FINAL REPORT

Options for Changes to Revenue Support Freight Grant Schemes

CONTENTS

List of abbreviations

3PL	Third party logistics provider
C&D	Collection and delivery
DfT	Department for Transport
EC	European Commission
EU	European Union
HGV	Heavy Goods Vehicle
LOLO	Load-on Load Off
MDST	MDS Transmodal Ltd
MGO	Marine Gas Oil
MSRS	Modal Shift Revenue Support
RORO	Roll-on Roll-off
SECA	Sulphur Emission Control Area
TEU	Twenty foot equivalent unit
WFG	Waterborne Freight Grant

EXECUTIVE SUMMARY

Chapter 1: Introduction

The Department for Transport (DfT) has commissioned Atkins, and through Atkins MDS Transmodal (MDST), to consider options for changes to Revenue Support Freight Grant Schemes.

Under the existing schemes DfT, Transport Scotland and the Welsh Government provide freight revenue grants to industry to encourage modal shift from road to rail and water where the cost is higher than road and where there are environmental benefits to be gained.

The options for change that the DfT has commissioned Atkins and MDST to consider are for:

- A Mode Shift Revenue Support (MSRS) (Intermodal) style scheme for coastal shipping;
- Channel Tunnel intermodal rail freight services to be included in the MSRS (Intermodal) scheme.

For the purposes of considering these options for changes to MSRS we have developed the following definitions for the relevant types of service:

Unitload coastal shipping service: *any unitload shipping service that calls at two or more GB ports allowing units to be transported between them and where the two ports are not in the same MSRS zone.*

Channel Tunnel intermodal rail freight service: *an intermodal rail freight service passing through the Channel Tunnel between an intermodal terminal on the European continental mainland and another intermodal terminal on the GB mainland.*

Chapter 2: Market Analysis

<u>Channel Tunnel intermodal</u>

Through Channel Tunnel rail freight services are relatively undeveloped, and represent only 1.4% of the total GB-Continent freight market. This is despite the relatively long distances that are available and which should allow through rail freight services to be competitive against all-road transport chains. Much of the explanation for the poor performance of Channel Tunnel intermodal services lies in the fact that continental rail services can be accessed by UK shippers and receivers instead at ports such as Rotterdam and Zeebrugge using east coast short sea shipping services.

The closest substitutes for the Channel Tunnel intermodal services are therefore unaccompanied RORO and LOLO shipping services that operate on routes between, for example, Zeebrugge and the major British estuaries such as the Thames. This suggests that the most appropriate comparators for Channel Tunnel intermodal rail

freight services for the purposes of their inclusion in the MSRS (Intermodal) scheme are short sea shipping services via an east coast port.

Unitload coastal shipping

The number of containers moved by sea between GB ports was 119,500 units in 2015 and 106,000 units in 2016. Very few of these containers are transported between two GB inland locations, but are deep sea containers that are fed between deep sea container ports such as Felixstowe, Southampton, Rotterdam, Antwerp or Le Havre and British regional ports.

Any additional MSRS scheme for coastal shipping is therefore likely to have an impact mainly on the deep sea feeder market either between a GB deep sea container port and GB regional ports or between a North European deep sea container port and GB regional ports.

An MSRS-style scheme for coastal shipping would ensure that this mode is treated in the same way as intermodal rail freight for the transport of containers between deep sea terminals and the British hinterland of the deep sea ports.

Chapter 3: Generic cost models

DfT can only provide grant where there is a financial need for the grant and therefore the DfT needs to have a clear understanding of operating costs for coastal shipping operators and for through Channel Tunnel intermodal rail freight services. We therefore developed generic cost models for these services based on the existing knowledge of the consultants and validation of the data by operators of both Channel Tunnel and coastal/short sea container shipping services.

Channel Tunnel intermodal

Cost modelling for Channel Tunnel intermodal rail freight services suggests that grant should be provided to Channel Tunnel intermodal services to ensure equal treatment with the GB domestic rail services that can secure MSRS grant.

It also suggests that a reasonable comparator for Channel Tunnel services for the purposes the inclusion of these services in the MSRS (Intermodal) scheme would be Wembley/Barking where access can be obtained to the Channel Tunnel network.

Unitload coastal shipping

Cost modelling for unitload coastal shipping showed it can be very cost effective against both road and rail for the transport of feeder containers over longer distances because the shipping costs are relatively low compared to the fixed port and inland distribution costs. However, where coastal shipping is more cost effective than rail freight, there may be an argument that MSRS should be provided only at a rate that could be justified for the lower cost mode.

Grant rates have been calculated in a spreadsheet model for all potential zonal flows that are relevant for coastal services. This shows that some 39 existing MSRS rates out of a total of 130 cannot be justified because coastal shipping would provide a cheaper alternative to rail.

Our approach is based on the transport of deep sea feeder containers, which means that one end of the transport chain is at a port; this reflects the market reality that this is the main market for unitload coastal shipping and our approach seeks to provide potential support, where necessary, to 'reasonably efficient' shipping solutions. It is possible for a unitload coastal shipping service to also provide a purely domestic service, which would require road collection or delivery between inland locations and ports at both ends of the maritime transport chain; such services are less likely to be competitive in quality terms with both road and rail and it may be difficult to verify that road haulage is required at both ends of the maritime transport chain within an MSRS-style scheme. This should not preclude applications being made for such services on a case-by-case basis for Waterborne Freight Grant.

Chapter 4: Results of Stakeholder Consultation

Consultation with key stakeholders was included as an important task within the overall work programme for this study and a consultation paper was developed which was then sent by email to 30 organisations, including:

- Freight and logistics trade associations;
- Shipping lines;
- Rail freight operators;
- Container hauliers and other third party logistics providers (3PLs);
- Freight transport infrastructure operators.

There were responses from 13 stakeholders to the consultation and the request for assistance in validating the cost models.

<u>Responses in relation to MSRS (Intermodal) grants being available for Channel Tunnel intermodal rail freight services</u>

The key issue that was raised related to potential distortions of competition between Channel Tunnel intermodal services and unitload shipping services, with particular concern expressed by some consultees about potential distortions of the market.

Other arguments against any support being provided for Channel Tunnel services were put forward by some consultees, such as the impact of additional services on congested sections of the rail network.

<u>Responses in relation to potential MSRS being provided to unitload container shipping</u>

Consultees appeared to be generally supportive of the potential new MSRS (Coastal Shipping) scheme, although one consultee was concerned about the competition

between coastal shipping and rail where possible differential levels of support might lead to mode shift between rail and water rather than away from road.

Some consultees were particularly supportive of the potential new scheme as they believe that these services would provide environmental benefits and help to relieve congested road and rail networks.

General comments

The main general comment related to concerns over the size of the overall budget. There was a general fear that the extension of the MSRS grant regime to another mode would lead to a reduction in the overall funding available for sustainable modes. In other words, some consultees were concerned that any increase in the scope of MSRS schemes would lead to the dilution of the existing scheme unless additional funding was provided.

Chapter 5: State Aid Guidelines

We reviewed the EU's State aid requirements as set out in its *Community guidelines on State aid to maritime transport* (Commission communication C(2004) 43) and considered whether the options for a new MSRS (Coastal Shipping) scheme are likely to meet those requirements.

Many of the State aid requirements are fully in line with the objectives of a potential MSRS Coastal Shipping scheme. In particular, the overall policy objective is to secure modal shift from road to short sea (or coastal) shipping services.

However, the EC's approach is to focus on providing funding for new (or upgraded) services and only for the short term (up to 3 years) with the expectation that the services will then be commercially viable after the start-up phase. It may not be possible therefore to adopt the same approach as for intermodal rail freight within GB because of the need to provide evidence that a service would be commercially viable after a maximum of three years. The administrative simplicity of the existing MSRS (Intermodal) scheme and the relatively low administrative burden in making applications for funding is one of its attractions for rail freight operators and this is also likely to be the case for shipping lines.

Chapter 6: Conclusions

Option for MSRS being provided for Channel Tunnel intermodal rail freight services

Our research suggests there is scope for the addition of a new Channel Tunnel zone for the existing MSRS (Intermodal) scheme, with the grant rates that are applied being the same as flows to and from Zone 1 of the existing MSRS (Intermodal) - Port scheme.

Option for MSRS being provided for unitload coastal shipping services

Existing LOLO services providing coastwise feeder services between GB ports are operating in the same market as intermodal rail services that are distributing containers between GB deep sea container ports and inland terminals; however, while MSRS is available for the rail services it is not available for coastal shipping services. There is therefore a case for ensuring that all sustainable transport modes are treated on an equal basis.

Any additional MSRS scheme for coastal shipping is likely to have its main impact on the deep sea feeder market either between a GB deep container port and GB regional ports or between a North European deep sea container port and the GB regional ports.

Coastal shipping can be very cost effective for the transport of feeder containers over longer distances because the shipping costs are relatively low compared to the fixed port and inland distribution costs. Feeder container services are performing the same role in the market as intermodal rail freight services to/from deep sea ports i.e. transporting containers between a deep sea container port and a regional origin/destination. This is via a regional port for coastal shipping services and a regional intermodal rail freight terminal for intermodal rail freight services respectively and both transport chains require road collection or delivery between the inland origin/destination and the regional port or rail terminal.

Many of the State aid requirements are fully in line with the objectives of a potential MSRS Coastal Shipping scheme but applicants would need to be able to demonstrate that any unitload coastal shipping services that are funded would be viable after 3 years (an EU condition for shipping support), perhaps by showing that the required critical mass could by then be achieved, which is an added obligation as compared with current applications for MSRS funding.

Most consultees appear to accept that allowing coastal shipping of deep sea feeder containers to be supported under MSRS mainly ensures that the two more sustainable modes are treated equally.

However, as the grant can only be provided to the lower cost alternative of the two modes and coastal shipping has lower costs per unit transported, the effect is to reduce the MSRS rate on many zone-to-zone flows. Of the 130 zone-to-zone grant rates that are currently available for MSRS (Intermodal), some 39 (or 30%) would fall as a result of the introduction of an extension of the scheme to include coastal shipping.

Affordability for DfT

In terms of affordability, the net impact on demand for MSRS will be the difference between:

- The generation of new demand for MSRS from coastal shipping operators and, in particular, feeder operators;
- The loss of opportunities for rail freight operators to make applications for MSRS on some zone-to-zone movements.

1 INTRODUCTION

1.1 Background to the study

The Department for Transport (DfT) has commissioned Atkins, and through Atkins MDS Transmodal (MDST), to consider options for changes to Revenue Support Freight Grant Schemes.

Under the existing schemes DfT, Transport Scotland and the Welsh Government provide freight revenue grants to industry to encourage modal shift from road to rail and water where the cost is higher than road and where there are environmental benefits to be gained.

For unitised rail freight movements within Great Britain the existing Mode Shift Revenue Support (MSRS) (Intermodal) scheme is a zonal-based grant with standardised maximum grant rates for freight movements between each of 18 zones in GB. It has the following two variants:

- MSRS (Intermodal) Ports: for movements by rail between a rail terminal located at a port and an inland rail terminal, with road collection or delivery only required from/to the inland rail terminal.
- MSRS (Intermodal) Domestic: for movements by rail between two inland rail terminals, with road collection or delivery required from/to both inland rail terminals.

While Channel Tunnel intermodal rail freight services are not currently eligible for MSRS (Intermodal), any applications for such services are assessed on a case-by-case basis under MSRS (Bulk and Waterways). Similarly, any applications for funding for coastal shipping services can be considered on a case-by-case basis under the existing Waterborne Freight Grant scheme.

The options for change that the DfT has commissioned Atkins and MDST to consider are for:

- An MSRS (Intermodal) style scheme for coastal shipping;
- Channel Tunnel intermodal rail freight services to be included in MSRS (Intermodal).

The MSRS (Intermodal) style scheme provides advantages for applicants in that the maximum grant rates for zone-to-zone flows are determined before application and the administrative procedures to apply for the grant are less onerous than those that apply under the MSRS (Bulk and Waterways) and Waterborne Freight Grant.

As things stand, the development of a new MSRS scheme for coastal shipping will require State aid clearance by the European Commission because it would provide support to shipping services, for which there are specific State aid guidelines.

This report provides the final results of the study, which has:

- Set out the market context within which any changes to the MSRS scheme would be implemented;
- Developed cost models for both options, which have been subject to validation by operators in the rail freight and container shipping industry;
- Applied the cost models to a sample of zone-to-zone freight movements in order to develop some illustrative case studies;
- Taken account of feedback from stakeholders following a consultation exercise;
- Produced calculations in a spreadsheet model (called the MSRS Coastal Shipping Model) for the potential MSRS (Coastal Shipping) scheme;
- Considered the implications of EU State aid guidelines on potential support for coastal shipping services between GB ports;
- Developed some conclusions on the feasibility of the application of the MSRS (Intermodal) scheme to Channel Tunnel intermodal rail freight services and the development of a new MSRS (Coastal Shipping) scheme.

As the options for possible changes to revenue support freight grant schemes would, as far as possible, follow the approach adopted for the MSRS (Intermodal) scheme, this existing scheme is described in more detail in the next section.

While MDST carried out the research for this project, Atkins undertook the quality assurance of the MDST outputs. This consisted of an independent review of findings and checking the spreadsheet underpinning the MSRS Coastal Shipping Model. The spreadsheet model was checked to ensure all the assumptions and inputs were recorded before use and key diagnostics were run on the spreadsheet integrity for input changes. The review also considered the best practice spreadsheet principles and its applicability, where relevant, to the MSRS Coastal Shipping Model. Following the spreadsheet review, a QA report was produced with recommended changes to MDST which were subsequently incorporated into the final model.

1.2 The existing MSRS (Intermodal) scheme

The existing MSRS (Intermodal) scheme is designed to support the movement of intermodal containers by rail in Great Britain. The scheme provides continued support for the sustainable deep-sea, short-sea and domestic intermodal container business that moves by rail. It has operated since April 2010 and has been approved by the European Commission to operate until 31 March 2020.

