when related to transhipment

**Table 7.1 Direct Port Employment - Deep Sea Ports UK**

| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 4,421 | 5,143 | 5,033 | 5,027 | 4,735 | 4,659 |
| Scenario 2a: SE Enhancements | 4,421 | 5,943 | 7,120 | 7,370 | 7,360 | 7,150 |
| Scenario 2b: SE Enhancements | 4,421 | 5,983 | 7,237 | 8,234 | 9,492 | 9,610 |
| Scenario 3: Non-SE Enhancements | 4,421 | 5,143 | 5,474 | 6,310 | 5,855 | 4,659 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 4,421 | 5,943 | 7,120 | 7,370 | 7,745 | 8,862 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 4,421 | 5,983 | 7,237 | 8,234 | 9,492 | 9,610 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 4,421 | 5,943 | 7,120 | 8,915 | 8,300 | 8,862 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 4,421 | 5,983 | 7,237 | 9,411 | 10,328 | 10,499 |

**Table 7.2 Direct Port Employment - Feeder Ports UK**

| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 579 | 1,808 | 3,465 | 4,907 | 7,082 | 9,564 |
| Scenario 2a: SE Enhancements | 579 | 1,008 | 1,378 | 2,564 | 4,456 | 7,073 |
| Scenario 2b: SE Enhancements | 579 | 969 | 1,262 | 1,700 | 2,324 | 4,613 |
| Scenario 3: Non-SE Enhancements | 579 | 1,808 | 3,024 | 3,625 | 5,961 | 9,564 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 579 | 1,008 | 1,378 | 2,564 | 4,072 | 5,361 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 579 | 969 | 1,262 | 1,700 | 2,324 | 4,613 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 579 | 1,008 | 1,378 | 1,020 | 3,516 | 5,361 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 579 | 969 | 1,262 | 524 | 1,488 | 3,723 |

**Table 7.3 Direct Port Employment - Transhipment***

| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 245 | 86 | 196 | 202 | 495 | 571 |
| Scenario 2a: SE Enhancements | 245 | 183 | 384 | 134 | 144 | 354 |
| Scenario 2b: SE Enhancements | 245 | 2,408 | 2,532 | 1,535 | 277 | 159 |
| Scenario 3: Non-SE Enhancements | 245 | 86 | 1,433 | 598 | 1,052 | 571 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 245 | 183 | 384 | 134 | 1,438 | 320 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 245 | 2,408 | 2,532 | 1,535 | 277 | 159 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 245 | 183 | 384 | 267 | 882 | 320 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 245 | 2,408 | 2,532 | 359 | 1,119 | 948 |

*These estimates relate to the potential direct employment generated by transhipment should excess capacity at deep-sea ports, where possible, be directed to transhipment

