

Short Sea Shipping in the Baltic Sea Region

Freight volumes and the potential of 45' containers

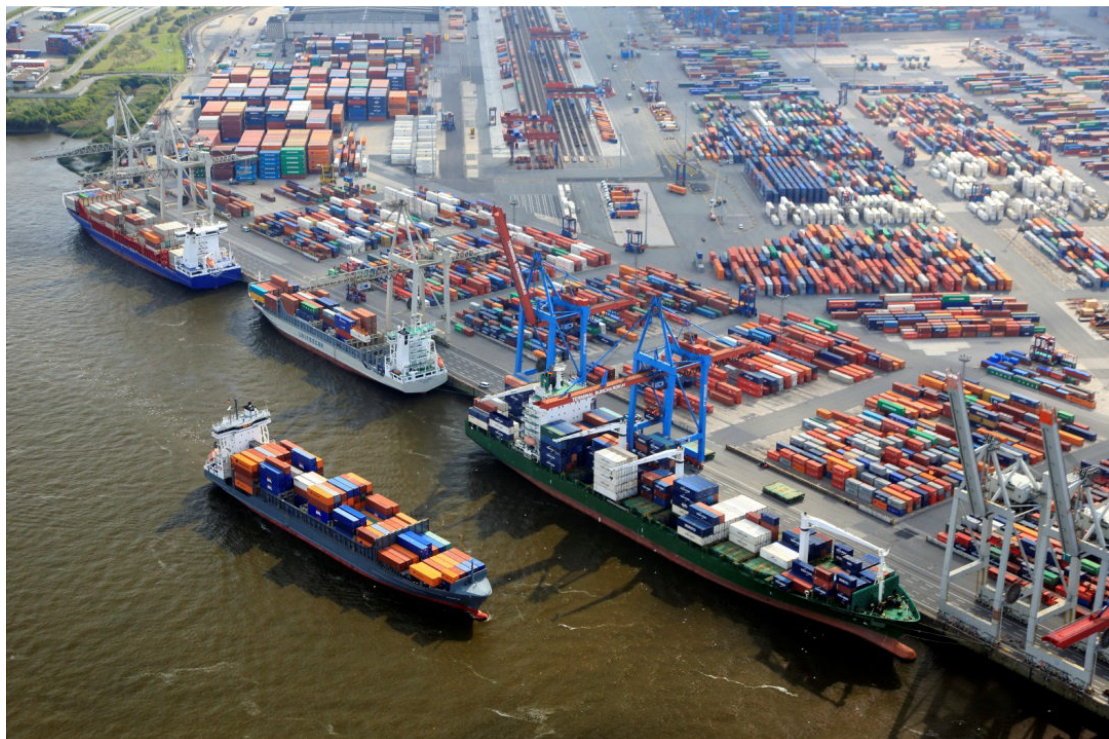
Base year 2012 and outlook 2020/2030

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Management Summary

Based on original research and targeted interviews, the present study estimates the shortsea container volumes in the Baltic Sea region and the share of 45' containers for each of the major trade routes. It also identifies the volumes transported by other modes of transport (ro-ro traffic and direct land transport). In a second step, the volumes are forecast based on market developments, taking into account the adverse effect of the stricter SECA regulations on sea-borne traffic.¹ This market forecast is the basis to analyse the potential impact of certain measures to promote the use of 45' containers which have been developed based on interviews with major stakeholders.

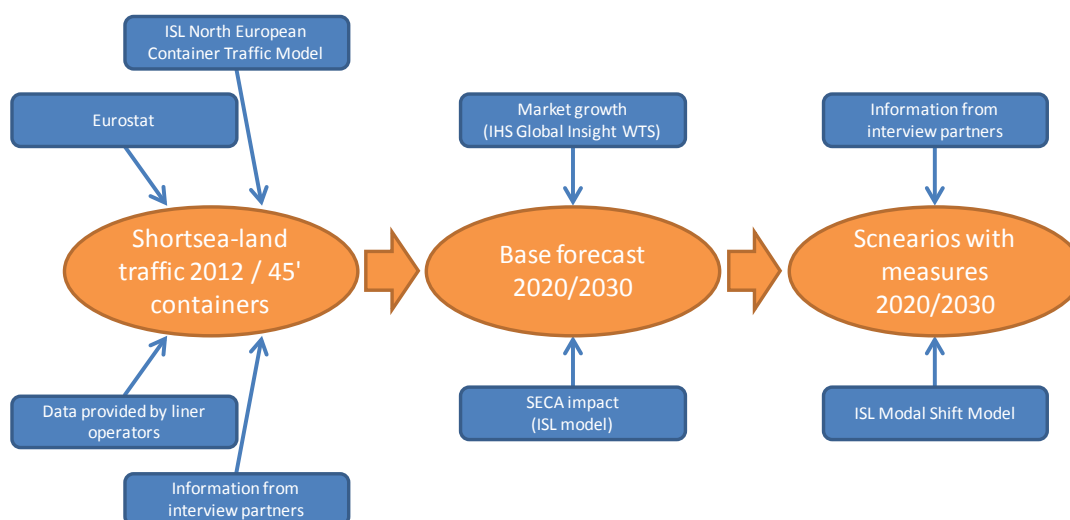
Main findings

- The total containerised shortsea-land volume in the Baltic Sea Region amounted to 1.3 million TEU in 2012, of which 1.1 million TEU between the North Range ports and the BSR, and 0.2 million TEU within the BSR.
- The base forecast for 2020/2030 is rather bleak due to the shifts induced by the new SECA regulations: ceteris paribus, containerised shortsea volumes drop by roughly 10 per cent between 2012 until 2020 and will more or less reach the 2012 level again in 2030.
- A total of six different measures are developed that might help to foster the use of 45' containers or shortsea container traffic in general, hence mitigating the modal backshift caused by the IMO Sulphur Directive.

Methodology

The first major challenge was the scarce availability of data. The share of shortsea-land traffic (as opposed to feeder traffic) is not included in official statistics and had to be estimated. Similarly, few ports report the handling of 45' containers. Based on ISL's North European Container Traffic Model and additional data from the liner operators, these gaps could be filled.

Fig. 1 Sources and project algorithm



Source: ISL 2014

¹ The impact of the stricter SECA regulations was analysed in an earlier study on which the present study draws (http://www.reederverband.de/fileadmin/vdr/pdf/themen_und_positionen/GermanISLStudyonSECAimpacts.PDF).

The forecast is based on foreign trade forecasts provided by IHS Global Insight. These contain forecasts on the volume of goods that are potentially transported in containers or trucks/trailers on a country-to-country-level. Therefore, the different dynamics of the different trade routes and the underlying commodity structure are taken into account.

Finally, the impact of those measures directly influencing transport costs were modelled based on ISL's modal split model which had already been calibrated to the Baltic Sea as part of previous research.

Results

The major **results for the base year 2012** can be summarised as follows:

- The total containerised shortsea-land volume in the Baltic Sea Region (BSR) amounted to 1.3 million TEU, of which 1.1 million TEU were transported between the North Range ports and the BSR and 0.2 million TEU within the BSR.
- The high volume of shortsea-land traffic between the North Range and the Baltic Sea area is in large part made possible by combining feeder and shortsea volumes on board the ships to reach the critical mass for regular liner services.
- Container traffic has the highest share on long sea distances, e.g. between the North Range and Russia (0.6 million TEU).
- Intra-Baltic traffic is to a large part ro-ro/ferry traffic. Significant amounts are transported only between German and Polish ports on the one hand and Russia, Finland, and Sweden on the other hand.

The **base forecast for 2020/2030** is rather bleak due to the shifts induced by the new SECA regulations. Assuming that the additional costs for meeting the stricter sulphur emission standards are eventually borne by the clients, we assume a shift towards routes with shorter sea distances (e.g. ferries) or direct land traffic (where a viable alternative). The base forecast can be summarised as follows:

- Containerised shortsea volumes drop by roughly 10 per cent between 2012 until 2020 and will more or less reach the 2012 level again in 2030.
- Particularly high growth rates are projected for intra-Baltic traffic to/from the Polish ports. Thanks to Maersk's direct calls with an Asia service in Gdansk, the intra-Baltic feeder network is growing and with it the possibility to develop containerised shortsea traffic in the region.