The scheme divides Great Britain into 18 geographical zones. Eligible flows attract a maximum grant rate relating to each container moved between two specific zones, whether empty or full. The MSRS (Intermodal) rates are the same for all intermodal units which are 20’ or more in size.

Two sets of rates exist under MSRS (Intermodal). These are:

- Port – where units are loaded straight to rail, trunk hauled by rail, and then delivered by road to the final customer. These services share the common characteristic of one road leg.
- Domestic – where units are delivered from a non-port location by road to a rail terminal, trunk hauled by rail, and then delivered by road to the final customer. These services share the common characteristic of two road legs

The maximum rates are based on the principle that a traffic flow is entitled to support if the environmental benefits justify it and the cost of using rail is greater than the cost of road, highlighting a 'financial need'.

Environmental benefits measure the effect of removing freight from Britain's roads. Specific values have been identified, known as Mode Shift Benefits, which quantify the value of taking a lorry off different categories of road. The environmental benefits have been adjusted in the MSRS scheme to take into account the environmental costs of the road legs from rail terminals where these occur.

The financial need is the difference between the door-to-door cost of using road as opposed to rail. Where the latter is more expensive, it can be demonstrated that there is a financial need for grant support. MSRS (Intermodal) cannot exceed the financial need of any flow of traffic and grant payments cannot be made in excess of the available environmental benefits or the financial need.

Any company can apply for support if it is acting as the operator or contractor of an eligible rail service. It is a requirement for MSRS (Intermodal) that the support is paid to whoever the contracting parties propose as taking the full financial risk of running the service.

1.3 Key definitions

For the purposes of considering these options for changes to MSRS we have developed the following definitions for the relevant types of service:

Unitload coastal shipping service: *any unitload shipping service that calls at two or more GB ports allowing units to be transported between them and where the two ports are not in the same MSRS zone.*

This definition is neutral between the type of unitload shipping and handling technology employed i.e. both load-on load-off (LOLO) and roll-on roll-off (RORO) would be eligible. While value for money principles mean that Government should only part-fund the operating costs of the lower cost shipping mode, which is container shipping, this should not preclude an operator choosing to deploy RORO technology.

Given the need for the MSRS scheme to lead to environmental benefits, the above definition excludes intra-zonal movements to ensure that grant is not provided to short-distance ferry services linking the GB mainland with GB islands such as the Western Isles, the Northern Isles and the Isle of Wight – because there is no modal choice and therefore no lorry miles saved. However, longer distance movements

between these islands and other zones could be eligible – because this may avoid road haulage.

This definition would also mean that services between the GB mainland and Northern Ireland would not be eligible for grant under MSRS, although such services could still be supported on a case-by-case basis by Waterborne Freight Grant (WFG) and this would be justified where this leads to a reduction in lorry miles. There are two main reasons for the exclusion of these services from the potential MSRS (Coastal Shipping) scheme, which are:

- A sea crossing is always required to link Northern Ireland with the GB mainland and therefore there would not automatically be resulting environmental benefits.
- Providing MSRS grant to some unitload shipping services between GB and Northern Ireland could lead to a diversion of traffic away from ports in the Republic of Ireland, such as Dublin, which might result in State aid concerns.

Channel Tunnel intermodal rail freight service: *an intermodal rail freight service passing through the Channel Tunnel between an intermodal terminal on the European continental mainland and another intermodal terminal on the GB mainland.*

This definition limits the scheme to the transport of containers, piggyback trailers, and swapbodies and other units using intermodal rail freight technology via the Channel Tunnel. It should be noted that the Channel Tunnel through rail freight network cannot be accessed at the entrances to the Tunnel (at Dollands Moor and Frethun) but only at inland terminals such as Barking and Dourges in France; this implies that a 'proxy port' for a Channel Tunnel zone in the MSRS scheme cannot be Dollands Moor. A similar issue applies within France as the Channel Tunnel terminal at Frethun is not equipped to load or unload trains.

1.4 Structure of this report

Chapter 2 Market Analysis describes the existing relevant markets and the services that are currently operating.

Chapter 3 Generic Cost Models sets out the cost models that have been developed for the study, with case studies and conclusions.

Chapter 4 Results of Stakeholder Consultation sets out the results of the consultation exercise with stakeholders in the freight transport industry.

Chapter 4 State Aid Guidelines sets out the potential implications of EU state aid guidelines on support for shipping services.

Chapter 5 Conclusions sets out conclusions on the feasibility of the inclusion of Channel Tunnel intermodal rail freight services within the MSRS (Intermodal) scheme and the development of a new MSRS (Coastal Shipping) scheme.

2 MARKET ANALYSIS

2.1 Introduction

This chapter sets out the current market position, including the existing services that operate in the relevant markets, which are:

- The GB-Continent unitload freight market, which is served mainly by RORO and LOLO services between GB and continental European ports, by the Eurotunnel Freight Shuttle and by rail freight services through the Channel Tunnel.
- The GB domestic unitload freight market, which is served by road haulage, domestic intermodal rail freight services and coastal shipping provided by LOLO services that operate between GB ports.

2.2 GB-Continent unitload freight market

Channel Tunnel intermodal rail freight services

Channel Tunnel intermodal rail freight services are freight transport services that provide an intermodal rail service between an inland terminal in GB (located at, say, Daventry) and an inland terminal on the European continental mainland (located in, say, Milan). The intermodal units are loaded or unloaded at a terminal in GB and are then transported through the Channel Tunnel with the cargo remaining in the same unit throughout the end-to-end journey between the terminals. The trains may have to stop at Dollands Moor (at the British entrance to the Channel Tunnel) and at Frethun (at the French entrance to the Channel Tunnel) in order to change locomotives or for security checks, but the cargo itself is not transferred between wagons or between modes of transport between the two rail terminals.

Through Channel Tunnel rail services have been operating since 1995 but have failed to capture a significant market share. By the early 1980s, train ferry services carrying conventional wagons succeeded in carrying around 1.5m tonnes of cargo per annum through the ports of Zeebrugge and Dunkirk when the total volume of RORO truck and trailer freight with the Continent was only 27m tonnes per annum. Through rail freight using train ferries then represented 5.3% of the Cross Channel RORO market.

At the time that the Treaty of Canterbury was signed in 1987, it was forecast by British Rail that over 6m tonnes of through rail freight would be secured by the Channel Tunnel through rail services, which was seen as reasonable given the technical advantages the Tunnel offered as compared with train ferries.

However, Channel Tunnel rail-freight has never exceeded 3.1m tonnes per annum and has not exceeded 2m tonnes since 2001. The total cargo carried in 2016, in 1,797 trains, was just 1.04m tonnes, 37% down since 2014, while total RORO traffic through UK ports, including the Eurotunnel Shuttle, reached around 69m tonnes. In 2016 through rail freight therefore represented only 1.4% of the GB-Continent RORO

market. On average only 2.5 freight trains passed per day per direction when capacity is available for 35 trains per day per direction between Dollands Moor and Wembley under the Treaty of Canterbury.

At the time of writing (December 2017) the only regular Channel Tunnel intermodal rail freight service is a weekly service carrying automotive components between Valencia and Dagenham which is operated on behalf of Ford. While these components are transported in intermodal units, the transport of homogenous commodities (such as automotive components) is not eligible for MSRS (Intermodal) to avoid incentivising a switch of bulk flows to intermodal.

Several explanations for the performance of the Channel Tunnel intermodal rail freight services have been put forward, including the level of tolls through the Tunnel that are levied by Eurotunnel, uncompetitive rail operating conditions in France and disruption due to migrants seeking to board trains through the Channel Tunnel.

It is also a fact, however, that MSRS (Intermodal) – Port grants are in principle available for rail links to ports that compete with Channel Tunnel services (e.g. on the Purfleet-Daventry route), while an equivalent scheme is not available for Channel Tunnel intermodal services; the Channel Tunnel intermodal services can, however, already receive revenue support through the MSRS (Bulk and Waterways) scheme where the financial need and mode shift benefits are assessed on a case-by-case basis.

The economics of Channel Tunnel intermodal services compared with rail and short sea shipping via the Thames is considered in more detail in Tables 6 and 7 in Chapter 3.

GB-Continent ferry services

Most unitload trade between GB and the continental mainland is transported on ferries and the Eurotunnel Freight Shuttle in one of the following ways:

- Accompanied trucks, where the cargo is transported in a semi-trailer with a tractor unit and driver on a ferry or on the Channel Tunnel Freight Shuttle; this amounted to 4.84 million units of traffic in both directions in 2016.
- Unaccompanied trailers, where the cargo is transported in a semi-trailer (without a tractor unit and driver) on a ferry; this amounted to 1.57 million units in 2016.
- Containers double-stacked on special low height trailers on a ferry; this amounted to 0.54 million ship trailer loads in 2016.

Figure 1 below shows the volumes of freight in terms of units that were transported between GB and the Continent on ferries or on the Eurotunnel Freight Shuttle in 2016. It shows that the dominant corridor is the Dover Straits, transporting 62% of the total volume and that the main mode of appearance for traffic transported on the Dover Straits is overwhelmingly accompanied HGVs. This is because this cross-Channel corridor generally provides:

- The cheapest crossing for many flows;
- A turn-up-and-go service, giving the hauliers greater flexibility;
- The fastest (but not cheapest) door-to-door route as it minimises the sea crossing but requires road haulage over longer distances.

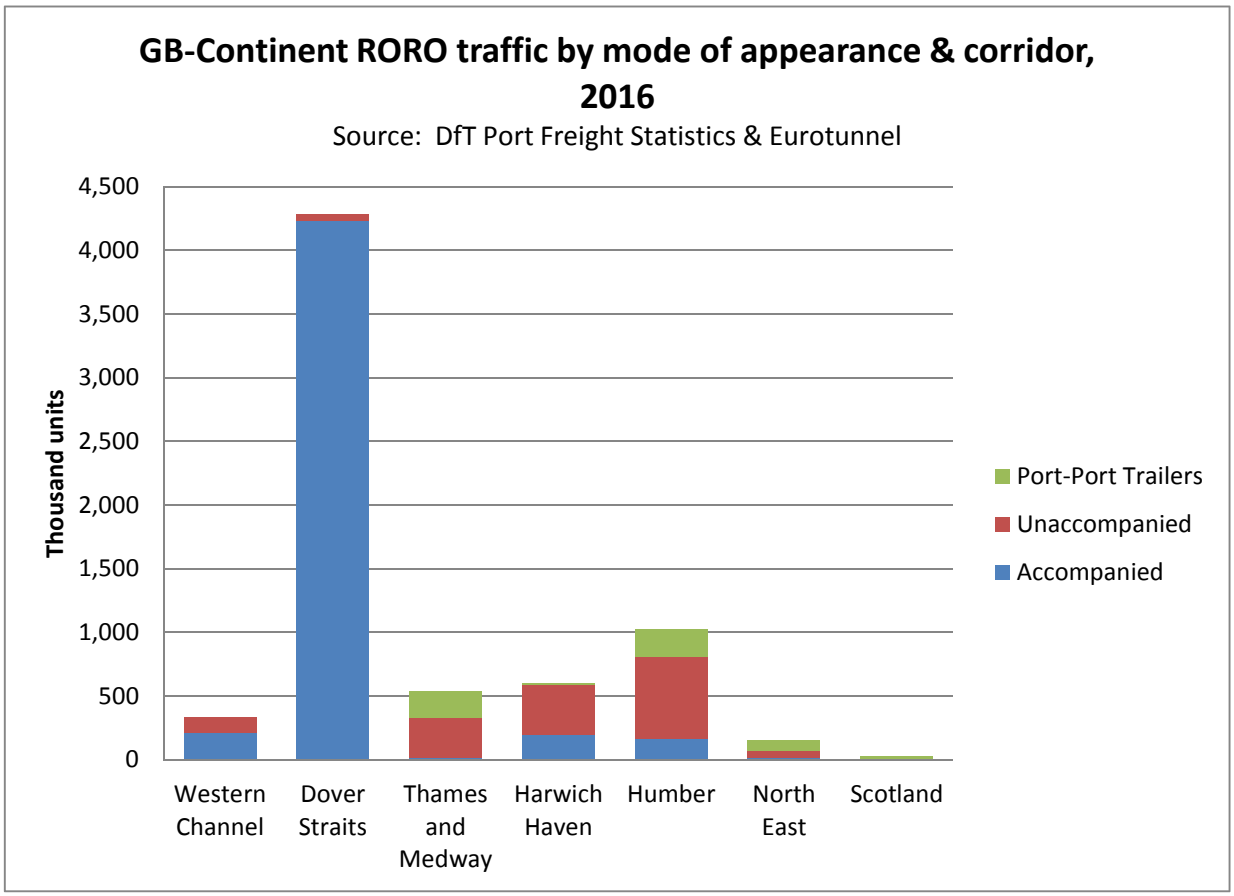

Figure 1

While the Eurotunnel Freight Shuttle service uses rail technology, from the point of view of the market, it is offering a turn-up-and-go ferry service for driver-accompanied HGVs in direct competition with the Dover-Calais ferry services.

On the basis of the cost structures already employed in the MSRS rules, the estimated one-way cost of transporting an accompanied HGV between Milan and Daventry via the Dover Straits (1,285km) on a ferry, using a British HGV and driver averaging 65kph and adding four hours for the crossing and delays would be:

Milan-Daventry fixed costs: £0.41/min x 60 minutes x 23.8 hours = £585
Milan-Daventry variable costs: £0.49/km x 1,285km = £630
Dover-Calais ferry crossing: £150[1]
Cost of re-positioning for backload (2 hours for loading/unloading plus 50km/0.77 hours repositioning: 2.77 hours x £24/hour + 50km x £0.49 = £93
Total cost = £1,458 per unit

However, most international haulage services on such a route would be likely to be provided by East European hauliers as the dominant flow is of imports and their costs would be lower due to lower driver costs, the use of second hand equipment and lower office overheads. The estimated cost of transporting an accompanied HGV on this route via the Dover Straits using an East European HGV and driver would be:

Milan-Daventry fixed costs: £0.33/min x 60 minutes x 23.8 hours = £471
Milan-Daventry variable costs: £0.49/km x 1,285km = £630
Dover-Calais ferry crossing: £150
Cost of re-positioning for backload (2 hours for loading/unloading plus 50km/0.77 hours repositioning: 2.77 hours x £19.80/hour + 50km x £0.49 = £80
Total cost = £1,331

Despite the dominance of the Dover Straits crossings there are also a large number of RORO and LOLO services that link the Near Continent with the east coast of GB via the major estuaries of the Thames, Haven, Humber, Tees, Tyne and Forth. While some of these services also offer a service to accompanied trucks (e.g. the P&O Ferries services between Hull and Rotterdam and Zeebrugge), most are focused on offering services for LOLO containers, unaccompanied trailers and double-stack containers; these services are more direct substitutes for the Channel Tunnel intermodal through rail freight services than the Dover Straits services because they are offering a service for unaccompanied unitload freight on a door-to-door basis.