**Table 7.4 Direct Port Employment – Total**

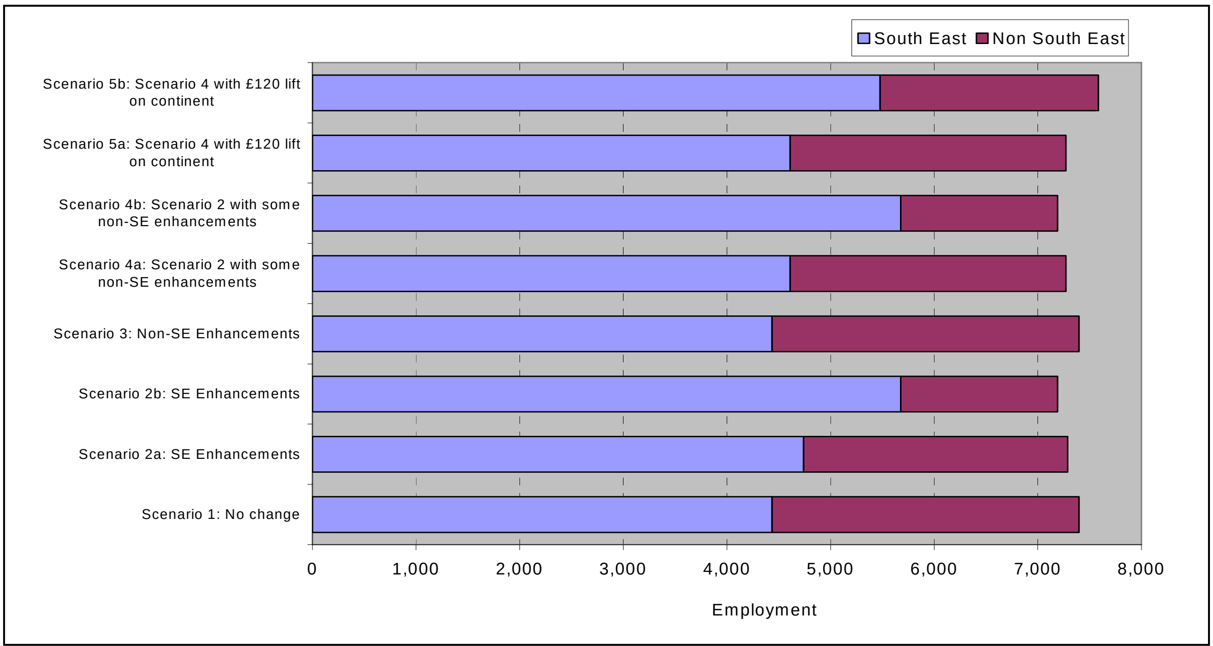
| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 5,245 | 7,037 | 8,695 | 10,137 | 12,311 | 14,793 |
| Scenario 2a: SE Enhancements | 5,245 | 7,134 | 8,882 | 10,068 | 11,960 | 14,577 |
| Scenario 2b: SE Enhancements | 5,245 | 9,359 | 11,031 | 11,470 | 12,093 | 14,382 |
| Scenario 3: Non-SE Enhancements | 5,245 | 7,037 | 9,932 | 10,532 | 12,868 | 14,793 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 5,245 | 7,134 | 8,882 | 10,068 | 13,254 | 14,543 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 5,245 | 9,359 | 11,031 | 11,470 | 12,093 | 14,382 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 5,245 | 7,134 | 8,882 | 10,202 | 12,699 | 14,543 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 5,245 | 9,359 | 11,031 | 10,293 | 12,935 | 15,171 |

It must be remembered that the key comparison is between scenarios, with Scenario 1 acting as a proxy for the reference case or 'do-nothing' scenario. This analysis suggests that there is forecast to be only a small difference in direct jobs created between the different scenarios by 2030. All the difference can be attributed to the amount of *potential* transhipment activity that can take place at UK ports. However, in the interim period, there is potential for significant levels of employment that could be supported by transhipment activity, the peak being 2,500 jobs in 2015 under Scenarios 2(b), 4(b) and 5(b) before new capacity is fully utilised by GB domestic demand. However, by 2030 if all transhipment potential is used, this only leads to a difference between the other scenarios and Scenario 1 of up to +/-400 jobs (3%).

A more substantial long-term differential between scenarios is the comparison between where direct employment is created. Figure 7.1 illustrates the share of direct employment potentially as a result of each scenario between the South East ports and Non South East ports.

On a regional basis, Scenarios 1, 3, 4(a) and 5(a) could lead to the greatest direct employment impacts outside the South East. Under these scenarios by 2030 around 40% of total direct employment related to containerised traffic is estimated to be outside the South East. It can be seen that if port facilities in the South East are further enhanced (Scenarios 2b, 4b) greater direct employment is generated in the region, at almost 80% of total direct employment by 2030.

**Figure 7.1: Direct Port Employment Related to Containerised Traffic by Region (2030)**




*Source: DTZ Pieda*

### *Indirect Employment*

There are two components of indirect employment to consider. The first relates to supply side linkages, which are due to purchases made as a result of the core port activities; in this case we are concerned with indirect jobs relating to deep sea containerised traffic. The second relates to jobs that are due to local expenditure by employees who derive their income from direct employment and supply linkage impacts.