Finally, a total of six different measures were analysed. The **impact of the measures on potential volumes in 2020/2030** is summarised below:

- Emission-based bonuses: According to the model calculations, a 30% fuel cost reduction, which would almost even out the additional costs of the SECA regulation, could increase the shortsea potential by 17-18 % in the forecast years, i.e. around 235,000 TEU in 2030.
- Subsidize container handling: According to the modal shift model, a 10-Euro subsidy on handling in EU ports would add some 7 to 8 % (approx. 80,000 TEU in 2020 and 100,000 TEU in 2030).
- Support construction of container-compatible ramps at shippers' hinterland facilities: according to interview partners, some shippers cannot handle containers as their loading ramps are

designed for trailers. However, it is unclear how much additional traffic could be generated when promoting the construction of suitable ramps.

- Marketing efforts in Baltic Sea economies: On several trades, the imbalance makes container traffic economically unviable. By creating more backhaul cargo, targeted marketing could generate some additional 50,000 TEU in 2030.
- Grey boxes: Imbalances of single liner operators or forwarders may in some cases even out (e.g. one specialising on exports from Germany and another on exports from Finland). By using the same boxes, the volume of empty transports could be reduced, hence making container transports more competitive. As there is no data available on the individual companies' imbalances, the potential success of grey boxes is difficult to estimate.
- Motivate carriers to accept shortsea cargo: Some of the large carriers operate own feeder services that are closed to shortsea-land containers. Especially where these services serve niche markets, opening them to shortsea containers could increase shortsea volumes by up to 50,000 TEU in 2030 (based on an appraisal of the service network).

1 Shortsea Shipping in the Baltic Sea – Status quo 2012

Identifying ‘real’ shortsea shipping flows – i.e. intra-European maritime trade as opposed to feeder volumes – is a major challenge because there is way of identifying it based on official statistics. On the one hand, maritime transport statistics differentiate between different types of cargo units, their weight and the ports of origin and destination, but feeder and shortsea-land traffic are lumped into one. On the other hand, after the conclusion of the European Single market in the early 1990s the customs-based statistics on intra-European trade disappeared and were replaced by a survey-based dataset with much less detail (e.g. border sections).

Therefore, ISL has developed a survey-based algorithm to split the intra-European maritime traffic into feeder and shortsea-land volumes. The so-called Short Sea Shipping Survey has first been conducted for the base year 2003 and has since then been at the heart of ISL’s North European Container Traffic Model. For the present study, this survey was extended to the intra-Baltic Sea traffic and complemented by questions regarding the use and potential of 45' containers (see following chapters).

In line with the tender, the focus will be on current and future short sea container traffic, which is limited to certain mostly long-distance routes. In this chapter, the ‘real’ short sea volumes (i.e. excluding feeder) for the base year 2012 will be identified for the major trade lanes and compared with the volume of ro-ro and direct truck traffic (containerised and non-containerised). The latter will be quantified to identify the potential for future modal shifts.

1.1 Traffic flows between continental Western Europe and the Baltic Sea area

The major containerised short sea flows can currently be found between the North Range ports and ports in the Baltic Sea. There are three reasons for this predominance:

- Existing extensive container liner network between North Range ports and Baltic Sea region, viable only because of the high volume of feeder traffic²
- Existing network of rail and barge services in the hinterland (additional cost savings in long-distance hinterland transport)
- Longer sea distances compared with intra-Baltic traffic, favouring container traffic³

In the following sections, the major trade flows will be identified and the competing modes for each corridor will be identified. For each trade, the share of 45' containers is estimated based on data reported by some of the ports,⁴ a database provided by one large regional liner operator, and interviews.

² According to ISL’s Shortsea Shipping Survey, all liner services on this trade predominantly transport feeder boxes, but most of them also carry intra-European shortsea-land boxes. Only a few liner services operated by or for deepsea liner operators exclusively transport feeder traffic.

³ The unit costs per sea mile are lower for containers, but loading/unloading is generally more expensive. In order to compensate the high fixed cost of handling operations, longer distances need to be travelled. Therefore, intra-Baltic transport – and especially the North-South trade – is dominated by ro-ro transport.

⁴ Most of the ports – including all major North Range ports – only distinguish between 20' and 40' containers so the 45' containers cannot be identified. Some ports, however, differentiate 45' from 40' containers; where they do, the share of 45' containers was analysed by corresponding country.

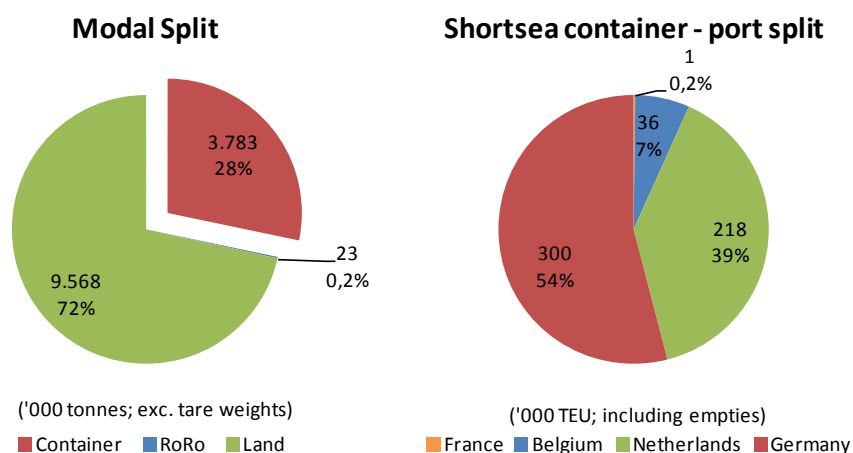
1.1.1 North Range – Russia

Due to the relatively long distance, the North Range-Russia trade is most prone to containerised transport. There are actually no ro-ro cargo services between the North Range and Russia. However, there is still a considerable amount of direct truck traffic, most notably to and from Germany. The truck traffic is first and foremost done by Russian transport companies, which are on average less expensive than the Western European ones.

According to the available data and ISL estimates, 28 % of the traffic between the North Range ports' hinterland and Russia is transported as shortsea container traffic, the remainder being mostly direct land traffic (truck).⁵ Since there are no regular ro-ro services between the North Range and Russia (excluding car carriers/trade of vehicles), the share of ro-ro traffic is limited to 0.2 %. However, the Russia ro-ro services in Lubeck, Kiel and Sassnitz (see 1.2.1) are a direct competition for the North Range ports' hinterland.

Though there is no consistent data on the hinterland distribution of shortsea-land container traffic, one can assume based on cost models that its share in the modal split is particularly high in the regions around the ports connected regularly with Russia and in regions connected to the ports through regular intermodal services.⁶ Quite some traffic also bypasses the North Range ports, e.g. trailers on rail services arriving in Hamburg-Billwerder rail station or directly in the port of Lubeck and then transported onwards by ro-ro services.

Fig. 2 North Range – Russia: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat, ISL estimates

The container shortsea-hinterland traffic of the North Range ports (excluding transshipment to/from e.g. Atlantic ports) amounted to 555,000 TEU, of which more than half was loaded/discharged in the German ports. All traffic modes show a pronounced export surplus of continental Western Europe vis-à-vis Russia.

The major players for shortsea container traffic in 2012 were CMA-CGM/FESCO, Containerships, Unifeeder, and Teamlines. Though deploying considerable capacity on the North Range-

⁵ The estimate of truck traffic is based on the traffic of EU vehicles and an estimate of the volume transported by Russian trucks – which in turn is based on a comparison with other East-West trades.

⁶ Rail transport of containers costs slightly less than the transport of trailers. Barge transport of trailers is very costly (no stacking possible) and hence not commonplace.

Russia trade, other deepsea liner operators like Maersk or MSC only transport little intra-European shortsea-land traffic.