Excluding the Dover Straits services offered by P&O Ferries, DFDS Seaways and the Eurotunnel Freight Shuttle, there are a total of 12 essentially short sea LOLO services linking GB to the continent (see Appendix 2) and 42 ferry services between the Plymouth-Rosyth port range and the continental mainland/Baltic (see Appendix 1).

These mainly unaccompanied services provide slower door-to-door transit times but offer competitive door-to-door costs for flows of less urgent cargo between the Near Continent and GB. An example for a UK haulier transporting a unitload of goods between Daventry and Mechelen in Belgium is provided in Table 1 for both the accompanied crossing via the Dover Straits and for a service between Zeebrugge and Tilbury.

[1] Consultant's estimate based on market knowledge

Table 1: Estimated costs for the transport of a unit between Mechelen and Daventry via the Dover Straits and via the Thames

	Mechelen-Daventry via Dunkirk-Dover ferry (accompanied HGV)	Mechelen-Daventry via Zeebrugge-Tilbury (container)
Road distance on continental mainland	220km	125km
Road distance in GB	260km	165km
	HGV operating hours required @ 65kph (allowing for 4 hours for crossing & delays): 11.4 hours	HGV operating hours required @ 65kph (allowing 4 hours for HGV turnaround in ports): 8.5 hours
Ferry freight rate	£150	£200
Fixed road haulage costs	11.4 hours x £24.60 = £280	8.5 hours x £24.60 = £209
Variable haulage costs	480km x £0.49 = £235	290km x £0.49 = £142
Total door-to-door cost	£665	£551

Source: MDS Transmodal, DfT MSRS spreadsheet

While the road haulage costs via Zeebrugge-Tilbury are lower because the distance is shorter, the freight rate across the southern North Sea is higher (because the shipping operator has a lower vessel utilisation than on the Dover Straits and so incurs higher costs per unit carried) and the ferry crossing is much longer, leading to a longer door-to-door transit time. This shows how shippers of less urgent cargo can use shipping services to the Thames (and other east coast estuaries) to reduce door-to-door costs; it also demonstrates that these services are closer substitutes to the Channel Tunnel intermodal rail freight services than accompanied services via the Dover Straits.

Indeed this is particularly the case because, for shippers and forwarders wishing to exploit the economies of rail for the Continent–GB market, the option of using rail already exists (i.e. from Milan via Zeebrugge and Purfleet to Daventry). A similar service is planned by P&O for its new service between Tilbury and Zeebrugge. Similarly, the P&O service between Tees and Zeebrugge is linked by rail with Mossend and points on the Continent including Milan. In principle a similar container service could operate between Manchester and Immingham on the Humber using low-liner wagons to carry 45’ long 9’6” containers (the typical container carried between the UK and the Continent). A service between Manchester and an east coast port is currently under active consideration and is therefore a valid comparator.

Such services are in direct competition with Channel Tunnel intermodal services, providing a means of making cost comparisons to determine the case for MSRS (Intermodal) to be applied to Channel Tunnel services. As explained above, two of these unaccompanied shipping services are serving ports with integrated intermodal rail freight services for inland distribution of containers by rail in GB, as shown in Table 2 below and these ferry services offer linked rail services on the Continent.

Table 2: Intermodal rail freight services to/from short sea ports, autumn 2017

GB port terminal	Other GB terminal	Operator	Traffic
Teesport	Mossend	DB Schenker	Short sea containers, linking RORO services to/from Benelux with Central Belt of Scotland
Purfleet	Daventry	DRS	Short sea containers, linking RORO services to/from Benelux with the Midlands

Source: MDS Transmodal, based on Freightmaster

The comparative economics of the Channel Tunnel through rail services and rail via the Zeebrugge-Purfleet route are examined in more detail in Chapter 3 below.

2.3 Unitload coastal shipping services

Appendix 2 provides a list of the shipping services that provide unitload coastal shipping services between two GB mainland ports. They are all LOLO services (i.e. there are no coastal ferry/RORO services). There are no 'pure' coastal shipping services that only transport units between two GB mainland ports. All these services are transporting containers between two GB ports as part of port strings that involve short sea or feeder links between GB and the Continental mainland. The main flows are likely to be of deep sea containers between GB deep sea container ports (Felixstowe, Southampton and Liverpool) and GB regional ports, but also (indirectly) deep sea containers between continental deep sea container ports and GB regional ports. The one exception to this rule is a single weekly deep sea container service that calls at both Felixstowe and Southampton.

Analysis of the DfT Port Freight Statistics shows that the total port throughputs related to coastal unitload traffic was 239,000 units in 2015 and 212,000 units in 2016 i.e. allowing for double-counting at ports of the same container being handled twice, the number of containers moved was 119,500 units in 2015 and 106,000 units in 2016 (Table 3). Of this total 32% of containers were empty, which are containers being moved from a net importing region to a net exporting region.

Table 3: Main coastwise port-to-port flows of containers, 2016
Thousand units, only flows>1000 units

Reporting port	Other port	2015	2016
Felixstowe	Forth	22	18
	Tyne	13	13
	Teesport	17	11
	London	2	..
	Immingham	1	..
Southampton	Clydeport	43	22
	Liverpool	11	18
Forth	Felixstowe	20	22
	Teesport	10	10
	Immingham	5	6
Liverpool	Southampton	14	16
	Clydeport	8	11
Teesport	Felixstowe	18	13
	Forth	10	11
	Medway	-	2
Clyde	Liverpool	7	11
	Southampton	10	7
Tyne	Felixstowe	16	15
Immingham	Forth	4	5
	Felixstowe	1	..

.. Less than 1,000 units
Source: MDS Transmodal analysis of DfT Port Freight Statistics

The main flows (over 1000 containers) shown in Table 3 are between deep sea container ports, such as Felixstowe, Southampton and Liverpool and 'regional' ports such as Forth, Tees, Tyne, Immingham and Clydeport. This suggests that the coastal services are feeding containers between deep sea container ports and regional ports, rather than transporting domestic cargo between GB regions. Where the services are operating between a GB deep sea container port and a regional port, they are providing a similar inland distribution function (e.g. transporting a deep sea container between Felixstowe and a distribution centre near Glasgow via the port of Grangemouth) as the intermodal rail freight services between Felixstowe, Southampton, Tilbury and London Gateway and inland terminals which may be funded by the existing MSRS (Intermodal) scheme (e.g. transporting a deep sea container between Felixstowe and the same distribution centre via the intermodal rail terminal at Coatbridge). This would appear therefore to support the view that the introduction of an MSRS-style scheme for coastal shipping would ensure that both modes are treated in the same way; or, in other words, the existing MSRS (Intermodal) scheme may distort competition in the market for the inland distribution of containers to and from GB deep sea container ports.

Given that the deep sea lines also serve continental mainland ports on the same voyage, shipping lines also have the opportunity to transfer feeder containers for UK regional ports at continental ports. Where these transfers take place may depend on port pricing strategies.

Figure 2 shows the coastal container traffic in the context of the wider short sea container traffic that was handled at GB ports in 2016.

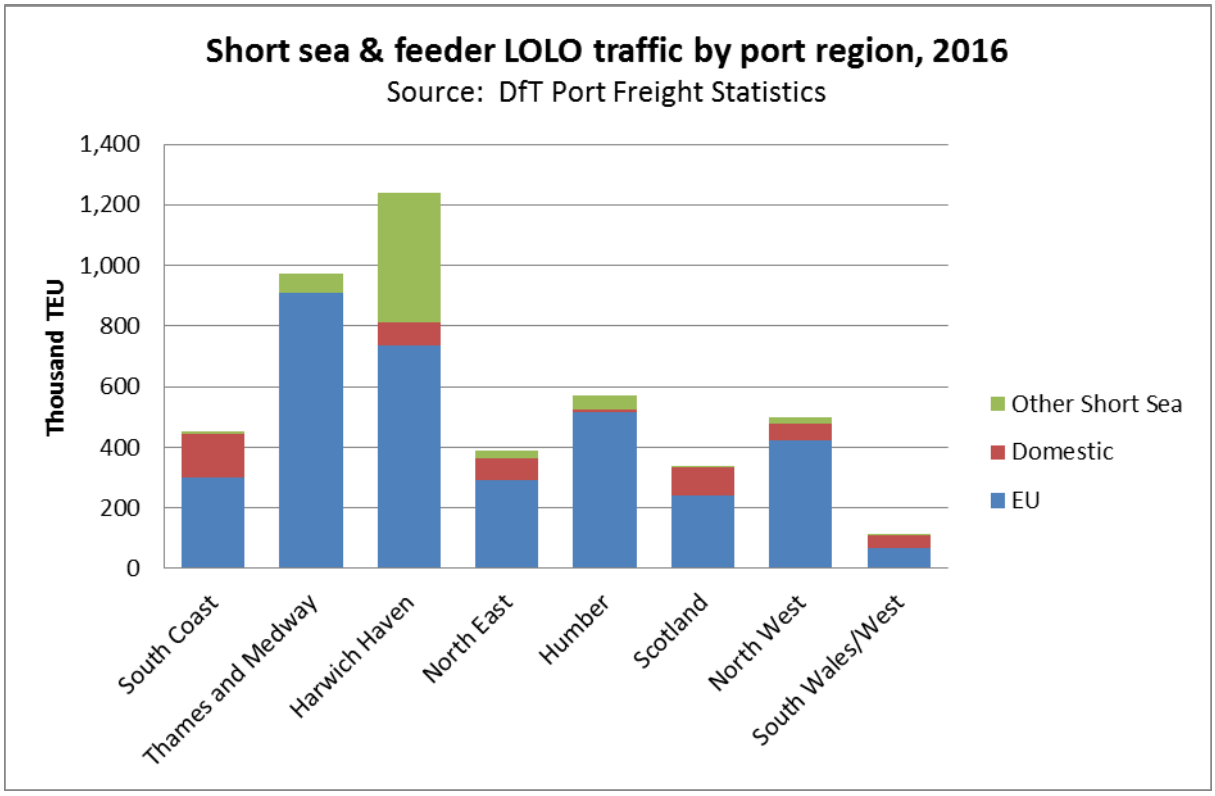

Figure 2

The total amount of short sea and coastal container traffic handled at GB ports in 2016 was 4.6 million TEU, of which some 0.5 MTEU was coastal traffic (i.e. 0.25MTEU actually transported). Much of the short sea traffic was, in fact, deep sea container traffic fed between continental mainland ports (mainly Rotterdam, Antwerp and Le Havre) and GB regional ports and some of the feeder containers are then transported coastwise because the feeder services call at more than one GB port. This would appear therefore to support the view that the introduction of an MSRS-style scheme for coastal shipping might have some impact on the North European deep sea container market in that supporting coastal services between GB ports would also, if only at the margin, encourage deep sea shipping lines to tranship feeder containers at GB ports rather than at continental ports such as Rotterdam and Antwerp. However, it might also encourage the operators of feeder services between Near Continent deep sea container ports to call at more than a single GB regional port.

2.4 Conclusions on market analysis

Through Channel Tunnel rail freight services are relatively undeveloped, and represent 1.4% of the total GB-Continent freight market. This is despite the relatively long distances that are available and which should allow through rail freight services

to be competitive against all-road transport chains. Much of the explanation for the poor performance lies in the fact that continental rail services can be accessed by UK shippers and receivers instead at ports such as Rotterdam and Zeebrugge using east coast RORO and LOLO services. The relative economics will be considered in Chapter 3.

About 60% of all GB-Continent unitload freight is transported by accompanied HGVs across the Dover Straits, either on Dover-Calais ferry services or on the Eurotunnel Freight Shuttle. This is generally fast-moving cargo, a large proportion relatively urgent (e.g. perishable products, components for just-in-time manufacturing processes) and the Channel Tunnel intermodal rail freight services (carrying slower-moving, unaccompanied cargo) are not direct substitutes for the short, high frequency ferry services that operate on the Dover Straits.

The closest substitutes for the Channel Tunnel intermodal services are unaccompanied RORO and LOLO services – in that they all carry 45ft long containers - that operate on longer crossings between, for example, Zeebrugge and the major British estuaries such the Thames, the Humber and the Tees. This suggests that the most appropriate comparator for Channel Tunnel intermodal rail freight services for the purposes of an extension of the MSRS is via an east coast port.

The number of containers moved by sea between GB ports was 119,500 units in 2015 and 106,000 units in 2016. None of these units are transported between two GB inland locations, but are deep sea containers that are fed between a GB or a continental deep sea container port such as Felixstowe, Southampton, Rotterdam, Antwerp or Le Havre.

Any additional MSRS scheme for coastal shipping is therefore likely to have an impact mainly on the deep sea feeder market either between a GB deep sea container port and GB regional ports or between a North European deep sea container port and GB regional ports. An MSRS-style scheme for coastal shipping would ensure that this mode is treated in the same way as intermodal rail freight. Such a scheme would also, if only at the margin, encourage deep sea shipping lines to tranship containers at GB deep sea ports rather than at ports such as Rotterdam and Antwerp. However, it might also encourage the operators of feeder services from Near Continent deep sea container ports to call at more than one GB regional port.