A variety of different studies have used a variety of assumptions to arrive at estimated multipliers for a number of different purposes. For this study we have examined evidence from the Port of London Authority (PLA), Bathside Bay, Felixstowe, Dover, Flemish Ports, and English Partnerships Additionality Guidance. The results are shown in table 7.5.

**Table 7.5: Supply, Income and Composite Multipliers**

| | Supply | Income | Composite |
|---|---|---|---|
| PLA | 1.5 | 1.15 | 1.65 |
| Bathside Bay | | | 1.56 |
| Felixstowe | | | 1.69 |
| Dover | 1.4 | 1.4 | 1.80 |
| Flemish Ports | 1.6 | | 1.60 |
| EP guidance (medium) | 1.25 | 1.25 | 1.50 |
| EP guidance (low) | 1.15 | 1.15 | 1.30 |
| Range | | | 1.3 -1.8 |

For the purposes of this study we have used a composite multiplier of 1.5. This reflects the range of multipliers noted above, as well as reflecting the fact that supply multipliers relating to containerisation are likely to be less than supply multipliers relating to total port activity. The results of this analysis are shown below:

**Table 7.6 Indirect Employment**

| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 2,623 | 3,519 | 4,347 | 5,068 | 6,155 | 7,397 |
| Scenario 2a: SE Enhancements | 2,623 | 3,567 | 4,441 | 5,034 | 5,980 | 7,289 |
| Scenario 2b: SE Enhancements | 2,623 | 4,680 | 5,516 | 5,735 | 6,047 | 7,191 |
| Scenario 3: Non-SE Enhancements | 2,623 | 3,519 | 4,966 | 5,266 | 6,434 | 7,397 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 2,623 | 3,567 | 4,441 | 5,034 | 6,627 | 7,271 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 2,623 | 4,680 | 5,516 | 5,735 | 6,047 | 7,191 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 2,623 | 3,567 | 4,441 | 5,101 | 6,349 | 7,271 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 2,623 | 4,680 | 5,516 | 5,147 | 6,468 | 7,585 |

*Source: DTZ Pieda*

This analysis assumes that the standard multiplier applies across deep sea, feeder and transhipment employment. There is some reason to believe that multipliers in feeder ports may differ due to scale effects, but in the absence of strong empirical evidence to support this view, we have decided to use a common approach.

Adding indirect to direct employment, we arrive at the estimates of total employment related to containerised traffic illustrated in table 7.7.

**Table 7.7 Total Port Employment Effect**

| Scenario | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | 7,868 | 10,556 | 13,042 | 15,205 | 18,466 | 22,190 |
| Scenario 2a: SE Enhancements | 7,868 | 10,701 | 13,324 | 15,103 | 17,941 | 21,866 |
| Scenario 2b: SE Enhancements | 7,868 | 14,039 | 16,547 | 17,205 | 18,140 | 21,573 |
| Scenario 3: Non-SE Enhancements | 7,868 | 10,556 | 14,897 | 15,798 | 19,302 | 22,190 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | 7,868 | 10,701 | 13,324 | 15,103 | 19,881 | 21,814 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | 7,868 | 14,039 | 16,547 | 17,205 | 18,140 | 21,573 |
| Scenario 5a: Scenario 4a with £120 lift on continent | 7,868 | 10,701 | 13,324 | 15,303 | 19,048 | 21,814 |
| Scenario 5b: Scenario 4b with £120 lift on continent | 7,868 | 14,039 | 16,547 | 15,440 | 19,403 | 22,756 |

*Source: DTZ Pieda*

It must be remembered that the key comparison is between scenarios, with Scenario 1 acting as a proxy for the reference case or 'do-nothing' scenario. The analysis supports observations made on table 7.4. For 2030 the range of jobs generated under the different scenarios is from 21,600 to 22,800, representing a +/- 2.5% difference from Scenario 1.

Regionally, under each scenario, based on the view that ports will source the majority of UK supplies from businesses that are located within their region, we estimate that overall jobs would be distributed on the same basis as direct jobs.