Tab. 1 North Range – Russia: major container and ro-ro liner services 2012

Shortsea container liner services	Ro-ro liner services
CMA-CGM/FESCO ESF RUS 1	-
CMA-CGM/FESCO ESF RUS 2	
CMA-CGM/FESCO ESF RUS 3	
CMA-CGM/FESCO ESF RUS 4	
Teamlines BAL1/RUS1	
Unifeeder BALT1	
Unifeeder BALT/SCAND1	
Unifeeder BALT/SCAND2	

Source: ISL based on MDS Transmodal

The share of 45' containers in the short sea container trade (excluding feeder) is estimated to have reached roughly 40 % between the North Range ports and Russia. Accordingly, roughly 220 thousand TEU were transported between the hinterland of the North Range ports and Russian ports – first and foremost St. Petersburg. The use of 45' boxes in Russia is hindered by insufficient availability of 45' chassis and general lack of intermodal transport capabilities according to the survey participants.

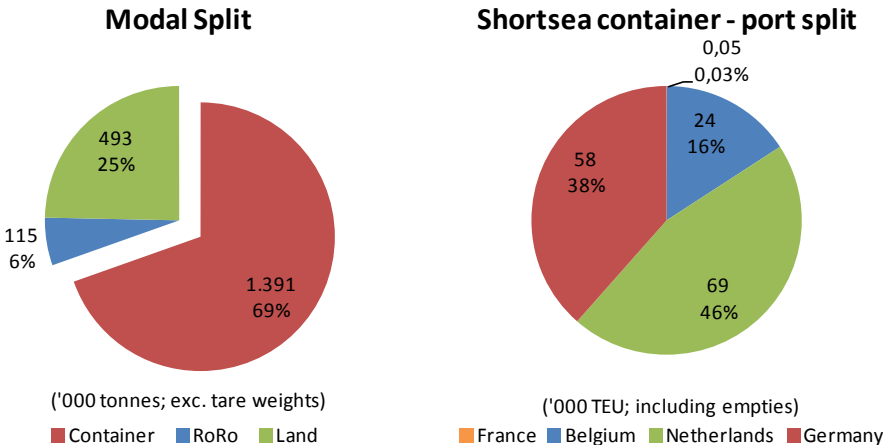
1.1.2 North Range – Finland

Traffic between the North Range ports and Finland is also well suited for containerised short sea trade because of the sea distance travelled and the even longer distance for direct truck traffic.⁷ In addition, Finland is EU member and part of the Eurozone, so the share of shortsea trade compared with deepsea volumes should be higher than for Russia. The trade is also rather balanced.

Accordingly, the share of shortsea-land traffic in the total modal split is particularly high: roughly two thirds of all traffic used maritime containers (excluding the volumes passing through Baltic ports). There is some ro-ro cargo on mixed ro-ro/container services to/from Belgium and the Netherlands (6 % of total).

⁷ Note that a large volume of Russia traffic is bound for the Moscow area. Here, the truck distance is generally shorter than the maritime transport chain, especially in the southern part of the hinterland.

Fig. 3 North Range – Finland: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

The shortsea-land container traffic amounted to 150,000 TEU in 2012, of which approximately 60 % (90,000 TEU) were 45' containers. Rotterdam is the leading port for Finland shortsea traffic, followed by Hamburg and Antwerp.

The major liner operators in 2012 were Unifeeder, Teamlines, and Containerships. Here again, liner operators like MSC, Maersk and Hapag-Lloyd operate own services, but mostly for feeder traffic.

Tab. 2 North Range – Finland: major container and ro-ro liner services 2012

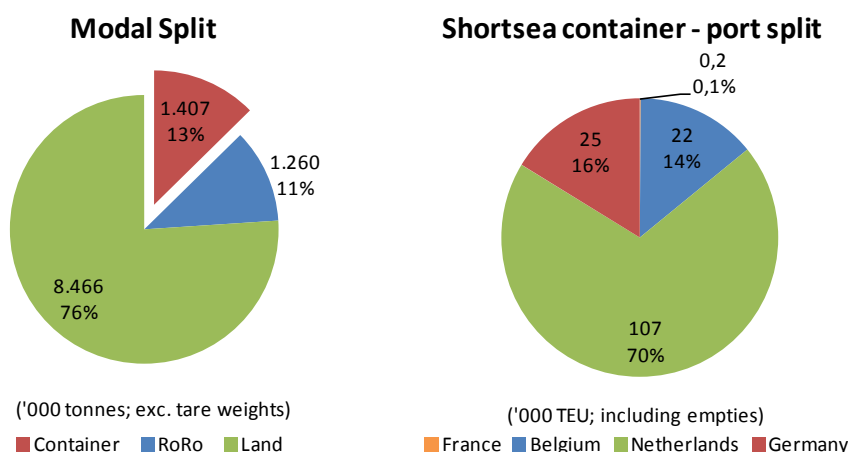
Shortsea container liner services	Ro-ro liner services
Containerships Loop 1	Transatlantic TransBothnia Line (ConRo)
Containerships Loop 2	Finnlines Amsterdam service (ConRo)
Teamlines BAL1/RUS1	
Teamlines FIN2/POL3	
Unifeeder BALT1	
Unifeeder BALT/SCAND1	
Unifeeder BALT/SCAND2	

Source: ISL based on MDS Transmodal

1.1.3 North Range – Sweden

For Sweden, pure land traffic via Great Belt and Öresund bridges as well as ro-ro/ferry traffic are strong competitors to shortsea container traffic. In terms of total distance travelled, the maritime services generally have a slight advantage. However, the distance advantage is rather small so it is difficult to make up for the handling and sea transport charges – especially to/from South Sweden. What’s more: the direct rail link via Denmark connects Sweden directly to the European continent. In 2012, roughly 3.5 million tonnes of freight were transported by rail and another 5 million by truck. The maritime connections together make up only a quarter of total transport between north-west Europe and Sweden (see Fig. 4).

Fig. 4 North Range – Sweden: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

Consequently, the share of shortsea-land traffic is much lower than for Finland and also than for Russia. The major players in Sweden shortsea container traffic are Teamlines, CMA-CGM and the special operator SCA Transforest.

Tab. 3 North Range – Sweden: major container and ro-ro liner services 2012

Shortsea container liner services	Ro-ro liner services
CMA-CGM DanBot Feeder	Sun Lines
SCA Transforest Container Express	
Teamlines BAL1/RUS1	
Teamlines DSW1	
Teamlines NOR1	
Unifeeder BALT/SCAND1	
Unifeeder SCAND2	
Unifeeder SCAND4	
Unifeeder SCAND5	
Unifeeder SCAND6	

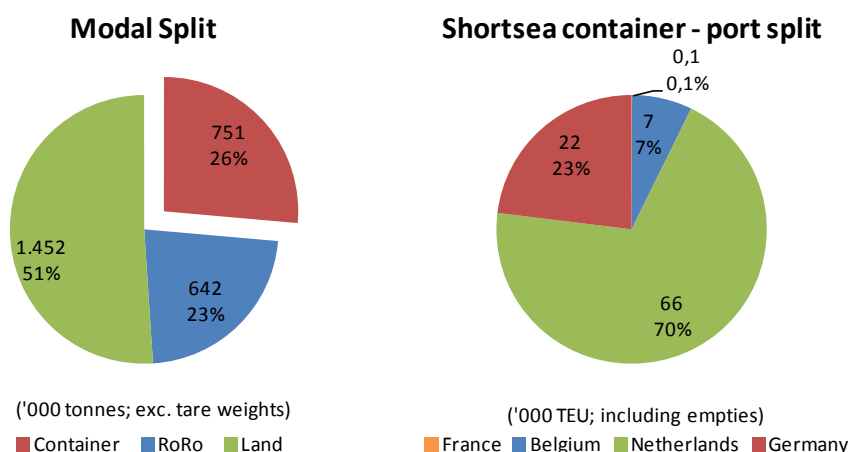
Source: ISL based on MDS Transmodal

The share of 45' containers seems to be rather limited even though the average weight per laden TEU is low. One reason could be the use of deepsea equipment by deepsea/feeder operators on the North Range – Sweden leg. The calculated volume of 45' containers is roughly 46,000 TEU.

1.1.4 North Range – Norway

Norway is reachable by land via the Great Belt/Öresund bridges, though the distance travelled is generally longer than the maritime transport chains. Still, the direct land traffic has a considerable share.

Fig. 5 North Range – Norway: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

There are ro-ro services to/from Rotterdam and Amsterdam that account for 23 % of the Norway traffic. Shortsea-land container traffic has a share of 26 %. The Dutch ports are also dominating in that segment.