3 GENERIC COST MODELS

3.1 Introduction

As grant can only be provided where there is a financial need for the grant, the DfT needs to have a clear understanding of operating costs for coastal shipping operators and for through Channel Tunnel intermodal rail freight services. . To overcome this we have developed generic cost models for unitload coastal shipping based on the existing knowledge of the consultants and validation of the data by operators of relevant services.

3.2 Channel Tunnel Cost Model

Overall approach

In order to assess the case in terms of unit costs we have chosen to utilise the existing cost structures used by MSRS to minimise any distortion with existing MSRS rates as set out in the ARUP report (March 2014) and the associated spreadsheets. 'Proposed value' costs have been raised from a 2014 to a 2017 base by CPI (+3.5%) to bring these assumptions up to date. Channel Tunnel trains are generally limited to a trailing weight of 1600 tonnes, which is similar to most domestic intermodal services. The type of containers that are operated to and from the Continent are generally 45' long and are therefore similar to those assumed on 'domestic' MSRS trains. Volumes to and from the Continent can be regarded as being within the 'high' classification in the context of MSRS assumptions, particularly given the opportunity to 'hub' at North European terminals to maintain critical mass. The train configuration we have assumed for the exercise is therefore described as '5 domestic', given the definitions shown in Table 1 of the March 2014 ARUP report for the DfT.

The approach that has been adopted for the last decade by MSRS has been to distinguish between 'short', 'medium' and 'long' rail journeys within Great Britain, which leads to a number of 'cliff edges' in terms of incremental costs. Given that final origins and destinations could be anywhere within GB or the Continental mainland we have only used the assumptions for 'long' journeys; this appeared to be the most pragmatic approach, assuming the productivity of a 'long' trip where 5 drivers are associated with a single locomotive, typically travelling between a south-east port and Scotland (mean distance approximately 750km).

Otherwise, the Channel Tunnel cost model assumes:

- A 36 platform train carrying 30 containers (83% utilisation) with diesel propulsion.
- The 'typical' Channel Tunnel service involves the transport of 45ft containers between a continental and GB mainland intermodal terminals, with road collection and delivery required at both end of the rail-based transport chain.

Input from validation of cost model

Some input has been provided by two operators and these have led to refinements to the generic cost model in relation to:

- Traction charges on the continental mainland;
- Eurotunnel tolls;
- Security charges associated with the Channel Tunnel and the cost of delays.

MDST was given access to information on traction charges for a range of destinations via the Channel Tunnel during this study. Generally the incremental cost per kilometre is similar to those that are used for MSRS in GB except where trains pass out of France, which appears to lead to a significant extra cost that is the equivalent of 15 hours of locomotive and wagon resource time (i.e. an additional £2,655 per one way train or £88.50 per single trip container).

Eurotunnel tolls as currently quoted are approximately £4,000 per off-peak train round trip (i.e. £2,000 per one way train or £67 per one-way container).

Security charges associated with the Channel Tunnel[2] are £1,200 per round trip train (i.e. £600 per one way train or £20 per one-way container).

Train 'delay' costs at security through the terminals at Dollands Moor and Frethun are 2.5 hours per round trip. In addition there are delays caused by changes in traction and waiting paths which we estimate at a further 2.5 hours round trip. These can be costed at £106/hour for the locomotive and £71/hour for the wagons so that the 'delay' costs are £885 per round trip. This equates to £442.50 one-way or £15 per one-way container.

[2] Sum of charges at Tunnel yards plus additional costs at inland terminals.

Assumptions for Channel Tunnel cost model

The detailed assumptions are set out in Table 4.

Table 4: Detailed assumptions for the generic Channel Tunnel cost model

Description	Value	Notes
Locomotive lease cost per annum	£167,000	
Locomotive maintenance cost per annum	£68,000	
Driver salaries	£349,000	5 drivers per loco
Locomotive depot costs	£64,000	
Fuel cost per litre	£0.69	
Fuel consumption (litres/km)	5.04	
Fuel cost per train km	£3.48	
Track charges for locomotive (per km)	£0.34	
Track charges for wagons (per km)	£1.27	
Wagon lease cost per annum	£6,700	
Wagon maintenance per annum	£5,429	
Number of wagons per train	36	
Number of containers per train	30	
Capacity utilisation	83%	30 units on 36 wagons
Locomotive & wagon operating hours per years	6,120	255 days x 24 hours
Average speed (kph)	50	
Time in terminals (hours)	8	Time for loading, unloading & marshalling at inland terminal
Time for security checks (hours)	2.5	Time for security checks at Dollands Moor/Frethun before entering Tunnel and delays at meeting paths
Additional resource costs @ French border (hours)	Equivalent of 15 hours of loco/wagon time	
Terminal charge per train	£500	Terminal charge for train at inland terminal & Dollands Moor/Frethun
Eurotunnel toll per train	£2,000	One-way off-peak toll per train
Channel Tunnel consolidated security charges	£600	
Terminal handling charge per unit	£26	Lift from train to back of HGV and vice versa
Road collection and delivery	£167	

Application of the Channel Tunnel Cost Model to a Milan-Daventry service

The cost model calculates the fixed cost per single trip (the cost of the locomotive, wagons and drivers) and then calculates the variable cost per kilometre (fuel, track access charges for the locomotive and wagons) and per unit transported (terminal handling charges, road collection and delivery).

At an assumed average speed of 50kph, the 1,366 km between Milan and Daventry would be completed in 27.3 hours to which are added 8 hours in terminals and 5 hours for security checks at the Channel Tunnel terminals and a resource cost of 12.5 hours of locomotive/wagon time at the French border.

Total fixed locomotive costs equate to £106 per operating hour (£167k loco lease costs + £68k loco maintenance costs + £349k driver costs + £64k loco depot costs/ 6,120 hours), while total wagon fixed costs equate to £71 per operating hour (36 wagons x (£6,700 lease cost + £5,429 maintenance cost)/6,120 hours).

The fuel cost per container km equates to £0.12 (£3.48 per train km/30 units), while the total track charges for the locomotive and the wagons equates to £0.05 (£0.34 + £1.27) per train km/30 units.

The results are shown in Table 5.

Table 5: Results of modelling for the Daventry-Milan Channel Tunnel intermodal rail freight service

DESCRIPTION	COSTS	NOTES
Fixed costs		
Locomotive costs	£2,328	£106/hour x 50.3 hours
Wagon costs	£3,590	£71 x 50.3 hours
Terminal charges	£500	
Terminal handling	£1,560	£26 x 30 x 2
Channel Tunnel consolidated security charges	£600	
Total fixed costs per train	£11,578	
Fixed cost per container	**£386**	£11,578/30 units
Variable costs		
Fuel costs per container	£158	1366km x £0.12/km
Track access charge for loco per container	£73	1366km x £0.05/km
Eurotunnel toll	£67	£2,000/30 containers
Total rail cost per container	**£684**	
Road collection & delivery		
Road collection/delivery GB	£167	
Road collection/delivery Continent	£167	
Total cost door-to-door	**£1,018**	

The cost of transporting a 45ft container between Milan and Daventry via the Channel Tunnel is an estimated £1,018.

As set out in Chapter 2 the estimated cost of transporting an accompanied HGV between Daventry and Milan via the Dover Straits would be £1,458 using a British haulier and £1,331 using an Eastern European haulier. The intermodal rail freight service would be about £440 per unit cheaper than by accompanied HGV using the UK domestic haulage rates used in MSRS. However, the majority of traffic would probably be transported by road hauliers with a lower cost base and our estimate is that the saving falls to £313 per unit for an East European haulier. Nevertheless, this suggests that, based on transport costs alone, there is not likely to be a justification for MSRS for intermodal services through the Channel Tunnel over this distance based on the cost of rail versus road.

Application of the Channel Tunnel Cost Model to other services

The results for a Daventry-Milan service and modelling of other services are shown below in Table 6. This shows that apart from the fixed costs of passing through the Tunnel (the toll plus security charges and associated delays) and the handling costs at the terminals the rail costs mainly vary with distance and the resources required. However, there also appears to be a 'friction cost' at the French border, with an impact on resource costs for routes that do not have a continental origin or destination in France.

Table 6: Results of modelling for Channel Tunnel intermodal rail freight services between a section of GB and continental locations

	Daventry-Milan	Daventry-Dourges	Daventry-Poznan	Manchester-Milan	Manchester-Poznan
Distance (km)	1366	433	1402	1573	1609
Operating hours @ 50kph	27.3	8.7	28.0	31.5	32.2
Time in terminal (hours)	8	8	8	8	8
Additional loco/wagon resource time @ French border (hours)	12.5	0	12.5	12.5	12.5
Channel Tunnel security checks (hours)	2.5	2.5	2.5	2.5	2.5
Total operating hours terminal-to-terminal	**50.3**	**19.2**	**51.0**	**54.5**	**55.2**
Locomotive costs	£5,328	£2,029	£5,404	£5766	£5,843
Wagon costs	£3,590	£1,367	£3,642	£3,886	£3,937
Terminal charges	£500	£500	£500	£500	£500
Terminal handling	£1,560	£1,560	£1,560	£1,560	£1,560
Channel Tunnel consolidated security charges	£600	£600	£600	£600	£600
Total fixed costs per train	£11,578	£6,056	£11,706	£12,312	£12,440
Fixed cost per container (30 containers)	£386	£202	£390	£410	£415
Fuel costs per container	£158	£50	£163	£182	£187
Track access charge for loco per container	£73	£23	£75	£84	£86
Eurotunnel toll (including discount)	£67	£67	£67	£67	£67
Total rail cost per container	£684	£342	£695	£744	£754
Road collection/delivery GB	£167	£167	£167	£167	£167
Road collection/delivery Continent	£167	£167	£167	£167	£167
Total cost door-to-door	**£1,018**	**£676**	**£1,029**	**£1,078**	**£1,088**

Comparison with Milan-Daventry by unaccompanied RORO service

Using the same intermodal rail freight model set out above we have calculated the estimated cost of a rail-based transport chain between Milan and Daventry via a LOLO service between Zeebrugge and Tilbury, assuming that the maximum MSRS

(Intermodal) – Port grant of £52 would be available for the GB domestic rail leg between the Midlands and the London area.The results are shown in Table 7 below.

Table 7: Results of modelling for the Daventry-Milan route via Zeebrugge-Tilbury

DESCRIPTION	COSTS	NOTES
Fixed costs Milan-Zeebrugge (1,025km)		
Locomotive costs	£3,018	£106/hour x 28.5 operating hours
Wagon costs	£2,033	£71 x 28.5 operating hours
Terminal charges	£500	£500 (inland terminal plus port terminal
Terminal handling	£1,560	£26 x 2 x 30
Total fixed costs per train	£7,111	
Fixed cost per container	**£237**	£7,111/30 units
Variable costs		
Fuel costs per container	£119	1,125km x £0.12/km
Track access charge for loco per container	£55	1,125km x £0.05/km
Total variable costs per container	**£174**	
Total rail cost per container	**£411**	
Road collection & delivery		
Road collection/delivery Continent	£167	
Total cost Milan to quay @ Zeebrugge	**£578**	
Zeebrugge-Tilbury LOLO freight rate (including stevedoring)	**£200**	
Fixed costs Tilbury-Daventry (165km)		
Locomotive costs	£1,196	£106/hour x 11.3 operating hours
Wagon costs	£806	£71 x 11.3 operating hours
Terminal charges	£500	£500 (inland terminal plus port terminal
Terminal handling	£1,560	£26 x 2 x 30
Total fixed costs per train	£4,063	
Fixed cost per container	**£135**	£4,063/30 units
Variable costs		
Fuel costs per container	£19	265km x £0.12/km
Track access charge for loco per container	£9	265km x £0.05/km
Total variable cost per container	**£28**	
Total rail cost per container	**£163**	
Road collection & delivery		
Road collection/delivery GB	£167	
Total cost quay & Purfleet to Daventry	**£330**	
TOTAL COST MILAN – DAVENTRY WITHOUT MSRS	**£1,108**	
Less: MSRS grant	**(£52)**	
TOTAL COST MILAN – DAVENTRY WITH MSRS	**£1,056**	

Without any grant for rail in GB the estimated cost on a door-to-door basis is about £1,108 i.e. £90 higher than the modelled cost via the Channel Tunnel. However, the impact of the maximum MSRS grant is to make the route only £38 more expensive than via the Channel Tunnel.

The results are summarised in Table 8, along with the same calculations for the rail and North Sea shipping costs for Milan to Manchester, Poznan to Daventry and Poznan to Manchester.

Table 8: Results of modelling for rail and North Sea LOLO services between a selection of GB and continental locations

		MILAN-DAVENTRY	MILAN-MANCHESTER	POZNAN-DAVENTRY	POZNAN-MANCHESTER
Continental rail leg		**Milan-Zeebrugge**	**Milan-Zeebrugge**	**Poznan-Zeebrugge**	**Poznan-Zeebrugge**
	Distance (km)	1025	1025	1057	1057
	Total time for terminal-to-terminal rail transit (hours)	28.5	28.5	29.1	29.1
	Total fixed costs per train	£7,111	£6,611	£6,724	£6,724
	Fixed cost per container	£237	£220	£224	£224
	Total cost per container	£411	£394	£403	£403
	Road collection/delivery Continent	£167	£167	£167	£167
	Total cost Milan-Zeebrugge	**£578**	**£561**	**£570**	**£570**
Ferry		**£200**	**£230**	**£200**	**£230**
GB rail leg		**Purfleet-Daventry**	**Immingham-Manchester**	**Purfleet-Daventry**	**Immingham-Manchester**
	Distance (km)	165	187	165	187
	Total time for terminal-to-terminal rail transit (hours)	11.3	11.7	11.3	11.7
	Total fixed costs per train	£4,063	£4,141	£4,063	£4,141
	Fixed cost per container	£135	£138	£135	£138
	Total cost per container	£163	£170	£163	£170
	Road collection/delivery Continent	£167	£167	£167	£167
	Total cost Purfleet-Daventry excl. MSRS	**£330**	**£337**	**£330**	**£337**
	MSRS grant	**-52**	**-42**	**-52**	**-42**
	Total cost Purfleet-Daventry incl. MSRS grant	**£278**	**£295**	**£278**	**£295**
Total door-to-door cost (with MSRS)		**£1,056**	**£1,086**	**£1,049**	**£1,095**
Cost via Channel Tunnel		**£1,018**	**£1,078**	**£1,029**	**£1,088**
Difference between Ch. Tunnel & Rail/sea		**-£38 -3.6%**	**-£8 -0.7%**	**-£20 -1.9%**	**--£7 -0.6%**

This highlights the extent to which Channel Tunnel services would be in direct competition with the existing rail and maritime services across the North Sea (with between -0.6% and -3.6% difference in door-to-door costs).