## 7.3 Port Revenue Effects

We assume that port revenues are generated from ship movements into UK ports and the number of containers lifted at portside. In addition transhipment activity in a UK port generates revenue per container handled.

Table 7.8 shows the port revenue associated with each scenario. Once again, it must be remembered that the key comparison is between scenarios, with Scenario 1 acting as a proxy for the reference case or 'do-nothing' scenario.

**Table 7.8 Port Revenue Effects (£m)**

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | £308 | £418 | £525 | £596 | £696 | £793 |
| Scenario 2a: SE Enhancements | £308 | £405 | £488 | £584 | £740 | £861 |
| Scenario 2b: SE Enhancements | £308 | £465 | £545 | £596 | £679 | £865 |
| Scenario 3: Non-SE Enhancements | £308 | £418 | £508 | £603 | £742 | £793 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | £308 | £405 | £488 | £584 | £734 | £884 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | £308 | £465 | £545 | £596 | £679 | £865 |
| Scenario 5a: Scenario 4a with £120 lift on continent | £308 | £405 | £488 | £712 | £923 | £1,113 |
| Scenario 5b: Scenario 4b with £120 lift on continent | £308 | £465 | £545 | £602 | £918 | £1,142 |

*Source: DTZ Pieda*

Analysis of table 7.8 suggests that for Scenarios 1-4, there is around a 10% difference in the overall port revenue effect, although no scenario represents a decline in revenue relative to Scenario 1. Effectively, the major difference is distributional, between deep sea and feeder, and South East and non-South East ports. For Scenario 5, UK port revenue is significantly enhanced because assumptions regarding the rate of continental charging have been adjusted which prompts a much greater degree of direct shipping into the UK. However it should be noted that not all of the port revenue would remain in the UK, as overseas owners of UK ports may repatriate their earnings.

## 7.4 Business Costs

This part of the analysis seeks to capture the impact of the different scenarios on UK business costs and therefore competitiveness. The basis for this analysis is to estimate the differential cost to UK business of transporting containerised goods under each scenario. At this point it is important to emphasise that there is an important distinction between those who pay higher transport costs, and where the final burden or 'incidence' of higher transport costs falls. For example, the imposition of an additional charge on a product may cause firms to increase price by the amount of that charge. If customers do not reduce their purchases, the entire burden of the increase will have been shifted to them.

For the purposes of this part of the analysis, we have assumed that all increases in cost are passed on to businesses that are transporting their goods in containers. The costs that vary under the scenarios fall under the following categories:

- Port lift
- Port entry
- Maritime costs
- Rail distribution costs
- Road distribution costs
- Continental transhipment lift costs

The results of the analysis are shown in table 7.9.

**Table 7.9 Differential Transport Costs to UK Businesses (£m)**

| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|
| Scenario 1: No change | £1,153 | £1,581 | £1,964 | £2,316 | £2,804 | £3,390 |
| Scenario 2a: SE Enhancements | £1,153 | £1,536 | £1,838 | £2,203 | £2,728 | £3,323 |
| Scenario 2b: SE Enhancements | £1,153 | £1,521 | £1,820 | £2,124 | £2,540 | £3,184 |
| Scenario 3: Non-SE Enhancements | £1,153 | £1,581 | £1,945 | £2,277 | £2,799 | £3,390 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | £1,153 | £1,536 | £1,838 | £2,203 | £2,685 | £3,283 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | £1,153 | £1,521 | £1,820 | £2,124 | £2,540 | £3,184 |
| Scenario 5a: Scenario 4a with £120 lift on continent | £1,153 | £1,536 | £1,838 | £2,327 | £2,960 | £3,649 |
| Scenario 5b: Scenario 4b with £120 lift on continent | £1,153 | £1,521 | £1,820 | £2,144 | £2,788 | £3,517 |

*Source: DTZ Pieda*

From table 7.9 we can see that the impact on UK business is very similar when comparing scenarios. However the difference between scenarios increases through time, and by 2030 the difference between the other scenarios and Scenario 1 represents a maximum saving to businesses of £207m (Scenario 2b/4b) or an increase in costs of up to £259m (Scenario 5a). To put this into perspective, total transport costs for the UK economy in 2000 were £78 billion. This means that the maximum saving to businesses in 2030 compared with Scenario 1 is equivalent to 0.2% of transport costs in 2000.