Tab. 4 North Range – Norway: major container and ro-ro liner services 2012

Shortsea container liner services	Ro-ro liner services
CMA-CGM Norway Feeder	Sea-Cargo Amsterdam/Esbjerg service
Teamlines NOR1	
Tschudi Lines Baltic Sea	
Unifeeder SCAND2	
Unifeeder SCAND4	

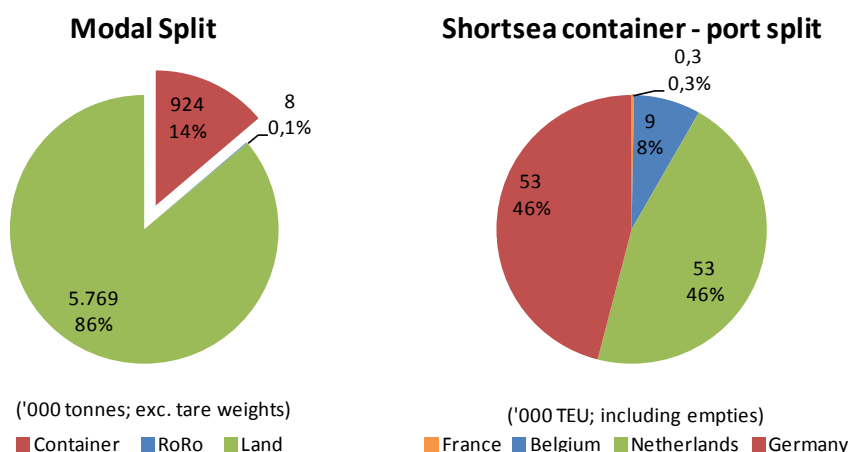
Source: ISL based on MDS Transmodal

The major operators are Unifeeder and Teamlines, the share of 45' containers is roughly 60 % (57,000 TEU).

1.1.5 North Range – Baltic States

For the Baltic States, land traffic is in most cases shorter. The total distance is rather short so the container handling costs have quite a high share, especially for e.g. Germany-Lithuania traffic. The share of shortsea-land container traffic is rather low with 14 %, ro-ro traffic is practically inexistent (to/from North Range).

Fig. 6 North Range – Baltic States: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

Container traffic totals some 115,000 TEU (excluding feeder), around half of which is transported in 45' boxes (60,000 TEU). The major operators are Unifeeder, Containerships and Teamlines, regular ro-ro services did not exist in 2012.

Tab. 5 North Range – Baltic States: major container and ro-ro liner services 2012

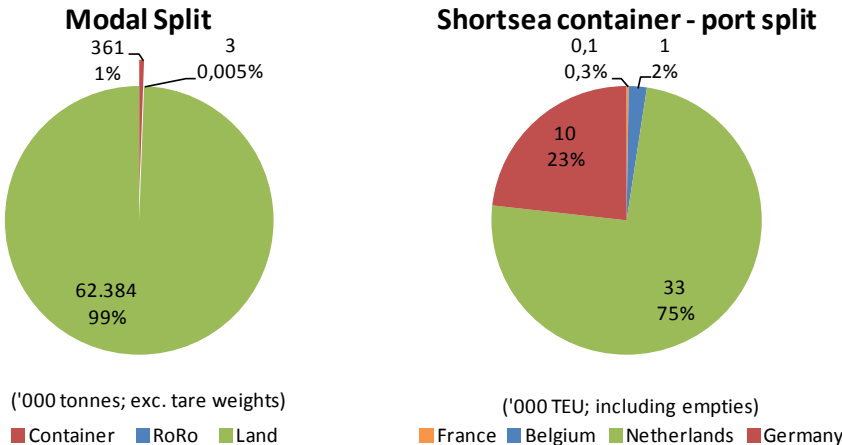
Shortsea container liner services	Ro-ro liner services
CMA-CGM/FESCO ESF RUS3	-
Containerships 1	
Containerships 2	
Unifeeder BALT4	
Unifeeder BALT/SCAND1	
Unifeeder BALT/SCAND2	

Source: ISL based on MDS Transmodal

1.1.6 North Range – Poland

Poland, finally, is the corresponding country with the lowest share of shortsea-land container traffic via North Range ports – for a good reason. In many cases, the maritime transport chain is significantly longer than the land traffic, and the short distance makes it difficult to compensate the container handling costs. This is especially true for the major trade partnership Germany-Poland. The cost advantage of direct truck traffic is strongest in East Germany, which is why there are neither maritime container nor ro-ro volumes between Germany's Baltic Sea ports and Polish ports (therefore no corresponding sub-chapter 1.2.6 below).

Fig. 7 North Range – Poland: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

There are no regular ro-ro services between the North Range and Poland, and the container liner services are mostly feeder services, only some of which carry small amounts of shortsea-land cargo.

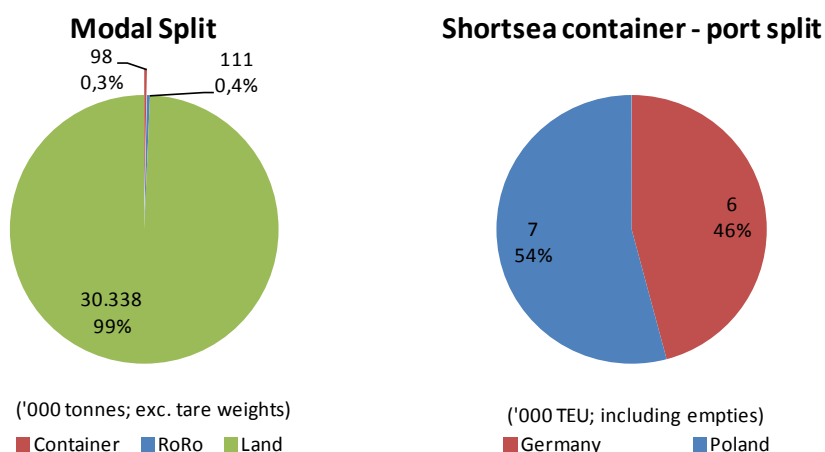
1.2 South Baltic – North and East Baltic

The southern Baltic Sea region – here defined through the German Baltic Sea ports and the Polish ports has little shortsea-container traffic with the other regions of the Baltic Sea, but an extensive network of ro-ro services. The following sub-sections show the major trade links and modal split of the trade between the regional ports’ hinterland and the other Baltic Sea regions. This will complete the analysis of shortsea-land container flows and its competing traffic flows.

1.2.1 South Baltic – Russia

Short sea container traffic between the German and Polish Baltic Sea ports and Russia has the potential to increase significantly during the years to come – despite the changes in the cost structure that the stricter sulphur emission limits will bring about as of 2015 (see chapter 5.1). In 2012, it only reached an estimated 15,000 TEU, but the feeder network to/from Gdansk and Gdynia to Russia is growing steadily since the introduction of Maersk’s direct calls with its AE1 service in Gdansk, and Maersk/Seago are increasing marketing efforts to attract shortsea cargo.

Fig. 8 South Baltic – Russia: Modal Split and shortsea-land container volumes



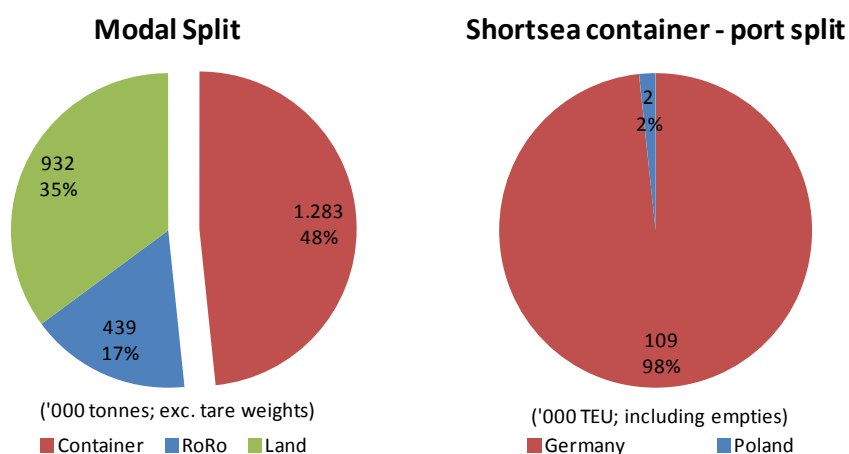
Source: ISL North European Container Traffic Model, Eurostat, ISL estimates

The volumes that could be generated are promising, especially if intermodal services are developed further. The same holds for the German ports of Kiel and Lubeck which are offering container or con-ro services with Russia. The share of 45' containers is currently about 40 %.