Table 9 below provides a comparison between distributing a container from the intermodal terminal at Dourges in France to Daventry via the Channel Tunnel and from the quay at Zeebrugge to Daventry by LOLO service and rail. The two locations are about 110km apart and represent similar locations from which to distribute goods by rail and sea from the continental mainland to distribution centres in the Midlands.

Table 9: Results of modelling for Dourges-Daventry via the Channel Tunnel and Zeebrugge-Daventry via LOLO shipping and rail

	Dourges-Daventry via Channel Tunnel	Zeebrugge-Daventry
Distance by rail (km)	433	165
Operating hours @ 50kph	8.7	3.3
Time in terminal (hours)	8	8
Additional loco/wagon resource time @ French border (hours)	0	-
Channel Tunnel security checks (hours)	2.5	-
Total operating hours terminal-to-terminal	**19.2**	**11.3**
Locomotive costs	£2,029	£1,196
Wagon costs	£1,367	£806
Terminal charges	£500	£500
Terminal handling	£1,560	£1,560
Channel Tunnel consolidated security charges	£600	-
Total fixed costs per train	**£6,056**	**£4,063**
Fixed cost per container (30 containers)	**£202**	**£135**
Fuel costs per container	£50	£19
Track access charge for loco per container	£23	£9
Eurotunnel toll (including discount)	£67	-
LOLO freight rate	**-**	**£200**
Total cost per container excl. road C&D	**£342**	**£363**
Road collection/delivery GB	£167	£167
Total door-to-door cost excl. MSRS	**£509**	**£530**
MSRS grant (Thames-Daventry)	**-**	**£52**
Total cost door-to-door cost incl. MSRS	**£509**	**£478**

The cost modelling suggests that, without MSRS grant, the Dourges-Daventry transport chain via the Channel Tunnel would be £21 (or 4.0%) cheaper than the Zeebrugge-Daventry transport chain. However, once the (assumed maximum) £52 MSRS grant that is available for rail services between the Thames and the Midlands is taken into account, the Zeebrugge-Daventry transport chain is £31 cheaper than a Dourges-Daventry transport chain.

The above calculations suggest that:

- Grant should be provided to Channel Tunnel intermodal services to ensure equal treatment with the GB domestic rail services that can secure MSRS grant and which form part of short sea international transport chains;

- A reasonable comparator for Channel Tunnel services for the purposes of any extension of MSRS (Intermodal where access can be obtained to the Channel Tunnel network (i.e. Zone 1 in the MSRS (Intermodal) zonal structure). This is because it is reasonable to assume that the effective rail 'gateway' for Channel Tunnel intermodal rail freight services is in the Thames Corridor (Willesden or Barking) which, like Tilbury and Purfleet, is in the MSRS Zone 1.

3.3 Coastal Shipping Cost Model

The coastal shipping cost model assumes:

- The deployment of a short sea/coastal shipping LOLO vessel of 600 TEU
- The 'typical' coastwise movement of containers relates to the movement of a container between a deep sea container port and a 'regional' container terminal, with inland road collection or delivery only required at one end of the transport chain.

Our approach is based on the transport of deep sea feeder containers, which means that one end of the transport chain is at a port; this reflects the market reality that this is the main market for unitload coastal shipping and our approach seeks to provide potential support, where necessary, to 'reasonably efficient' shipping solutions. It is possible for a unitload coastal shipping service to also provide a purely domestic service, which would require road collection or delivery between inland locations and ports at both ends of the maritime transport chain; such services are less likely to be competitive in quality terms with both road and rail and it may be difficult to verify that road haulage is required at both ends of the maritime transport chain within an MSRS-style scheme. This should not preclude applications for Waterborne Freight Grant being made for such services on a case-by-case basis.

The assumptions included in the container cost model are based on those developed for MDST's own in-house cost model for feeder/short sea container shipping. This model has been developed to allow the consultancy to complete cost modelling exercises on container shipping services for a wide variety of clients such as ports, shipping lines and for regulators such as the Office of Road and Rail. The model is designed to replicate the actual costs of container shipping service which are made up of:

- Time charter cost: the cost of 'hiring' the ship by the shipping line from it owners with its crew. This is charged for the term of the agreement at a charge per day. Time charters typically exclude all variable costs such as port and fuel costs which are incurred through operating the vessel.
- Bunker cost: the cost of the fuel required to operate the service. As the vessels are likely to be operating in the North Sea, the Baltic and the Channel area, we have assumed that the ships use Marine Gas Oil (MGO), which is a fuel with a sufficiently low sulphur content to meet the requirements of the Sulphur Emission Control Area (SECA) that is in place in these maritime zones.

- Bunker consumption per day: the tonnes of fuel that the ship would burn in a 24 hour period at a typical efficient steaming speed for this type of ship of 13 knots;
- Port cost per call: the cost per port call (i.e. to cover both the ship's arrival, and its departure from, the port) for the use of the port's infrastructure such as its approach channels and its breakwaters and quays.
- Transhipment and gateway lift cost per unit: the charges made by the container terminal operator for the handling of a container through the terminal. For a gateway unit (i.e. a container that is being transported inland to/from the port) the cost includes the transfer of the container from the ship to storage and then onto the back of a truck or a train at the port. For a transhipment unit (i.e. a container that is being transported by sea via a transhipment port without being taken directly inland) the cost includes the transfer of the container from a large containership to storage and then onto a feeder containership at the port.
- Fixed road collection and delivery cost: The fixed cost per container of transporting a container by road between a port and an inland origin or destination.

The detailed assumptions are shown in Table 10 below.

Table 10: Assumptions for generic coastal shipping cost model

Description	Value	Notes
Ship capacity (TEU)	600 TEU	Reasonably efficient LOLO vessel
Time charter cost per day	£4,000	Based on 'typical' 600 TEU ship
Bunker cost per tonne (MGO)	£500	MGO, as assumed to be operating in SECA
Bunker consumption (tonnes/day)	20	Based on fuel consumption of a 'typical' 600 TEU ship
Average speed (nautical miles per hour)	13	Based on average speed for a 'typical' 600 TEU container ship
Port cost per call	£3,000	Port costs include all charges to the port for use of infrastructure
TEU/unit	1.67	Average number of TEU for each container unit transported
Transhipment lift cost/unit	£30	Charge to container terminal operator for a lift from the container stack to the container ship
Gateway lift cost/unit	£60	Charge to container terminal operator for a lift between the container ship and the container storage area and between the storage area and the back of a truck at a regional port
Handling rate per hour (containers/hour)	20	Assumes one ship-to-shore crane @ 20 lifts per hour cranes
Vessel capacity utilisation	75%	Based on 'reasonably efficient' utilisation of vessel
Fixed road collection & delivery cost	£167	As for existing MSRS scheme

The assumption in relation to the capacity utilisation of the vessel was challenged by a short sea container line (while also being accepted by another line during the consultation exercise) on the grounds that it was too high. Determining the capacity of a container ship is more complex than for a train, where for the latter the weight of the cargo is less critical. If the containers are laden with heavy cargo this reduces the effective capacity of the ship in terms of TEU to below the theoretical capacity of 600 TEU. However, we have assumed that the ships would also be carrying empty containers, which increases the capacity of the ship and allows the capacity utilisation (in terms of the stated capacity of 600 TEU) for a reasonably efficient service to be higher. Analysis of the DfT's Maritime Freight statistics shows that 32% of containers transported coastwise were empty in both 2015 and 2016.

The handling rate is assumed to be 20 lifts per hour with one crane being deployed. This assumes that a feeder container ship is not given the same priority as a larger deep sea container ship operating on an inter-continental service, with only crane being deployed by the terminal operator. While most container terminals advertise that they can achieve handling rates of 25 lifts per hour per crane, this is not always achieved in practice when providing a stevedoring service for short sea/feeder ship calls which are regarded as being less 'urgent'.

Case study 1: application of the Coastal Shipping Cost Model to the Felixstowe-Teesport route

Cost of operating a coastal LOLO service between Felixstowe and Teesport (241 nautical miles one way), which would (with some slack in the schedule) allow a vessel dedicated to the service steaming at 13 knots to achieve two round trips in a week.

The cost model calculates the fixed cost per week of operating the service (the cost of the ship, the bunkers and the port costs) and then calculates the fixed cost per unit transported, based on assuming a 75% utilisation factor on each leg. The model then adds the variable costs per unit (handling costs at the two ports and the inland road haulage costs).

The results are shown in Table 11 below.

Table 11: Results of cost modelling for the Felixstowe-Teesport route

Description	***Costs***	***Notes***
Fixed coastal shipping service costs (per week)		
Time charter	*£28,000*	*7 days x £4,000*
Bunkers	*£30,897*	*£500/tonne x 20 tonnes/day x 0.77 days steaming per one-way voyage x 4 one-way voyages*
Port costs	*£12,000*	*4 calls x £3,000*
Total fixed costs per week	***£70,897***	
Number of units	*1,078*	*600 TEU x 4 single trips x 75% utilisation / 1.67*
Average cost per unit	***£66***	
Variable coastal shipping costs (per unit)		
Transhipment handling costs	*£30*	
Gateway handling costs	*£60*	
Inland road D&C costs	*£167*	
Total variable costs per unit	***£257***	
Grand total per unit	***£323***	
MSRS road cost (zones 2 and 6)	***£471***	
MSRS rail cost (zones 2 and 6)	***£405***	
Existing MSRS rail grant	***-***	

The generic cost of transporting a feeder container between Felixstowe and Teesport on a quay to delivered North East basis is an estimated £323. This is cheaper than rail transport and road haulage and so would not secure any MSRS. There is in any event, no MSRS grant for rail flows between Felixstowe and the North East because rail can be competitive against road over these distances without grant.

Case Study 2: application of the Coastal Shipping Cost Model to the Liverpool - Greenock route

Cost of operating a coastal LOLO service between Liverpool and Greenock (201 nautical miles one way), which would allow (with some slack in the schedule) a vessel dedicated to the service steaming at 13 knots to achieve two round trips in a week.

The results are shown in Table 12 below.

Table 12: Results of cost modelling for the Liverpool-Greenock route

Description	***Costs***	***Notes***
Fixed coastal shipping service costs (per week)		
Time charter	*£28,000*	*7 days x £4,000*
Bunkers	*£25,769*	*£500/tonne x 20 tonnes/day x 0.64 days steaming per one-way voyage x 4 one-way voyages*
Port costs	*£12,000*	*4 calls x £3,000*
Total fixed costs per week	***£65,769***	
Number of units	*1,078*	*600 TEU x 4 single trips x 75% utilisation / 1.67*
Average cost per unit	***£61***	
Variable coastal shipping costs (per unit)		
Transhipment handling costs	*£20*	
Gateway handling costs	*£60*	
Inland road D&C costs	*£167*	
Total variable costs per unit	***£257***	
Grand total per unit	***£318***	
MSRS road haulage cost (zones 11 and 8)	***£363***	
MSRS rail cost (zones 11 and 8)	***£444***	
Existing MSRS rail grant	***£24***	

The generic cost of transporting a feeder container between Liverpool and Greenock on a quay to delivered Central Belt basis is an estimated £318. This is significantly cheaper than both road transport and rail transport and could be interpreted as removing the justification for MSRS for rail between the North West and the Clyde area.

Case Study 3: application of the Coastal Shipping Cost Model to the Southampton – Liverpool route

Cost of operating a coastal LOLO service between Southampton and Liverpool (474 nautical miles one way), which would allow a vessel dedicated to the service steaming at 13 knots to achieve one round trip in a week.

The results are shown in Table 13 below.

Table 13: Results of cost modelling for the Southampton-Liverpool route

Description	***Costs***	***Notes***
Fixed coastal shipping service costs (per week)		
Time charter	*£28,000*	*7 days x £4,000*
Bunkers	*£15,192*	*£500/tonne x 20 tonnes/day x 1.52 days steaming per one-way voyage x 2 one-way voyages*
Port costs	*£6,000*	*2 calls x £3,000*
Total fixed costs per week	***£49,192***	
Number of units	*539*	*600 TEU x 2 single trips x 75% utilisation / 1.67*
Average cost per unit	***£91***	
Variable coastal shipping costs (per unit)		
Transhipment handling costs	*£30*	
Gateway handling costs	*£60*	
Inland road D&C costs	*£167*	
Total variable costs per unit	***£257***	
Grand total per unit	***£348***	
MSRS road haulage cost (zones 17-11)	***£374***	
MSRS rail cost (zones 17-11)	***£392***	
Existing MSRS rail grant	***£28***	

The generic cost of transporting a feeder container between Southampton and Liverpool on a quay to delivered North West basis is an estimated £348. This is cheaper than both road and rail transport and could be interpreted as removing the justification for MSRS for rail between the North West and the Solent area.

3.4 Conclusions on cost modelling

Coastal shipping can be very cost effective for the transport of feeder containers over longer distances because the shipping costs (ship charter plus bunkers) are relatively low compared to the fixed port and inland distribution costs. The generic cost modelling suggests that coastal shipping is competitive on this basis between, for example, Southampton and Liverpool (471 nautical miles).

However, where coastal shipping is more cost effective than rail freight, there may be an argument that MSRS should not be provided to these rail services because another sustainable mode is able to be more cost effective than road freight services.