The lowest costs to businesses are generated by Scenario 2 and 4 because both scenarios involve expansion of deep sea capacity in the South East, which enable more direct calls to South East ports, which appears (on the margin) the most economic way of transporting goods to markets.

We can say with a degree of certainty which sectors are likely to be the most affected by different costs in bringing goods to market. We do this by looking at those sectors that import the most goods via containerisation.

Table 7.10 shows the 35 activities together accounting for nearly 50% of total UK containerised imports. Based on these proportions, we can say, for example, that approximately 4% of the difference in costs between scenarios would affect importers of fruit and nuts, which obviously would tend to be in the food and drinks industry. Given a potential overall saving of £207m, this would mean lower costs to the food and drinks industry of approximately £8m. The food and drinks sector in total imports goods to the value of £4.6b from outside the EU, meaning £8m represents less than 0.2% of the value of these goods. The question then becomes whether costs of this magnitude would result in behavioural changes on the part of key importers.

The problem in undertaking this type of analysis is that there are a large number of assumptions underpinning the estimate of £8m. Apart from all of the modelling issues relating to trade volumes, direction and port capacity, we would be assuming that current usage of containerisation remain constant up to 2030 (when the differences between scenarios arise), and that all higher charges are passed on to importers. More importantly, we should note that the transhipment forecasts do not discriminate between different types of containerised goods. This means that it may be possible for patterns of transhipment to change radically, without actually affecting any individual sector. Given these factors, and the relatively small difference in costs between different scenarios, we do not believe that the forecast differences in transport costs between scenarios will have a noticeable impact on UK competitiveness.

**Table 7.10: Imports of Containerised Goods by Sector**

| | Tonnes | % of all containerised goods |
|---|---|---|
| Fruit And Nuts (Not Including Oil Nuts), Fresh Or Dried | 607,100 | 4.0% |
| Furniture And Parts Thereof; Bedding, Mattresses, Mattress Supports, Cushions And Similar Stuffed Furnishings | 555,513 | 3.7% |
| Articles, N.E.S. Of Plastics | 524,236 | 3.5% |
| Paper And Paperboard | 421,638 | 2.8% |
| Wood, Simply Worked And Railway Sleepers Of Wood | 400,484 | 2.6% |
| Alcoholic Beverages | 377,846 | 2.5% |
| Baby Carriages, Toys, Games And Sporting Goods | 328,288 | 2.2% |
| Vegetables, Fresh, Chilled, Frozen Or Simply Preserved; Roots, Tubers And Other Edible Vegetable Products, N.E.S., Fresh Or Dried | 319,716 | 2.1% |
| Feeding Stuff For Animals (Not Including Unmilled Cereals) | 281,914 | 1.9% |
| Sugars, Molasses, And Honey | 227,370 | 1.5% |
| Pulp And Waste Paper | 226,615 | 1.5% |
| Parts And Accessories For Tractors, Motor Cars And Other Motor Vehicles, Trucks, Public-Transport Vehicles And Road Motor Vehicles N.E.S. | 221,596 | 1.5% |
| Manufactures Of Base Metal, N.E.S. | 215,158 | 1.4% |
| Rice | 214,572 | 1.4% |
| Paper And Paperboard, Cut To Size Or Shape, And Articles Of Paper Or Paperboard | 212,768 | 1.4% |
| Polymers Of Ethylene, In Primary Forms | 200,575 | 1.3% |
| Inorganic Chemical Elements, Oxides And Halogen Salts | 197,220 | 1.3% |
| Fish, Crustaceans, Molluscs And Other Aquatic Invertebrates, Prepared Or Preserved, N.E.S. | 194,809 | 1.3% |
| Veneers, Plywood, Particle Board, And Other Wood, Worked, N.E.S. | 188,349 | 1.2% |
| Wood Manufactures, N.E.S. | 187,277 | 1.2% |
| Fertilizers (Exports Include Group 272; Imports Exclude Group 272) | 181,532 | 1.2% |
| Metallic Salts And Peroxysalts Of Inorganic Acids | 177,545 | 1.2% |
| Clay Construction Materials And Refractory Construction Materials | 174,250 | 1.1% |
| Household Type Electrical And Nonelectrical Equipment, N.E.S. | 169,040 | 1.1% |
| Tea And Mate | 158,633 | 1.0% |
| Fruit Preserved, And Fruit Preparations (Excluding Fruit Juices) | 153,926 | 1.0% |
| Glass | 151,447 | 1.0% |
| Internal Combustion Piston Engines And Parts Thereof, N.E.S. | 149,504 | 1.0% |
| Oil Seeds And Oleaginous Fruits Used For The Extraction Of Soft Fixed Vegetable Oils (Excluding Flours And Meals) | 146,556 | 1.0% |
| Subtotal | | 48.4% |
| Not speciifed | | 50.6% |