1.2.2 South Baltic – Finland

The transport of containers between the South Baltic and Finland concentrates largely on the port of Lubeck in Germany. Almost half of the traffic potential of the region's hinterland is transported in maritime containers, it seems, but it is actually the intermodal connections of the port of Lubeck that make it attractive for transporting containers between the **North Range ports'** hinterland and Finland.

Fig. 9 South Baltic – Finland: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

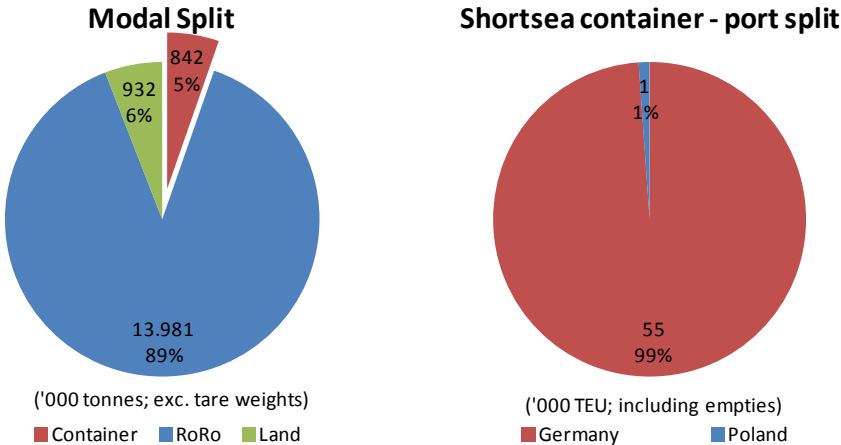
Lubeck being among the few ports to report the share of 45' containers, we can safely say that 57 % of the traffic was transported in 45' boxes in 2012 (63,200 TEU).⁸

⁸ This high share indicates that the importance of the “land bridge” between Hamburg and Lubeck for the transport of overseas containers to the Baltic Sea has lost significance. These flows would have considerably lower shares of 45' boxes.

1.2.3 South Baltic – Sweden

The traffic structure for Sweden resembles very much the structure for Finland: the German Baltic Sea ports of Kiel and Lubeck show considerable volumes of shortsea traffic which are partly generated in the North Range ports’ hinterland. However, RoRo traffic (including ferry traffic) is by far the most important transport mode on this trade.

Fig. 10 South Baltic – Sweden: Modal Split and shortsea-land container volumes



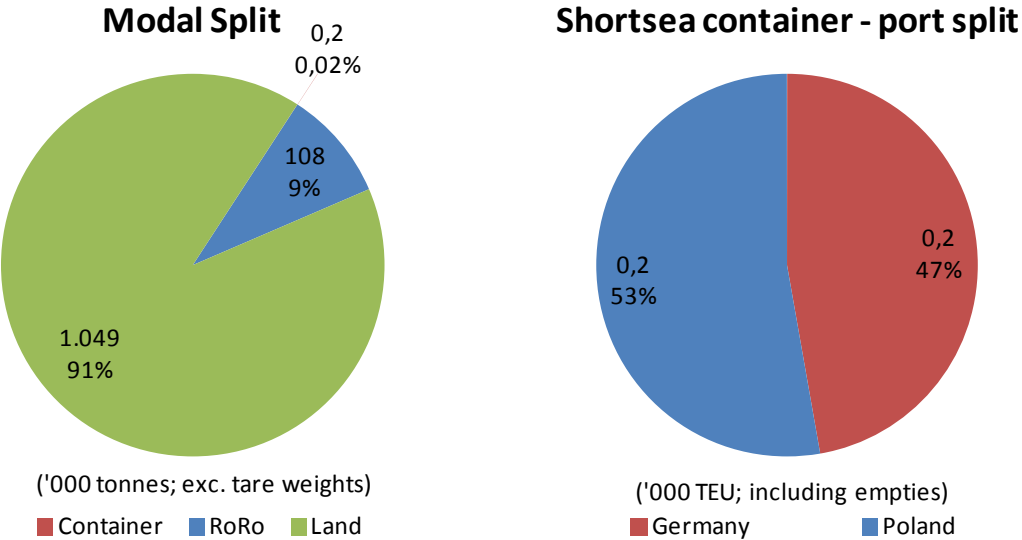
Source: ISL North European Container Traffic Model, Eurostat

Total shortsea-hinterland container traffic of the German and Polish Baltic Sea ports amounted to an estimated 56,000 TEU in 2012, of which only around 30 % are 45' containers. The volume of direct land traffic (via Great Belt and Öresund bridges) is surprisingly small. The additional distance that needs to be travelled from Central Europe to Sweden’s main markets when using the bridges apparently favours the ro-ro links between the South Baltic and Sweden.

1.2.4 South Baltic – Norway

There is practically no containerised South Baltic – Norway trade. There is no feeder traffic from the Southern Baltic to Norway so there are no synergies between the two traffic types. While direct land traffic is rather small from the South Baltic Sea ports’ hinterland to Sweden (as the most important Swedish areas are in the South and East of Sweden and well connected with ro-ro services), more than 90 % of traffic uses bridges rather than ships. Ro-ro services are in a remote second place with 9 %.

Fig. 11 South Baltic – Norway: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

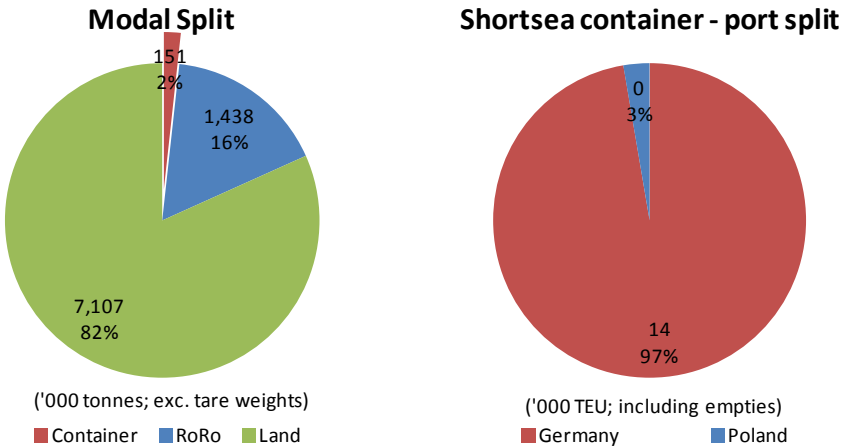
Container traffic is insignificant on this trade though there are considerable volumes transported most notably between Norway and Poland by land.

1.2.5 South Baltic – Baltic States

The final trade – South Baltic with Baltic States – is another candidate for high truck shares as the distances are rather small, the trucking costs lower than in Western Europe, and the sea route follows the coast line. With 82 %, the truck volumes have indeed a high share, but ro-ro traffic is not insignificant with 16 %. These traffics are exclusively generated in the German ports, first and foremost by Lubeck and Kiel. It can be assumed that part of the traffic is actually generated in the North Range ports’ hinterland through intermodal connections.

With roughly 15,000 TEU generated mostly by the German ports, shortsea-hinterland container traffic is of minor importance. With roughly 30 %, the share of 45' containers is rather low.

Fig. 12 South Baltic – Baltic States: Modal Split and shortsea-land container volumes



Source: ISL North European Container Traffic Model, Eurostat

1.3 Summary of 2012 trade volumes

To summarise, the share of shortsea-land container traffic is particularly high if

- the distance travelled is long
- there are high feeder volumes to bundle with shortsea volumes
- sea distances are considerably shorter than land distances

According to the estimates, there was a total of 1.3 million TEU shortsea-land traffic in the Baltic Sea area in 2012, of which 1.1 million TEU were generated by the North Range ports.⁹ In terms of TEU, 44 % of the volume was transported in 45' containers, equal to roughly 260,000 45' boxes transported throughout the year.