Grant rates have been calculated in a spreadsheet model for all potential zonal flows that are relevant for coastal services (see Appendix 3). This shows that some 39 existing MSRS rates out of a total of 130 could fall because coastal shipping would provide a cheaper alternative to rail. It should be noted that the financial costs that are included in the calculations of financial need in the MSRS scheme do not take account of non-financial factors in making decisions between modes, such as door-to-door transit time. While rail freight services may often be more expensive than coastal shipping services, shippers and freight forwarders will be prepared to pay more for a transit time that is closer to - or possibly even faster than - the transit time by road.

4 RESULTS OF STAKEHOLDER CONSULTATION

4.1 Introduction

Consultation with key stakeholders was included as an important task within the overall work programme for this study. Following completion of the initial research tasks within the study - data and market analysis and the development of validated cost models - a consultation paper was developed which was then sent by email to 30 organisations, including:

- Freight and logistics trade associations, so that they could pass the paper on to their members;
- Shipping lines;
- Rail freight operators;
- Container hauliers and other 3PLs;
- Freight transport infrastructure operators.

The consultation paper was sent out by email on 13 November 2017, allowing a two week period for the receipt of responses. Some consultees requested an extension to the deadline and we were able to provide some flexibility beyond the formal deadline of 27 November to maximise the number of responses.

The consultation paper set out the initial results of the study and asked the stakeholders to respond to seven questions, while also allowing them to comment, if they wished, on any other aspects of the research study as they saw fit.

As well as validation of the cost models, which was provided by a total of three operators, twelve organisations provided a response to the consultation, replying either by letter or in the form of an email.

In total 14 stakeholders contributed to the research out of a total of 30 organisations which were contacted. Our overall conclusion on the consultation process is that it provided the opportunity for a wide range of stakeholders that would be most affected by the potential changes to the revenue support freight grants to provide their views on the initial results of the study and the organisations that responded provided a good spread of representatives from across the relevant industry sectors.

The feedback from the consultation exercise is set out below.

4.2 Results

Introduction

The consultation document set out the following definitions for the purposes of the research and consultees were asked:

Question 1: Are these definitions appropriate for the potential options for changes to revenue support freight grant schemes?

Channel Tunnel intermodal rail freight service: *a rail freight service carrying unitised traffic passing through the Channel Tunnel between an intermodal terminal on the European continental mainland and another intermodal terminal on the GB mainland.*

Unitload coastal shipping service: *any unitload shipping service that calls at two or more GB ports allowing units to be transported between them.*

Where a view was expressed, the definitions were regarded as being clear. Very few consultees commented on the definitions as such, suggesting that they were not regarded as being controversial in themselves. One consultee argued that the definition of Channel Tunnel intermodal should not include piggyback trailers because this involves the transportation of a whole trailer rather than just a 'box'; similarly, the same consultee argued that the definition of unitload coastal shipping should not include RORO services because these would be transporting trailers and tractor and trailer combinations as well as containers and the economics were different.

Our view is that, while it is true that the economics of RORO services and piggyback trailers are not exactly the same as LOLO services and intermodal rail freight services carrying containers respectively, the philosophy of the existing MSRS scheme is to base the maximum grant rates on the economics of reasonably efficient services and then not prescribe the intermodal or shipping technology that should be deployed by the transport operators. This ensures that the grant rates represent value for money, while also avoiding any distortion in the market for the provision of unitload shipping and rail freight services using any suitable technology.

Channel Tunnel intermodal

The consultation document described the GB-Continent market (as set out in section 2.2 of this report), including some case studies of door-to-door transport costs. Consultees were then asked:

Question 2: Do you agree with the description of the existing GB-Continent unitload market set out above?

Where a view was expressed, the description of the relevant market was regarded as being accurate. However, very few consultees commented on the description, suggesting that either they were not in a position to form a view or the description was not regarded as being controversial. One consultee made further suggestions about the reasons for the poor performance of Channel Tunnel intermodal rail freight services, suggesting that the lack of traffic is essentially due to operational and structural issues rather than costs; these are issues related to the lack of investment in the conventional rail route through Kent to the Tunnel (compared to Network Rail's investment in gauge clearance to and from ports such as Felixstowe and Southampton), the lack of interest in freight from the operators of the HS1route, the on-going investment in the French rail network which has reduced the reliability of rail freight services and the strength of competition from rail links to Belgian ports.

The consultation document then set out a generic cost model for Channel Tunnel intermodal services, which is provided in section 3.2 of this report. Consultees were asked:

Question 3: Does the above cost model provide a reasonably accurate reflection of the actual costs of Channel Tunnel intermodal rail freight services in 2017?

There were a number of detailed comments on the cost model. Where these comments were substantive, and not based on a misunderstanding, we have set out our responses in brackets alongside the comments below:

- The model assumes diesel propulsion, but diesel locomotives cannot be used for Channel Tunnel transits [this is true but the approach taken was to use the existing MSRS intermodal rail freight cost model which is based on diesel propulsion; in addition the relevant road haulage savings relate only to GB, where diesel propulsion is more likely]
- The model should refer to 'platforms' rather than 'wagons' for the purposes of measuring capacity and providing costs [this is accepted and the terminology has been changed in this Final Report]
- The model does not allow for enough drivers [this comment appears to be based on a minor misunderstanding of the cost model that was developed, which is based on the allocation of the total annual costs of drivers to a specific journey based on operating hours];

- The cost of diesel per litre was regarded as being too high at £0.69 [this is consistent with the cost per litre used by the DfT in its MSRS spreadsheet model plus an allowance for inflation]
- The cost model requires costs that are not validated through the existing MSRS model [the additional costs were validated with the assistance of two operators that have direct experience of operating Channel Tunnel intermodal services]
- Overheads have been excluded from the cost model [the cost model we have used is consistent with that used by the DfT in its MSRS spreadsheet plus an allowance for one year of inflation; this includes overheads, although this was not explicitly clear to the consultee]

Generally, the cost model seems to have been regarded as reasonably accurate. For example, a shipping line which also operates intermodal rail freight services felt that the cost model did 'seem to be accurate'. Many other consultees chose not to respond directly to this question, perhaps because they lacked the detailed knowledge of the economics of Channel Tunnel intermodal rail freight services.

The consultation document then provided some conclusions on the potential extension of the existing MSRS (Intermodal) scheme to include Channel Tunnel intermodal rail freight services:

- There is an argument that the existing MSRS (Intermodal) scheme should also include Channel Tunnel intermodal rail freight services in order to ensure equal treatment with rail services that are integrated with existing short sea shipping services between a GB port and a continental mainland port.
- The most reasonable comparator for a 'port' for Channel Tunnel services is not the entrance to the Tunnel at Dollands Moors because it is not possible to load or unload units there and, in any case, the Channel Tunnel services are not competing in the market with Dover-Calais or Dover-Dunkirk ferry services.
- A more appropriate comparator 'port' for Channel Tunnel services for the purposes of any extension of MSRS (Intermodal), while reducing the risk of distortion of competition, would be Wembley or Barking where access can be obtained to the Channel Tunnel network. This would mean that Channel Tunnel intermodal rail freight services would be eligible for grant within GB at the same grant rates as can be secured by domestic intermodal rail freight services to and from ports on the Thames.

The consultees were asked:

Question 4: Do you agree with the above conclusions in relation to a potential extension of the existing MSRS (Intermodal) scheme to include Channel Tunnel intermodal rail freight services?

The key issue that was raised related to potential distortions of competition between Channel Tunnel intermodal services and unitload shipping services, with particular concern expressed by some consultees about distortions of the market due to

operating subsidy for Channel Tunnel intermodal services. One argued that such funding for Channel Tunnel intermodal rail freight services could have an impact on one of their services, but also added that 'No problem however if also our environment friendly…[services]…would be entitled to the same grant as well.'

Our view is that the inclusion of Channel Tunnel intermodal rail freight services within the MSRS (Intermodal) scheme would help to remove an existing potential distortion of the market because operators of short sea shipping and rail freight transport chains already compete with Channel Tunnel intermodal services and are able to secure MSRS (Intermodal) grants for GB domestic services to/from the GB port.

Another consultee was sufficiently concerned about any subsidy to Channel Tunnel services to state that 'We would object to the proposed introduction of a rail freight grant applicable to the Channel Tunnel which in our opinion would distort the freight market between mainland Europe and the UK'; this consultee argued that such subsidy would 'have the potential to undermine the commercial position and volumes currently handled by "feeder" vessels'. However, as has been made clear in our description of the GB-Continent market, Channel Tunnel intermodal services are mainly in competition with unitload services to and from east coast ports to the south of the Humber; Channel Tunnel services handle short sea traffic, not deep sea feeder traffic.

Two consultees also used other arguments against any support being provided for Channel Tunnel services, such as the impact of additional services on congested sections of the rail network such as the West Coast Main Line and on the line through Kent between London and the Channel Tunnel. One also argued that support for Channel Tunnel intermodal services would add to congestion through pinch points on the rail network (e.g. through London), while the 'utilisation of regional ports gives more opportunity to avoid these pinch points and deliver goods closer to customers'. Our view is that, while there are capacity issues on the WCML and through London, there are few capacity issues through Kent because there are train paths on the conventional line to the Channel Tunnel that are protected by the Treaty of Paris. The issue of where capacity is available and the impact of additional services on pinchpoints is not relevant to MSRS, which only provides any grant in arrears once the traffic has actually moved.

Unitload coastal shipping

The consultation document described the unitload coastal shipping market (as set out in section 2.4 of this report), including some case studies of door-to-door transport costs. Consultees were asked:

Question 5: Do you agree with the description of the existing unitload coastal shipping market set out above?

Where a view was expressed, the description of the relevant market was regarded as being accurate, particularly in terms of the main market being the deep sea feeder container market. However, only a few consultees commented on the description,

suggesting that either they were not in a position to form a view or the description was not regarded as being controversial.

One consultee pointed out that coastal shipping also includes movements on inland waterways, such as the Manchester Ship Canal. Our view is that where a service involves a voyage on the open sea it should be eligible for MSRS.

The consultation document then set out a generic cost model for unitload coastal shipping services, which is provided at section 3.2 of this report. Consultees were asked:

Question 6: Does the above cost model provide a reasonably accurate reflection of the actual costs of LOLO coastal shipping services in 2017?

Following validation of the cost model by one operator (which argued that the costs should in some cases be higher), a further operator regarded the cost models as being 'based upon accurate assumptions'. One consultee raised the issue of the potential impact of larger ship sizes on the economics of coastal shipping, given the trend for larger ships being deployed in the container shipping industry. No other consultees chose to respond directly to this question, perhaps because they lacked the detailed knowledge of container shipping economics.

Our view is that the generic cost model for coastal shipping that was developed for this research study is based on a reasonably efficient coastal shipping service using LOLO technology and therefore provides the basis for a MSRS-style scheme for unitload coastal shipping.

The consultation document then provided the conclusions on the potential addition of an MSRS (Coastal Shipping) scheme:

- Any additional MSRS scheme for coastal shipping is likely to support the operators of deep sea container feeder services;
- The costs that are included in the calculations of financial need in the MSRS scheme do not take account of non-financial factors in making decisions between modes, such as door-to-door transit time and service frequency. While rail freight services may often be more expensive than coastal shipping services, shippers and freight forwarders will be prepared to pay more for a transit time that is closer to - or possibly even faster than - the transit time by road.
- Based on the cost modelling carried out for LOLO shipping services, it is unlikely that pure domestic coastal shipping movements (requiring road collection and delivery to/from both ports) would be competitive with direct road haulage. This suggests that the scheme should be designed on the basis that the main market would be feeder containers (requiring road collection or delivery at only one end of the transport chain).

The consultees were then asked:

Question 7: Do you agree with the above conclusions in relation to a potential MSRS (Coastal Shipping) scheme?

Consultees appeared to be generally supportive of the potential new MSRS (Coastal Shipping) scheme, although one commented that, 'Our concern centres on the competition between rail and feeder, where possible differential levels of support may lead to mode shift but between rail and water rather than off road'.

Two other consultees were particularly supportive of the potential new scheme as they believe that these services would provide environmental benefits and help to relieve congested road and rail networks. One commented that 'Given the physical geography of the UK has a limited inland waterways network, coastal shipping is in effect the UK alternative for inland waterways and should not be at a disadvantage to rail'.

Our view is that an MSRS-style scheme for unitload coastal shipping would ensure that both intermodal rail freight and unitload coastal shipping would be treated in the same way.

Other comments

The main further comments related to:

- Concern on the part of one consultee that as rail and coastal shipping feeder services already compete on medium distance flows (where road is competitive and rail receives some grant support), there is a risk that support for coastal shipping will only lead to a switch of traffic from rail.
- Concerns over the size of the overall budget: It was feared by several consultees that the extension of the MSRS grant regime to another mode would lead to a reduction in the overall funding available for sustainable modes. In other words, some consultees were concerned that any increase in the scope of MSRS schemes would lead to the dilution of the existing scheme unless additional funding was provided.
- One consultee questioned the timing of the research, given the uncertainty surrounding international trade and GB-Continent freight movements due to Brexit. There was a request for a more integrated approach to be taken to issues related to public sector interventions that have an impact on cross-channel trade.

Our view is that, while the size of the budget available is a matter for the DfT, Transport Scotland and the Welsh Government, MSRS grant support on any particular zone-to-zone flow should be provided to both rail and coastal shipping services up to a maximum grant rate based on the lower cost mode of transport.

5 STATE AID GUIDELINES

5.1 Introduction

We have reviewed the EU's State aid requirements as set out in its *Community guidelines on State aid to maritime transport* (Commission communication C(2004) 43) and have considered whether the options for changes to the revenue support grants schemes are likely to meet those requirements.

5.2 Review of maritime State aid guidelines

The State aid guidelines allow financial aid to be provided by Member States of the EU to ship owners only in certain limited circumstances. These are to:

- Further develop safe, efficient, secure and environmentally friendly maritime transport;
- Encourage the flagging or re-flagging of ships to Member States' registers;
- Contribute to the consolidation of the maritime cluster in the EU while maintaining the competitiveness of Member State fleets on world markets;
- Maintain and improve maritime know-how and protect and promote employment for European seafarers, and;
- Contribute to the promotion of new services in the field of short sea shipping.