*Source: MDS Transmodal Ltd*

## 7.5 Overall Effect

We have considered the wider impacts of the different scenarios from three perspectives. These are employment effects, port revenue effects and the effect on UK business costs. Table 7.11 summaries key indicators for each of the scenarios, for the end of the forecast period:

**Table 7.11: Impacts of Scenarios Relative to Scenario 1 by 2030**

| 2030 | Employment Effect | Port Revenue (£m) | UK Business Costs (£m) |
|---|---|---|---|
| Scenario 1: No change | ***22,190*** | ***£793*** | ***£3,390*** |
| Scenario 2a: SE Enhancements | -324 | +£68 | -£67 |
| Scenario 2b: SE Enhancements | -617 | +£72 | -£206 |
| Scenario 3: Non-SE Enhancements | 0 | £0 | £0 |
| Scenario 4a: Scenario 2a with some non-SE enhancements | -376 | +£91 | -£107 |
| Scenario 4b: Scenario 2b with some non-SE enhancements | -617 | +£72 | -£206 |
| Scenario 5a: Scenario 4a with £120 lift on continent | -376 | +£320 | +£259 |
| Scenario 5b: Scenario 4b with £120 lift on continent | +566 | +£349 | +£127 |

*Source: DTZ Pieda*

Here we can see that differences in total employment relative to Scenario 1 amount to roughly +/-600 jobs by 2030. However, these modest differences seem to relate to assumptions about the use of spare deep port capacity for transhipment where possible and there is not necessarily a direct relationship to an increase in overall capacity.

Revenue figures for Scenarios 1-4 vary by up to 10%, but differ markedly for Scenario 5 where assumptions regarding continental charges have been changed. Each of the scenarios, with the exception of Scenario 3, represents a relative increase in port revenue compared with Scenario 1.

UK business costs are relatively similar, although Scenarios 2 and 4 deliver the lowest business costs representing savings to businesses of around 6% compared to Scenario 1 (the reference case). Again, by 2030, Scenario 3 (non SE enhancements) does not have any differential impacts compared to Scenario 1.

The regional impact can best be assessed by studying the employment impact. This analysis suggests that by enhancing South East port capacity, a greater proportion of jobs relating to containerisation will be generated in the region.

It is important to note that even when capacity is increased in the South East, there is little scope for greater transhipment in the UK. This is because the over-riding demand for direct calls is likely to soak up any increase in capacity. This means that the proportion of employment, revenues and costs directly related to transhipment is quite low, and that the main driver underlying differences in these three forecasts is the different assumptions regarding continental charges as embodied in Scenario 5.

### 7.6 Impact summarised

We have stressed above that while this study is nominally intended to explore the value that transhipment brings to the UK economy, in practice it relates the provision of deep water port capacity in Britain and on the Continent to the volume of transhipment and domestic port demand in Great Britain and the consequential combined impact on road and rail networks and on the GB economy.