Tab. 6 Summary: estimate of shortsea-land container traffic and use of 45' containers

Corr. region	Total shortsea-land container traffic (TEU)		45' containers (TEU)		45' containers (no.)	
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic
Russia	555	13	222	6	99	3
Finland	150	110	90	63	40	28
Sweden	154	56	46	16	21	7
Norway	95	0	57	0	25	0
Baltic States	115	15	58	4	26	2
Poland	45	-	22	-	10	-
Total	1.115	194	496	89	220	40

Source: ISL North European Container Traffic Model, Eurostat, ISL estimates

Russia is the corresponding country generating the highest volume of shortsea-land traffic, though volumes are still nascent between Russia and the South Baltic Sea ports. Russia is followed by Sweden, Finland, the Baltic States and Norway. Poland still has little traffic despite high total trade and many feeder services. The main trade between Germany and Poland is practically 100% land traffic, and for most of the other West European corresponding countries, the direct land link is considerably shorter than transport involving sea transport. Transport to/from Scandinavia, on the other hand, is predominantly ro-ro transport. Only traffic between Poland and Russia is partly containerised (included under Russia-South Baltic, see chapter 1.2.1).

⁹ In line with the tender, traffic to/from the British Isles is excluded.

2 Major container shortsea operators

For this analysis, the operators which are found operating container capacity in the Baltic see have been broken down into two main categories:

- Pure Shortsea/Regional operators
- Deepsea Carriers with own networks in the Baltic Sea.

Thereby the Identification based on MDS liner shipping networks is not always clear and could be subject for discussion. For example the capacity of services attributable to Maersk and Seago has been added and featured under the section of Shortsea Operators because the Seago brand is trying to establish itself as a individual provider of shortsea services yet it does have access to Maersks liner network as well.

To gauge the impact and market relveance of the enterprises, an indicator, based on the operated capacity was build,

2.1 Offered services of Baltic Sea container lines

As the survey and enquiries made by ISL suggest, the “door-to-door” transport of containers seems to be the industry standard and is well provided by most of the capacity operated by pure shortsea operators (including the Maersk+Seago capacity). So far, at least 89% of the trade capacity would offer door-to-door logistics directly or at least stated they would.

Tab. 7 Major Baltic Sea Short Sea operators and offered services (as of 2014)

	trade capacity estimate ISL based on MDS 1,000 TEU	own equipment 45	Shortsea D2D	Shortsea Port to Port
Major Short-Sea Operators (North Range - Baltic Sea)				
Unifeeder	2270	x	x	x
Teamlines (Delphis + OOCL coop) / "Green Feeder"	1035	x	x	x
Seago + Maersk	705	x	x	x
Containerships (since 2013: via Rostock)	364	x	x	x
Transatlantic	295	x	x	x
Delta Shipping (financial trouble)	181	x	x	x
Eimskip	151	-	x	x
Fesco (CMA)	113	-	only in Russia	no 45'
SCA Transforest	99	-	in cooperation	x
X-PressFeeders	95	-	-	x
Samskip	94	x	x	x
North Sea Container Lines	78	x	x	x
Sea connect	71	x	x	x
Mann Lines	68	x	x	x
Norilsk Nickel	67	no feedback	no feedback	no feedback
NSC Archangelsk	63	no feedback	no feedback	x
Tschudi Lines	52	x	x	x
Swan Containerline (turned NVOCC)	23	-	working with	working with
Oy Hacklin Seatransport	12	x	x	x
Grimaldi (Finnlines)	6	no feedback	no feedback	no feedback

Source: ISL 2014

Tab. 8 Deepsea liner companies with own Baltic Sea transport networks (as of 2014)

	trade capacity estimate ISL based on MDS 1,000 TEU	own equipment 45	Shortsea D2D	Shortsea Port to Port
Deepsea liner operators with own NR-Baltic Sea services				
MSC	1957	-	x	x
CMA-CGM+Fesco	1132	x	x	x
Hapag-Lloyd	513	-	shortsea yes... but:	no 45'
Cosco RFS	265	-	-	-
Evergreen /W Unif./Xpressf.	234	x	x	x
OOCL only	218	-	x	x
APL	104,8	-	-	-
Hyundai	90	x	-	-

Source: ISL 2014

Among the Deepsea liner operators, MSC is having – by far – the lions share in trade capacity in the Baltic Sea, offering door to door services for shortsea containers. However upon request they stated that HCPW containers would be considered “Out of Gauge” (OOG)-cargo for which premium prices are charged. Hapag Lloyd generally excluded the transport of 45' boxes on their

current network and the services of Cosco, Hyundai and APL seem to be internal feeder services of the lines without the possibility to book shortsea containers at all.

2.2 Used equipment

The five largest shortsea operators (including Maersk/Seago) all own 45' boxes. Except for Maersk/Seago, these have all been “HCPW” containers. Generally speaking, when 45' equipment is being owned (or time chartered), the “High cube, pallet wide” box with an inner width of 2.44m seems to be the box of choice.

Tab. 9 Major Baltic Sea Short Sea operators and operated 45' equipment (as of 2014)

	trade capacity estimate ISL based on MDS 1,000 TEU	own equipment 45	Subtypes	
			HIGH (2,69m int) & PW (~2,44m int) 89m ³	others (DF 45 ignored)
Major Short-Sea Operators (North Range - Baltic Sea)				
Unifeeder	2270	x	x	
Teamlines (Delphis + OOCL coop) / "Green Feeder"	1035	x	x	
Seago + Maersk	705	x	-	45' High
Containerships (since 2013: via Rostock)	364	x	x	
Transatlantic	295	x	x	
Delta Shipping (financial trouble)	181	x	300	
Eimskip	151	-	n/a	
Fesco (CMA)	113	-	n/a	
SCA Transforest	99	-	n/a	
X-PressFeeders	95	-	n/a	
Samskip	94	x	x	
North Sea Container Lines	78	x	70	"Seacells" 34p
Sea connect	71	x	x	
Mann Lines	68	x	x	
Norilsk Nickel	67	no feedback	no feedback	
NSC Archangelsk	63	no feedback	no feedback	
Tschudi Lines	52	x	x	
Swan Containerline (turned NVOCC)	23	-	n/a	
Oy Hacklin Seatransport	12	x	x	
Grimaldi (Finnlines)	6	no feedback	no feedback	

Source: ISL 2014

Approximately 73 % of the total trade capacity operated by the shortsea carriers effectively has direct access to HCPW boxes. One reason for the special situation of Maersk Seago could be its affiliation with the deepsea business and hence a lack of focus for the intra-European trade requirements.

Tab. 10 Deepsea liner companies with own Baltic Sea transport networks and operated 45' equipment (as of 2014)

	trade capacity estimate ISL based on MDS 1,000 TEU	own equipment 45	Subtypes	
			HIGH (2,69m int) & PW (~2,44m int) 89m ³	others (DF 45 ignored)
Deepsea liner operators with own NR-Baltic Sea services				
MSC	1957	-	n/a	
CMA-CGM+Fesco	1132	x	x	
Hapag-Lloyd	513	-	n/a	
Cosco RFS	265	-	n/a	
Evergreen /W Unif./Xpressf.	234	x	-	45' High
OOCL only	218	-	n/a	
APL	104,8	-	n/a	
Hyundai	90	x	-	45' High

Source: ISL 2014

As it would seem, CMA-CGM is the only operator with an owned fleet of 45' HCPW boxes, whilst other operators either entirely avoid the 45' boxes or simply focus on the “45' high” type, which with its typical inner width of 2.35m is not optimized for the standardized European pallet-size.

As an interim conclusion it would thus seem that the intra-European container trade could benefit from both

- An opening of Top liners carriers own feeder services for shortsea cargoes, as well as
- A wider availability of 45' HCPW boxes among carriers (although the conducted interviews among the shortsea operators did in no way indicate a shortness of 45' HCPW boxes¹⁰).