Of these aims, the most relevant in the context of MSRS is the last circumstance, where State aid would contribute to the promotion of short sea shipping.

In addition, State aid may generally be granted only in respect of ships that are registered in the EU, although flag-neutral aid measures may be approved in certain exceptional cases where a benefit to the EU is clearly demonstrated. As a general rule, the objective of MSRS is to secure modal shift from road to more sustainable modes irrespective of the nationality of the ship owner or the flag of the vessel. However, as long as the environmental benefits of the MSRS scheme are set out and clearance is obtained from the European Commission, it may be possible to allow services deploying ships of any flag to obtain the MSRS funding; alternatively, shipowners could be required to deploy vessels that are flagged in an EU Member State.

The guidelines explain there is no legal definition of 'Short Sea Shipping', but propose the following working definition based on a previous document produced by the European Commission:

'The movement of cargo and passenger by sea between ports situated in geographical Europe or between those ports and ports situated in non-European countries having a coastline on the enclosed seas bordering Europe'.

This definition is sufficiently broad to encompass the coastal services that would be the subject of any additional MSRS scheme for coastal shipping.

In addition, the European Commission recognises that launching short-sea shipping services may be accompanied by 'substantial financial difficulties' which the Member States may wish to mitigate by providing some form of financial assistance to secure wider benefits. This overall objective would appear to be well-aligned with the objective of DfT to introduce an additional MSRS scheme for unitload coastal shipping.

Any planned State aid for short sea shipping would require notification to the European Commission under Article 1 of Regulation (EEC) No 4055/86 and the Guidelines then set out some rules that would need to apply for the European Commission to allow State aid to short sea shipping. These are set out below in Table 14, along with some comments on the potential impact of the rules on the feasibility of an extension of the MSRS scheme to unitload coastal shipping.

Table 14: EC State aid rules on State aid to short sea shipping services

State aid requirement	Comment on feasibility	Conclusion
Restricted to transport between ports in the territory of the Member States.	Coastal shipping between two GB mainland ports complies with this requirement.	No apparent issue for MSRS-style scheme.
The aid must not exceed three years in duration	MSRS for any individual coastal shipping service may need to be limited to 3 years.	Likely time limit of 3 years for aid to any individual service.
Must be to finance a shipping service connecting ports situated in the territory of the Member States	The aid would be provided to services between two UK ports.	No apparent issue for MSRS-style scheme.
The service must be of such a kind as to permit transport (of cargo essentially) by road to be carried out wholly or partly by sea, without diverting maritime transport in a way which is contrary to the common interest	This would be the objective of the potential extension of the MSRS scheme to unitload coastal shipping.	No apparent issue for MSRS-style scheme.
The aid must be directed at implementing a detailed project with a pre-established environmental impact, concerning a new route or the upgrading of services on an existing one, associating several ship owners if necessary, with no more than one project financed per line and with no renewal, extension or repetition of the project in question	This implies that the aid should be to secure a change in service level (either a new service or an upgrade) rather than just to assist existing services.	The MSRS scheme may only apply to new or upgraded coastal shipping services rather than to existing services. The EC has provided some clarification to the DfT in relation to its Waterborne Freight Grant scheme which indicates that grant can be provided for more than one service to the same shipping line as long as the services are distinct from each other in terms of the route, the cargo shipped and the environmental impacts.
The purpose of the aid must be to cover, either up to 30% of the operational costs of the service in	Financing the purchase of handling equipment is not relevant in the context of MSRS,	No apparent issue for MSRS-style scheme.

question or to finance the purchase of trans-shipment equipment to supply the planned service, up to a level of 10 % in such investment,	but the level of grant funding is unlikely to be more than 30% of total operating costs. This 30% limit would need to be checked within the calculation of the grant rate.	
The aid to implement a project must be granted on the basis of transparent criteria applied in a non-discriminatory way to ship owners established in the Community.	The existing MSRS is already provided on the basis of transparent criteria and so this would require no change in approach.	No apparent issue for MSRS-style scheme.
The aid should normally be granted for a project selected by the authorities of the Member State through a tender procedure in compliance with applicable Community rules,	The existing MSRS is already provided on the basis of a tender procedure.	No apparent issue for MSRS-style scheme.
The service that is funded should have the potential to be commercially viable after the period in which it is eligible for public funding,	This means that the service should be commercially viable after the 3 year period. With this kind of scheme this is usually demonstrated through the provision of a business plan showing that the service only requires start-up aid for up to 3 years.	The MSRS scheme as applied to coastal shipping would need to take account of the need to demonstrate likely viability after 3 years.
Such aid must not be cumulated with public service compensation (obligations or contracts).	As far as we are aware the only shipping services that are the subject of Public Service Obligation contracts are between the GB mainland and remote island communities; the proposed definition for the MSRS-style scheme would exclude such services.	No apparent issue for MSRS-style scheme.

The potential issues from the State aid guidelines, which might require a different approach to be taken to coastal shipping when compared to the existing rail-based scheme would be:

- The MSRS funding would need to be limited to no more than three years, after which any services that are supported would be expected to be commercially viable without further public funding. The EC is likely to require that MSRS is only provided for new or upgraded services. While this might also be the primary objective of the DfT in providing MSRS for unitload coastal shipping, this has not been the approach adopted by the DfT to the MSRS grants for intermodal rail freight. If only 'new' services can be funded this will require a clear definition of what 'new' means in this context to avoid 'gaming' by the shipping lines to secure grant.
- The EC is likely to require some evidence that services that would be the subject of the MSRS grant would not require funding after 3 years.

5.3 Conclusion on state aid issues

Many of the State aid requirements are fully in line with the objectives of a potential MSRS Coastal Shipping scheme. In particular, the overall policy objective is to secure modal shift from road to short sea (or coastal) shipping services.

However, the EC's approach is to focus on providing funding for new (or upgraded) services and only for the short term (up to 3 years) with the expectation that the services will then be commercially viable after the start-up phase. This is not completely compatible with the MSRS approach that has been taken for rail.

6 CONCLUSIONS

6.1 Channel Tunnel intermodal rail freight

The through Channel Tunnel services have a very low share of the GB-Continent market, which may indicate that some additional support would be justified; however, the many of the reasons for this poor performance are not related to relative costs between road and rail but due to operational and structural issues such as the poor performance of the French rail network.

There are a number of inefficiencies in the Channel Tunnel cost structures (e.g. the cost of security checks and delays at the Tunnel, the cost of delays for trains crossing the French border) which the MSRS scheme might indirectly subsidise. It is also possible that any support would partly be captured by infrastructure providers in increased Channel Tunnel tolls.

The results of the consultation exercise suggest there is likely to be some freight and logistics industry opposition to the extension of the MSRS (Intermodal) scheme to include Channel Tunnel intermodal.

MSRS (Intermodal) grant is less likely to be justified for services over longer distances (e.g. eastern and southern Europe), the adoption of a zonal system for the continental mainland would be very complex and, in any case, traffic switches to other rail services on the continent over such long distances.

Freight cannot be loaded to rail at Dollands Moor or Frethun and so this is not the relevant location for a ‘proxy port’ for Channel Tunnel services; in addition environmental benefits and MSRS (Intermodal) – Port grant rates should not be calculated from Dover or Folkestone as the Channel Tunnel intermodal services should already be cheaper than accompanied RORO services via the Dover Straits on a door-to-door basis.

The most valid comparator port is Purfleet because the Channel Tunnel intermodal services are competing most closely with unaccompanied unitload routes via the Thames, particularly where the continental ports and the GB ports are rail-connected.

The most appropriate grant rates to apply to ensure that Channel Tunnel services are treated on an equivalent basis to these unaccompanied routes would be to allow the ‘Channel Tunnel port zone’ to have the same grant rates as Wembley/Barking/Purfleet/Tilbury where it is possible to access the Channel Tunnel network.

Our research suggests therefore that there is scope for the addition of a new Channel Tunnel zone for the existing MSRS (Intermodal) scheme, with the grant rates that are applied being the same as flows to and from Zone 1 of the existing MSRS (Intermodal) – Port scheme. There is likely to be some opposition to such a move from the ports and shipping sector on the grounds that it would lead to a distortion of competition with short sea or coastal shipping services.

6.2 MSRS (Coastal Shipping) scheme

Existing LOLO services providing coastwise feeder services between GB ports are operating in the same market as intermodal rail services that are distributing containers between GB deep sea container ports and inland terminals; however, while MSRS is available for the rail services it is not available for coastal shipping services, which come under the Waterborne Freight Grant scheme. There is therefore a case for ensuring that all sustainable transport modes are treated on an equal basis.

Any additional MSRS scheme for coastal shipping is likely to have its main impact on the deep sea feeder market either between a GB deep container port and GB regional ports or between a North European deep sea container port and the GB regional ports. Such a scheme would also, if only at the margin, encourage deep sea shipping lines to tranship containers at GB deep sea ports rather than at ports such as Rotterdam and Antwerp. However, it might also encourage the operators of feeder services between Near Continent deep sea container ports to call at more than a single GB regional port.

Coastal shipping can be very cost effective for the transport of feeder containers over longer distances because the shipping costs are relatively low compared to the fixed port and inland distribution costs. Feeder container services are performing the same role in the market as intermodal rail freight services to/from deep sea ports i.e. transporting containers between a deep sea container port and a regional origin/destination. This is via a regional port for coastal shipping services and a regional intermodal rail freight terminal for intermodal rail freight services respectively and both transport chains require road collection or delivery between the inland origin/destination and the regional port or rail terminal. Where coastal shipping is more cost effective than rail freight there may be an argument that MSRS should not be provided to these rail services (albeit rail is faster and may address a different sub-market).

Any new MSRS-style scheme should be neutral between LOLO and RORO technology.

A rule will need to be developed to ensure that deep sea container services that call at more than one GB port would not be eligible for the grant, perhaps by limiting the eligibility to ships of no more than (say) 2,000 TEU.

Many of the State aid requirements are fully in line with the objectives of a potential MSRS (Coastal Shipping) scheme but our interpretation of the State aid guidelines for shipping is that funding can only be provided for new (or ‘upgraded’) services and only for the short term (up to 3 years) with the expectation that the services will then be commercially viable after the start-up phase.

Our research suggests therefore that there is scope for a potential MSRS (Coastal Shipping) scheme and we have demonstrated how it could be applied in practice.

Most consultees appear to accept that allowing coastal shipping of deep sea feeder containers to be supported would ensure that the two more sustainable modes are treated equally.

Our calculations based on cost modelling suggest that, as the grant can only be provided to the lower cost alternative of the two modes and coastal shipping has lower costs per unit transported, the MSRS rate should be reduced on some zone-to-zone flows. This has been demonstrated through the development of a spreadsheet cost model for MSRS (Coastal Shipping), which has been delivered with this Final Report. An outline of the objectives of the model and its inputs, calculations and outputs is provided in Appendix 3, along with the maximum zone-to-zone grant rates for the existing rail scheme, the maximum rates for a wider scheme that includes coastal shipping and the difference between the two. Of the 130 zone-to-zone grant rates that are currently available for MSRS (Intermodal), some 39 (or 30%) would fall as a result of the introduction of an extension of the scheme to include coastal shipping.

In terms of affordability, the net impact on demand for MSRS will be the difference between:

- The generation of new demand for MSRS from coastal shipping operators and, in particular, feeder operators;
- The loss of opportunities for rail freight operators to make applications for MSRS on some zone-to-zone movements.

Due to the EU State aid rules that apply to shipping, the operators of coastal shipping services would need to justify MSRS grant by demonstrating that the services between the relevant ports are new or upgraded compared to the existing position and that services would be commercially viable after 3 years, probably on the basis of the services reaching a certain critical mass of traffic.

APPENDIX 1: GB-CONTINENT FERRY SERVICES (EXCLUDING DOVER STRAITS)

Operator	Corridor	Route
COBELFRET FERRIES	Thames	Purfleet-Zeebrugge
COBELFRET FERRIES	Thames	Purfleet-Zeebrugge/Denmark
COBELFRET FERRIES	Thames	Purfleet-Vlissingen
P&O FERRIES	Thames	Tilbury-Zeebrugge
SCA TRANSFOREST	Thames	Sweden/Rotterdam-Sheerness
TRANSFENNICA	Thames	Tilbury-Baltic
TRANSFENNICA	Thames	Tilbury-Antwerp/Baltic
DFDS SEAWAYS	Southern North Sea	Felixstowe-Vlaadingen
MANN LINES	Southern North Sea	Harwich-Germany/Baltic
STENA LINE	Southern North Sea	Harwich-Hook of Holland
STENA LINE	Southern North Sea	Harwich/Felixstowe-Hook of Holland/Rotterdam
COBELFRET FERRIES	Northern North Sea	Killingholme-Zeebrugge
COBELFRET FERRIES	Northern North Sea	Killingholme-Rotterdam
COBELFRET FERRIES	Northern North Sea	Rotterdam-Dublin-Killingholme-Purfleet-Iberia-Rotterdam
DFDS SEAWAYS	Northern North Sea	Rosyth-Zeebrugge
DFDS SEAWAYS	Northern North Sea	Immingham-Esbjerg
DFDS SEAWAYS	Northern North Sea	Immingham-Cuxhaven
DFDS SEAWAYS - ENG/NETH 2	Northern North Sea	Immingham-Vlaadingen
DFDS SEAWAYS	Northern North Sea	Tyne-Ijmuiden
DFDS SEAWAYS	Northern North Sea	Immingham-Brevik (Norway)
DFDS SEAWAYS	Northern North Sea	Immingham-Gothenburg/Brevik
FINNLINES	Northern North Sea	Baltic/Zeebrugge-Hull-Iberia
FINNLINES	Northern North Sea	Baltic/Antwerp-Hull
P&O FERRIES	Northern North Sea	Hull-Zeebrugge
P&O FERRIES	Northern North Sea	Hull/Immingham-Zeebrugge
P&O FERRIES	Northern North Sea	Tees-Rotterdam
P&O FERRIES	Northern North Sea	Hull/Immingham-Rotterdam
SEA-CARGO	Northern North Sea	Immingham-Norway
SEA-CARGO	Northern North Sea	Immingham-Norway