These impacts are summarised below for 2030:

**Table 7.12 Comparison of impacts (comparison with Scenario 1 in 2030)**

| SCENARIO | 1 | 2(a) | 2(b) | 3 | 4(a) | 4(b) | 5(a) | 5(b) |
|---|---|---|---|---|---|---|---|---|
| Third country transhipment in GB (m TEU) | 0.6 | 0.4 | 0.2 | 0.6 | 0.4 | 0.2 | 0.4 | 1.1 |
| GB transhipment on Continent (m TEU) | 10.8 | 8.0 | 5.2 | 10.8 | 6.0 | 5.2 | 6.0 | 4.2 |
| Extra feeder berths required (‘000s metres) | 14.0 | 9.0 | 6.8 | 14.0 | 7.3 | 6.8 | 7.0 | 5.5 |
| Delivery costs for GB shippers (comparative)(£/TEU) | - | -5 | -13 | - | -7 | -13 | +16 | +7 |
| Transport revenue in GB (comparative) (£m ) | - | +173 | +364 | - | +347 | +364 | +575 | +672 |
| Overall business cost to GB (£m) (comparative) | - | -67 | -206 | - | -107 | -206 | +259 | +127 |
| Employment (comparative) | - | -324 | -617 | - | -376 | -617 | -376 | +566 |
| Port revenue(comparative) (£m) | - | +68 | +72 | - | +91 | +72 | +320 | +349 |
| Sensitive Lorry Mile value (comparative) (£m)* | - | +34 | +52 | - | +40 | +52 | +40 | +46 |

* a negative value represents an improvement in environmental conditions.

**Scenarios:**

1: No further deep water berths
2a: SE Enhancements
2b: SE Enhancements (including London Gateway)
3: Deep water Enhancements beyond the south-east only
4a: Scenario 2a with some enhancements beyond the south-east
4b: Scenario 2b with some enhancements beyond the south-east
5a: Scenario 4a with transhipment tariff on Continent raised from £80 to £120 per unit
5b: Scenario 4b with transhipment tariff on Continent raised from £80 to £120 per unit

*Source: MDS Transmodal Ltd*

The forecast suggests that employment directly and indirectly related to port activity may rise by about 10,000 from 2004 to 2030. This is a simple function of the assumed increased levels of port throughput.

- When comparing different scenarios, the study finds that differences in the level of employment are reasonably small, but there is nonetheless likely to be a different pattern of activity in different ports.

- Because the pattern of activity in ports varies between scenarios, there are geographical implications for employment patterns.

- For all scenarios (excluding Scenario 5) the differences in total port revenues are likely to be small, and will probably involve a redistribution of money between operators. This redistribution will be related to port location and function.

- In Scenario 5, port revenue is enhanced because charges have been adjusted in line with assumptions regarding feeder capacity on the continent. It is assumed that these changes will prompt a greater degree of direct shipping into the UK.

- In terms of the wider effects on business competitiveness, the cost variations relating to the five different scenarios are small in relation to both total business costs, and total transport expenditure.

- Although differences between scenarios are relatively small, the overall impact of adding further deep water capacity lowers business costs and increases transport revenue relative to the do-nothing scenario.

- The least environmentally attractive options from the point of view of sensitive lorry miles appear from this analysis to be those scenarios that include the development of port capacity in the south east (Scenarios 2, 4 and 5). The disadvantage increases with the addition of London Gateway. Scenario 1 (no new capacity) and Scenario 3 (new capacity in non-south east ports) have the lowest SLM rating (i.e. produce the highest value of Sensitive Lorry Miles). The reason for this result is that forecast port traffic is allocated to rail on the basis of rail taking only a share of the market (based on current performance) where rail is cheaper. The remaining traffic is assumed to move by road over relatively long distances in Scenarios 2, 4 and 5. If all traffic were allocated to rail where rail offers the cheaper option (to final destination), then the results would be quite different and Scenarios with additional south east capacity would perform better than Scenarios 1 or 3. Insofar as an evaluation of expanding south-east port capacity is concerned, this approach is cautious, as it is being compared with Scenario 1 which assumes that in the absence of extra south east capacity, all traffic to Northern Britain moves by sea to feeder ports. In practice, the more urgent of this traffic would move by road via GB south-east ports, while less urgent traffic to (say) the Midlands would be squeezed out and enter GB via feeder services to the Mersey or Humber.