¹⁰ A fact most likely driven by the relatively small charter rates or investment costs and unproblematic buying/discarding procedures of containers as opposed to e.g. merchant vessels

3 Market perception of 45' box potentials and challenges

A first response during the conducted interviews among the shortsea operators was that the most striking challenge preventing a wider use of 45' containers in intra-European container shipping was the price or rather the competition of the trucks and ro-ro networks. Other than that, the feedback from the interview-partners suggested that there are no hard obstacles in place, but rather challenges which can be categorized into:

- Terminal operations challenges,
- Hinterland challenges, or
- Shipping challenges.

Some of the reported challenges which fit the above mentioned categories have a more or less direct/transparent connection to the price/competition challenge. Others stand alone.

3.1 The price/competition challenge

This criteria is so obvious that it is barely worth reporting, yet every interview participant has stretched that the biggest challenge in order to attract cargoes for intra-European container shipping networks would be the competition from truck transport.

3.2 Challenges related to the port areas/terminal operations

Whilst in the Baltic Sea ports, storage and handling of 45' boxes seems to be a relatively trivial and carefree issue one might have gotten the impression that some of the major North Range Container Terminals consider these boxes a burden on their economic performance as they would require specially designed storage areas (the current alternative being offered is that 45' boxes consume the space of three 20' boxes and get charged accordingly for three TEU which would be a disproportional burden). Additionally, one continental North range terminal was quoted repeatedly as effectively denying storage and handling of 45' boxes.

3.3 Challenges related to the hinterland transportation/logistics

A surprisingly wide bouquet of challenges for an increased use of 45' containers or shortsea shipping of containers in general arises in the hinterland. Relatively often it was stated that the logistics of container transports are more complicated due to the fact that truck drivers can be asked to take care of the stowing process for conventional trailers and that shippers in the hinterland typically are not accustomed to loading 45' boxes and ramps are typically constructed around the loading procedures of trucks.

Two availability problems seem to be a major burden

1. The limited availability of backhaul cargoes in the Baltic Sea economies is rendering some of the trade routes imbalanced and thus economically challenged as shippers in the end have to pay higher freight rates on the head haul, to compensate for the cargo shortage on the backhaul.

2. The rather limited supply of 45' boxes in areas more distant from the ports such as southern Germany, where shippers could be willing to use 45' boxes but the needed pre-carriage of the box to the shipper is rendering the operation economically unattractive.

3.4 Challenges related to the shipping operation itself

The biggest common denominator in the interviews regarding challenges of the shipping operation was that the service frequency of the shortsea shipping operation – sometimes related to the generally reduced reliability of the shipping operation would be the biggest burden when trying to attract even the most seatransport-affine customer.

Additionally it became evident that a lot of the connections operated by the deepsea-lines are effectively not available to intra-European shippers, which is probably exacerbating the phenomenon.

Industry insiders suggested that approximately one third of container ships available for time charter would be fitted to transport 45' boxed in an economically viable way. Yet a few operators stated that they could only transport a given amount of the extra-long boxes on board their vessels without giving up too much of the container capacity of the vessel.

4 List of suggestions to overcome / outweigh the challenges

During the conducted interviews among shortsea shipping companies, a few suggestions have been made as to how the identified challenges could be overcome. Some of those suggestions seemed either too radical, not practical or by far not compatible with EU laws to begin with. Others seemed more realistic. The following table contains the suggestions made by survey participants as well as two suggestions by ISL.

Tab. 11 Suggested measures and affected dimensions of the challenges for the use of 45' containers

Measure	Affects			
	Price/ Competition	Hinterland	Seaside	Terminal/ Port
Introduction of an emission based bonus system	Increases relative economic performance of 45' boxes			
Subsidize container handling fees of 45' boxes	Increases relative economic performance of 45' boxes			
Support construction of ramps to load containers at shippers hinterland facilities		Eases/enables use of 45' boxes		
Increase marketing efforts in Baltic Sea economies	Increases relative economic performance of 45' boxes by...	... generating backhaul cargo and thus reducing the trade imbalance		
Introduction of EU-wide "grey boxes"	Increases relative economic performance of 45' boxes by...	Reducing equipment transport demand in areas distant from the ports e.g. Southern Germany		
Motivate Deepsea carriers to accept shortsea cargoes on their feeder networks	Decreases competitive disadvantage of 45' boxes by...		... providing more frequent sailings to/from hub ports	

Source: ISL 2014, based on interviews with short sea shipping companies and own assessments

All but two of the suggestions (listed as “measures” in the table) directly reduce two challenges of the use of 45' containers. Solely the measure “Support construction of ramps to load containers at shipper’s facilities” does not directly address the price issue. There is currently no competition between container usage and truck usage in these cases and as a result, this dimension is not impacted.

5 Market forecast 2020/2030 and impact estimate of selected measures

The forecast of shortsea-hinterland volumes in general and 45' boxes in particular is generated in two steps. First, the forecast of merchandise trade volumes between the countries involved is used to forecast the TEU volumes. The trade forecasts are based on the IHS World Trade Service.¹¹ Second, the impact of the stricter sulphur limits on the modal shares per trade route is assessed based on results from a previous ISL project.¹² The forecast and model calculations are based on simplified algorithms and the forecasts and shifts should hence be interpreted as size dimensions and not as precise forecasts.

The amplitude of shifts on the different routes is the effect of two mechanisms that sometimes partly offset each other. On the one hand, the impact of measures on costs may vary between routes. Lump-sum cost reductions reduce the cost of shorter distances by a higher percentage (because of the lower total costs) while distance- or fuel-based reductions have a higher relative impact on longer distance (because fixed port call costs have a lower share on these trades). The amplitude of effects, in turn, depends on the intensity of competition between the modes. Where the cost differences between modes (including unobserved costs like service frequency and the like) are very high (e.g. Poland land truck vs. Poland maritime container), even a considerable cost change will not influence the modal split strongly as the cost difference will remain high afterwards. Where several options are available on a more or less equal footing, small changes may induce comparatively large shifts.

5.1 Market forecast including stricter SECA regulation

When forecasting maritime cargo flows in the Baltic Sea area, the impact of the stricter sulphur emission limits must be taken into account. According to ISL calculations based on a generalised modal shift function, the additional costs associated with higher bunker costs will shift between 16 and 23 % even in a cautious scenario,¹³ the amplitude depending on the competition by direct land traffic and the share of fuel costs in the total transport chain. For the present project, ISL has extended the model to intra-Baltic container shortsea-hinterland traffic.

While the market forecast itself would yield an increase of total BSR container hinterland volumes by 9 % from 2012 to 2020 (1.1 % yearly on average, dampened by a cautious outlook for the most import trade route North Range-Russia) and by 22 % until 2030, the adjusted calculation results in a reduction of trade volumes by 10 % until 2020 and 2030 volumes only slightly above the 2012 level. In general, the intra-Baltic trades grow more than the North Range-Baltic trades.

¹¹ For more detail see <http://www.ihs.com/products/global-insight/industry/commerce-transport/world-trade.aspx>

¹² Reducing the sulphur content to 0.1% in the North Sea and Baltic Sea in 2015, final report available at http://www.reederverband.de/fileadmin/vdr/pdf/themen_und_positionen/GermanISLStudyonSECAImpacts.PDF

¹³ See SECA study quoted above

Tab. 12 Market forecast 2020/2030 with SECA shifts induced by stricter SECA regulations (model-based estimate)

		2012					
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)		
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic	
	Russia	555	15	220	6	98	3
Finland	150	110	90	66	40	29	
Sweden	154	56	115	17	51	7	
Norway	95	0	57	0	25	0	
Baltic States	115	15	60	4	27	2	
Poland	45	-	30	-	13	-	
Total	1.115	196	572	93	254	41	

		2020					
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)		
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic	
	Russia	457	15	183	5	81	2
Finland	142	116	85	66	38	29	
Sweden	139	52	42	15	19	7	
Norway	82	0	49	0	22	0	
Baltic States	109	17	55	5	24	2	
Poland	50	-	25	-	11	-	
Total	979	200	438	91	195	40	
over 2012	88%	103%	88%	102%	88%	102%	

		2030					
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)		
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic	
	Russia	454	17	182	7	81	3
Finland	162	150	97	86	43	38	
Sweden	168	62	50	17	22	8	
Norway	86	0	52	0	23	0	
Baltic States	128	22	64	6	29	3	
Poland	68	-	34	-	15	-	
Total	1.067	251	479	117	213	52	
over 2012	96%	129%	97%	131%	97%	131%	

Source: ISL Modal Split Model, 2014; compare Tab. 6 on page 20

5.2 Impact of selected measures on traffic flows 2020/2030

As laid down in chapter 4, six types of measures have been identified among the proposals made by the industry experts and those developed by ISL. Using the same modal split model as in section 5.1, the potential impact of these measures on shortsea traffic flows and the use of 45' containers will be estimated below.