SEA-CARGO	Northern North Sea	Aberdeen-Norway
STENA LINE	Northern North Sea	Killingholme-Vlaadingen
STENA LINE	Northern North Sea	Killingholme-Hook of Holland
BRITTANY FERRIES	Western Channel	Portsmouth-Bilbao/Santander/Roscoff
BRITTANY FERRIES	Western Channel	Portsmouth-Caen
BRITTANY FERRIES	Western Channel	Poole-Cherbourg
BRITTANY FERRIES	Western Channel	Portsmouth-Cherbourg
BRITTANY FERRIES	Western Channel	Portsmouth-Le Havre
BRITTANY FERRIES	Western Channel	Plymouth-Roscoff
BRITTANY FERRIES	Western Channel	Portsmouth/Plymouth-St Malo/Cork/Santander
BRITTANY FERRIES	Western Channel	Portsmouth-St Malo
LD TRANSMANCHE FERRIES	Western Channel	Newhaven-Dieppe

APPENDIX 2: COASTWISE LOLO SERVICES

SERVICE	PORT ROTATION	TYPE OF LOLO SERVICE	NO. OF VESSELS	AVERAGE VESSEL SIZE (TEU)	ANNUAL DEPLOYED CAPACITY (TEU)
A2B-ONLINE - BLY	Moerdijk - Blyth - Tees - Moerdijk - Blyth - Moerdijk	Short sea	1	508	26,416
A2B-ONLINE - THP	Moerdijk - Th'port - Moerdijk - Th'port - Moerdijk - Teesport - Moerdijk - Th'port - Moerdijk	Short sea	1	508	26,416
BG FREIGHT LINE - EAST COAST UK 1	Rotterdam - Immingham - Felixstowe - Grangemouth - Rotterdam	Short sea/feeder	1	850	44,200
BG FREIGHT LINE - EAST COAST UK 2	Rotterdam - Felixstowe - Tyne - Teesport - Rotterdam	Short sea/feeder	1	974	50,648
BG FREIGHT LINE - EAST COAST UK 3	Rotterdam - Immingham - Grangemouth - Rotterdam	Short sea/feeder	1	660	34,320
BG FREIGHT LINE - MSC & IR SEA	Liverpool - Dublin - Liverpool - Belfast - Greenock - Irlam - Liverpool - Cork - Liverpool	Short sea/feeder	2	340	8,840
BORCHARD - WC UK	Cardiff-Avonmouth-Liverpool-Dublin-Portugal-W Med-E Med-Cardiff	Short sea	4	1,216	15,808
CONTAINERSHIPS - LP1	Baltic - Zeebrugge - Thamesport - Tyne – Baltic	Short sea	2	808	21,112
EIMSKIP - GREY LINE	Iceland/Faeroe Islands - Scrabster - Immingham - Iceland	Short sea	2	553	13,130
MACANDREWS - SP/UK	N Spain - Bristol - Liverpool - Greenock - N Spain	Short sea	1	1,036	53,872
MSC - GRANGE/TEES	Antwerp - Grangemouth - Teesport - Antwerp	Feeder/short sea	1	1,712	89,024
MSC - LIV/PBR/BES	Antwerp - Brest - Liverpool - Bristol - Antwerp	Feeder/short sea	2	3,685	85,800
OCEAN ALLIANCE - FAL7/LL3/NE7/AEU7	Far East - Med - Antwerp - Hamburg - Rotterdam - Felixstowe - Southmpton - Med - Far East	Deep sea	11	13,908	66,536
UNIFEEDER - UK 4	Rotterdam - Felixstowe - Tees - Grangemouth - Rotterdam	Feeder	1	508	26,416

UNIFEEDER - UK/BALT	Hamburg - Immingham - Baltic - Immingham - Felixstowe - Tees - Hamburg	Feeder	2	865	19,760
UNIFEEDER - UK1	Rotterdam - Immingham - Grangemouth - Felixstowe - Rotterdam	Feeder	1	808	42,016
X-PRESS FEEDERS - ISX3	Le Havre - Southampton - Liverpool - Greenock - Le Havre	Feeder	1	822	42,744
X-PRESS FEEDERS - ISX5	Southampton - Le Havre - Liverpool - Greenock - Southampton	Feeder	1	820	42,640

APPENDIX 3: MSRS COASTAL SHIPPING MODEL

This spreadsheet model was developed by MDS Transmodal to model the maximum grant rates that would apply under a potential MSRS (Coastal Shipping) grant scheme and to establish the extent of any potential impact on existing maximum grant rates under the existing MSRS (Intermodal) – Ports scheme.

The model has the following tabs, which are either inputs to the model, calculations within the model or outputs.

TABS	NOTES	SOURCE
Inputs		
Assumptions	Input assumptions for the coastal container shipping cost model	MDS Transmodal, validated by shipping lines
Maritime distances	Input assumptions for maritime distances for coastal shipping cost model	MDS Transmodal, based on Veson Nautical distances calculator
Env benefits	Environmental benefits for zone-to-zone movements	DfT MSRS (Intermodal) Port spreadsheet model
Rail costs	Rail costs for zone-to-zone movements	DfT MSRS (Intermodal) Port spreadsheet model
Road costs	Road costs for zone-to-zone movements	DfT MSRS (Intermodal) Port spreadsheet model
Existing rail grant rates	Existing MSRS (Intermodal)-Port grant rates for zone-to-zone movements	DfT MSRS (Intermodal) Port spreadsheet model
Calculations		
Calculations	Calculations of coastal container shipping costs for zone-to-zone movements	MDS Transmodal
Coastal shipping costs	Presentation of coastal container shipping costs for zone-to-zone movements	MDS Transmodal
Rates sustainable vs road	Calculation separately of coastal shipping cost vs. road cost and rail cost vs. road cost	MDS Transmodal
Financial need	Calculation of financial need separately for coastal shipping vs. road and rail vs. road	MDS Transmodal
Outputs		
New grant rates	Presentation of new grant rates for rail/coastal shipping	MDS Transmodal
Existing vs New grant rates	Presentation of comparison between new grant rates for rail/coastal shipping and existing rail grant rates	MDS Transmodal

The outputs from the MSRS Coastal Shipping Model are provided below, along with the existing MSRS (Intermodal) – Port maximum grant rates for the purposes of comparison.

MSRS (Intermodal) – Port: Existing maximum grant rates for rail

	Destination Zone (Inland Terminal)																		
	Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Origin	1	£0	£40	£51	£27	£23	£0	£0	£0	£0	£0	£15	£36	£54	£52	£27	£0	£63	£7
	2	£79	£0	£63	£20	£24	£0	£0	£0	£0	£0	£0	£17	£40	£23	£19	£0	£19	£68
	3	£63	£66	£0	£65	£56	£87	£78	£0	£0	£0	£94	£55	£66	£66	£83	£0	£51	£12
	4	£39	£4	£76	£0	£9	£45	£76	£29	£0	£0	£42	£63	£51	£33	£59	£0	£0	£0
	5	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
	6	£0	£0	£57	£54	£30	£0	£61	£75	£0	£0	£63	£84	£5	£54	£34	£0	£0	£0
	7	£0	£0	£0	£18	£73	£97	£0	£57	£49	£15	£81	£36	£0	£0	£0	£0	£0	£0
	8	£0	£0	£0	£4	£59	£65	£3	£0	£95	£74	£24	£28	£0	£0	£0	£0	£0	£0
	9	£0	£0	£0	£0	£0	£38	£62	£89	£0	£89	£0	£0	£0	£0	£0	£0	£0	£0
	10	£0	£0	£0	£0	£0	£0	£29	£52	£89	£0	£0	£0	£0	£0	£0	£0	£0	£0
	11	£17	£0	£49	£48	£21	£60	£14	£24	£0	£0	£0	£19	£88	£62	£55	£10	£6	£0
	12	£71	£0	£28	£66	£39	£78	£31	£40	£0	£0	£15	£0	£80	£47	£63	£0	£41	£0
	13	£28	£6	£35	£44	£74	£0	£0	£0	£0	£0	£80	£79	£0	£52	£0	£48	£47	£19
	14	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
	15	£19	£0	£38	£64	£57	£9	£28	£0	£0	£0	£47	£63	£0	£21	£0	£38	£38	£0
	16	£62	£0	£0	£0	£0	£0	£0	£0	£0	£0	£25	£0	£48	£14	£38	£0	£133	£0
	17	£19	£0	£27	£0	£12	£0	£0	£0	£0	£0	£18	£40	£42	£42	£33	£128	£0	£53
	18	£30	£68	£43	£8	£3	£0	£0	£0	£0	£0	£0	£17	£60	£35	£27	£0	£57	£0

MSRS: new maximum grant rates (lower of coastal shipping and rail)

		Destination Zone (Port)																
	Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Origin Zone (Port)	1		£40	£42	£27							£15	£36	£38		£27		£63	£7
	2	£70		£23	£20								£17	£40		£14		£19	£29
	3	£63	£24		£65		£87	£35				£94	£55	£23		£63		£9	£12
	4	£39	£4	£8			£2	£75	£29			£42	£63	£51		£35			
	5																		
	6			£57	£52			£61	£75			£63	£78	£5		£34			
	7				£18		£47		£57	£49	£15	£81	£36						
	8				£4		£10	£3		£31	£74	£24	£28						
	9						£38	£62	£89		£48								
	10							£29	£52	£46									
	11	£17		£49	£48		£60	£14	£24				£19	£88		£3	£10	£6	
	12	£33		£28	£66		£61	£31	£3			£15		£80		£63		£41	
	13	£28	£6	£35	£44			£0				£14	£79				£25	£47	£5
	14																		
	15	£19		£38	£28		£9	£28				£29	£10				£38	£38	
	16	£62		£0								£25		£27		£38		£91	
	17	£19		£16								£5	£40	£42		£33	£91		£23
	18	£30	£33	£15	£8								£17	£37		£27	£0	£57	

Change in new maximum MSRS rates compared to existing rates

Grant rates (£/unit) Coastal shipping (new) vs Rail (existing) zone with no port

		Destination Zone (Port)																	
	Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Origin Zone (Port)	1		£0	-£9	£0							£0	£0	-£16		£0		£0	£0
	2	-£9		-£40	£0								£0	£0		-£5		£0	-£39
	3	£0	-£42		£0		£0	-£43				£0	£0	-£43		-£20		-£42	£0
	4	£0	£0	-£67			-£43	-£1	£0			£0	£0	£0		-£24			
	5																		
	6			£0	-£2			£0	£0			£0	-£6	£0		£0			
	7				£0		-£50		£0	£0	£0	£0	£0						
	8				£0		-£54	£0		-£64	£0	£0	£0						
	9						£0	£0	£0		-£41								
	10							£0	£0	-£43									
	11	£0		£0	£0		£0	£0	£0				£0	£0		-£52	£0	£0	
	12	-£38		£0	£0		-£18	£0	-£37			£0		£0		£0		£0	
	13	£0	£0	£0	£0			£0				-£66	£0				-£23	£0	-£15
	14																		
	15	£0		£0	-£35		£0	£0				-£19	-£53				£0	£0	
	16	£0		£0								£0		-£21		£0		-£41	
	17	£0		-£11								-£13	£0	£0		£0	-£36		-£30
	18	£0	-£35	-£27	£0								£0	-£23		£0	£0	£0	

Negative number = reduction compared to existing rail grant rate
£0 = no change compared to existing position
White blank cell = no existing grant for rail

APPENDIX 4: QUALITY ASSURANCE REPORT ON THE MSRS COASTAL SHIPPING MODEL

No.	QA Description	Tab & Cell References	QA result	Suggested Action
Check_01	Check the inputs in the assumption tab of the model.	<Assumptions>, whole tab	The notes in column C provides description of the inputs/assumptions	If possible, provide basis of assumptions in greater detail.
Check_02	Check if the formats of cost & benefit inputs are consistent.	<Env benefits>, <Rail costs>, <Road costs>, <Maritime distances>, whole tab	OK The format (i.e. the number of empty/zero inputs, due to 0 port in zone 5 and 14) for each input tab matches each other.	None
Check_03	Check the labels and input values are correct.	<Calculations>, row 2 and 3, cells C6-C16	OK	None
Check_04	Check if the calculations follow the logic and formulae work correctly.	<Calculations>, row 20 - 47	OK	None
Check_05	Check if the table looks up the correct value from the calculations.	<Coastal shipping costs>, whole tab	OK	None
Check_06	Check the logic of calculations in these two tabs for calculating the new grant rates.	<Rates sustainable vs road> and <New grant rates> tab, whole tab	OK	None
Check_07	Check the formulae in the tabs, see if they have been dragged correctly from top to the end of table.	<Existing vs New grant rates> <Coastal shipping vs Rail> <Financial need>	OK	None

Check_08	Check the model inputs/outputs against the Draft Interim Report.	Whole model	Issue 1. Assumptions in the spreadsheet don't match the report, i.e. Time charter per day - 4000 in spreadsheet, 3000 in the Draft Interim Report 2. Because assumptions are different, the numbers in the case study cannot be replicated in the model. For example, within case study 1 (Table 11) from the Draft Interim Report, the time charter cost is 21,000 whereas it is 28,000 in the spreadsheet model.	Please check if the numbers in the Draft Interim Report are updated based on this version of cost model for the Final Report.
Check_09	Spreadsheet best practice check.	Whole Model	There are a few places in the model which do not follow spreadsheet modelling best practice rules.	A few suggestions: 1. To have the clearer format of inputs, calculation and output tabs. For example, apply different colour for different types of tab and a good order of tabs (i.e. input tabs stay together as the first few tabs). 2. Move the hardcode values within the formulae (i.e. "7" within C18 of <Calculations> tab) to another tab (i.e. <Assumptions> tab). Although it is well known that there are 7 days per week, having hard coded numbers within formulae is still confusing and can lead to potential errors. 3. Include a "Version Control" tab, in which the updates of each version of model are recorded. This is easier to track the changes/updates once it is handed over to DfT.