- A comparison of business costs versus environmental costs between Scenarios at 2015 and 2030 is shown in table 7.13 below. Scenarios which include added port capacity in the south east result, in the longer term, in substantially greater net benefit to the UK in terms of business cost savings than the value of any net environmental costs (measured in SLM value) suffered. In Scenario 5 business costs are a result of higher port tariffs, demonstrating some vulnerability to the UK economy should adequate transhipment capacity at a competitive rate not be available in continental (or UK) ports for transhipment to Northern Britain.

**Table 7.13: Net cost comparisons with Scenario 1 (do nothing case) (£m)**

| Scenario/year | 2(a) | 2(b) | 3 | 4(a) | 4(b) | 5(a) | 5(b) |
|---|---|---|---|---|---|---|---|
| **2015** | | | | | | | |
| Relative Business cost | -126 | -144 | -19 | -126 | -144 | -126 | -144 |
| Relative SLM value | +20 | +18 | -3 | +20 | +18 | +20 | +18 |
| Net costs | -106 | -126 | -22 | -106 | -126 | -106 | -126- |
| **2030** | | | | | | | |
| Relative Business costs | -67 | -206 | - | -107 | -206 | +259 | +127 |
| Relative SLM value | +24 | +52 | - | +40 | +52 | +40 | +46 |
| Net costs | -33 | -154 | - | -67 | -154 | +299 | +173 |

*Source: MDS Transmodal Ltd*

# 8. CONCLUSIONS AND RECOMMENDATIONS

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 178% between 2004 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 2004, there was approximately 7.1m TEU of domestic container traffic to and from Great Britain. Some 1.0m TEU of that figure was transhipped elsewhere in Europe before it landed. A further 0.5m TEU of business was transhipped between third countries at 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.

- Adding to GB capacity in the south-east (Scenarios 2 and 4) would address these issues, lead to some third country transhipment in those years when projects offered more capacity than (steadily growing) domestic demand and have generally positive economic impacts. These conclusions depend upon there being adequate rail capacity for south-east ports to serve northern markets economically.

- A strategy (Scenario 3) of only adding to capacity in northern and western Britain would generally (but not entirely) fail to divert deep sea vessels from their established routing and produce a similar feedering approach from the Continent as under Scenario 1.

- If, however, capacity on the Continent to support a remorseless growth in feedering was eventually unavailable (Scenario 5) and consequently tariffs become expensive, northern and western British deep water terminals would attract deep sea vessels, in part because of the savings that lines would make in feedering to third (smaller) countries at lower cost transhipment tariffs than on the Continent. This scenario does imply higher end user costs, but this is largely explained by the assumed tightening of capacity (rising rates) at Continental transhipment ports. Otherwise, this scenario performed well in terms of environmental impact, transport revenue, expanding rail freight, minimising the need for more feeder berths and overall impact on the economy. It does, however, depend on Continental ports failing to invest in the opportunities currently available to them.

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. These included (i), lines diverting deep sea services between Asia and East Coast North America (via the Suez Canal) to a GB port call and (ii) remote interlining of containers to concentrate traffic onto a single container ship calling at one GB port devoted entirely to GB destined cargo. That port would then not need to be in the south-east so that the 'diversion' costs currently faced would no longer be a factor. Our conclusions were that while such a 'concentration' strategy (ii) to a single port would be too expensive because of high stevedoring costs, the diversion of Post Panamax vessels to a GB west coast port en route between Asia and N. America (i) 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 (port expansion is self funding).

However, differences in the way containers are routed in Britain do not have a major impact on overall economic benefit.

# APPENDICES

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