5.2.1 Introduction of an emission-based bonus system

The introduction of an emission-based bonus system or any other measure that reduces the cost of bunker will favour shortsea shipping on trades with longer sea distances (which are also the ones where the positive environmental impact of shifts is highest). The shift potential apparently also depends on the volume of land or ro-ro traffic that can be captured through this measure.

In the model calculation for this measure, we assume that the bonus system is applied to both maritime container and ro-ro traffic (including, of course, con-ro types). In a way, such a measure would partly alleviate the additional costs borne by the shipowners because of the stricter sulphur limits in the Baltic Sea, and it is assumed that the measure will dampen the price increase borne by their customers. More precisely, a fuel cost reduction by about 30% is assumed,¹⁴ which reduces the cost of carrying a container e.g. from the North Range to St. Petersburg by approx. 58 Euro and the cost for Poland-bound containers by 37 Euro (2012 prices).

Tab. 13 Impact of emission-based bonus system 2020/2030

2020						
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic
Russia	533	18	213	6	95	3
Finland	165	135	99	78	44	34
Sweden	167	60	50	17	22	8
Norway	95	0	57	0	25	0
Baltic States	136	20	68	6	30	2
Poland	58	-	29	-	13	-
Total	1.155	233	517	106	230	47
impact	+18%	+17%	+18%	+17%	+18%	+17%

2030						
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic
Russia	530	20	212	8	94	4
Finland	189	175	113	100	50	45
Sweden	201	71	60	20	27	9
Norway	101	0	61	0	27	0
Baltic States	160	26	80	7	36	3
Poland	79	-	39	-	17	-
Total	1.260	292	565	136	251	61
impact	+18%	+17%	+18%	+17%	+18%	+17%

Source: ISL Modal Split Model and Liner Service Calculator, 2014; compare Tab. 12 on page 30

According to the model calculations, roughly 210,000 TEU could be shifted (back) to shortsea traffic until 2020, a volume that grows to 235,000 TEU until 2030.¹⁵

¹⁴ The scenario is based on the 0.5 % IFO scenario of the aforementioned SECA study. Though the solution with the authorisation of 0.5 % sulphur fuel will not be adopted, the equivalent cost reduction/subsidy would have the same effect.

¹⁵ For the present study, it was not possible to produce a forecast of all input variables for 2020 and 2030. Therefore, it was assumed that the cost ratios of the different components (energy, capital, personnel) remain roughly constant throughout the period. Therefore, the shift percentages are similar for 2020 and 2030.

5.2.2 Subsidize container handling fees of shortsea containers

Since the 1990s, the EU directive 92/106/EEC offers the member states the possibility to subsidize – through tax exemptions – the intermodal handling in the hinterland. A similar initiative could give a boost to shortsea shipping, especially on medium and shorter distances where the handling fees are often prohibitive.

In order to appraise the impact of such a subsidy, a rate discount of 10 EUR per movement has been entered in the model. It is assumed that it is applied in all EU ports of the zone, so the costs of the transport chain are reduced by 20 EUR except for Russia and Norway (10 EUR). Despite the rather low discount, the traffic shifts are significant.

Tab. 14 Impact of subsidy on shortsea container handling 2020/2030

		2020					
		Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
Corr. region		North	Range South	North	Range South	North	Range South
		Range	Baltic	Range	Baltic	Range	Baltic
Russia		479	16	191	5	85	2
Finland		152	124	91	71	40	32
Sweden		153	57	46	16	20	7
Norway		86	0	51	0	23	0
Baltic States		118	18	59	5	26	2
Poland		54	-	27	-	12	-
Total		1.041	215	466	98	207	43
impact		+6%	+8%	+6%	+7%	+6%	+7%

		2030					
		Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
Corr. region		North	Range South	North	Range South	North	Range South
		Range	Baltic	Range	Baltic	Range	Baltic
Russia		487	18	195	8	86	3
Finland		173	161	104	92	46	41
Sweden		185	67	55	19	25	8
Norway		95	0	57	0	25	0
Baltic States		138	23	69	7	31	3
Poland		74	-	37	-	16	-
Total		1.151	270	517	126	230	56
impact		+8%	+8%	+8%	+8%	+8%	+8%

Source: ISL Modal Split Model and Liner Service Calculator, 2014; compare Tab. 12 on page 30

Compared with the market/SECA scenario, shortsea-hinterland container traffic is increased by roughly 7 % in 2020 (80.000 TEU) and 8 % in 2030 (105.000 TEU).

5.2.3 Support construction of ramps to load containers at shippers' hinterland facilities

A different way to foster shortsea container traffic would be subsidies to adapt shippers' ramps to make them suitable for container loading/unloading operations. The idea would be to increase the number of shippers that could handle containers and hence attract new traffic volumes.

However, based on the information collected, it was not possible to quantify the additional potential volumes.

5.2.4 Increase marketing efforts in Baltic Sea economies

The main argument behind this measure is that the export surplus of Western European economies leads to a high share of empty transports. As the analysis of traffic structures (chapter 1) has shown, this is first and foremost an issue for Russian trades. In calculations, we hence calculated an increase exclusively for Russian trades.

Tab. 15 Impact of increased marketing efforts in BSR on shortsea container handling 2020/2030

2020						
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic
Russia	503	17	201	6	89	2
Finland	142	116	85	66	38	29
Sweden	139	52	42	15	19	7
Norway	82	0	49	0	22	0
Baltic States	109	17	55	5	24	2
Poland	50	-	25	-	11	-
Total	1.024	201	456	92	203	41
impact	+5%	+1%	+4%	+1%	+4%	+1%

2030						
Corr. region	Total shortsea-land container traffic ('000 TEU)		45' containers ('000 TEU)		45' containers (1,000 units)	
	North Range	South Baltic	North Range	South Baltic	North Range	South Baltic
Russia	500	19	200	8	89	4
Finland	162	150	97	86	43	38
Sweden	168	62	50	17	22	8
Norway	86	0	52	0	23	0
Baltic States	128	22	64	6	29	3
Poland	68	-	34	-	15	-
Total	1.112	253	497	118	221	52
impact	+4%	+1%	+4%	+1%	+4%	+1%

Source: ISL Modal Split Model and Liner Service Calculator, 2014; compare Tab. 12 on page 30

Though it is difficult to appraise the exact impact of the measure, an additional volume of roughly 50,000 TEU per year could be mobilised. This could also be achieved in part through a further containerisation of Russian exports, i.e. a shift from conventional maritime general cargo traffic.

5.2.5 Introduction of EU-wide "grey boxes"

The introduction of grey boxes as a means of cost savings has been discussed in the literature and in the industry since decades. The advantage is clear: by sharing a common equipment pool, the transport of empty containers could be reduced, especially where the regional profiles of the operators involved vary.

In order to assess the potential impact of the introduction of grey boxes on intra-European traffic, more information would be needed on the traffic flows of single market players. The model works best if one operator e.g. exports from Germany to Russia while another is specialised in exports from Russia to Germany. In such a case, sharing the same equipment would not only increase the flexibility, but also reduce radically the number of empty transports.

5.2.6 Motivate Top 20 carriers to accept shortsea cargoes on their feeder networks

While some deepsea operators are open to accept intra-European shortsea cargo and sometimes even actively market the shortsea potential, others are reluctant to do so. In many cases, this move would only increase competition on existing routes, increasing the already high service frequency on the major corridors. However, some of the deepsea liner operators also have niche feeder services that would have the potential to open new shortsea-hinterland trades. Based on an analysis of existing feeder services, the shortsea potential of these niche services could reach up to 50,000 TEU if consequently marketed.