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# SHIPS VISITING EUROPEAN PORTS

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Fairplay





Authors: Lennart Nilsson, +46 (0) 31 704 4330,  
Niklas Bengtsson, +46 (0) 31 704 4330, +46 (0)709 99 69 77  
Christopher Pålsson, +46 (0) 31 704 4330

E-mail: [maritime.research@ihs.com](mailto:maritime.research@ihs.com)

IHS Fairplay, Sven Källfelts gata 210, Västra Frölunda, 426 71, Gothenburg, Sweden

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## Executive summary

This report has been based on AIS Live data for port calls worldwide during the period 1 July 2009 to 30 June 2010.

Looking at the total number of calls, the most striking observation is that over 80% of calls are either from another EEA country or have an EEA country as the next destination.

In general, the smaller the ships the more likely they are to trade only within the EEA region. But very large ships, such as 8,000teu container ships, make many calls within the region. This is explained by the structure of the market in which a container ship *en route* from Asia starts with a call in, for example, Gioia Tauro before going to Rotterdam, Hamburg and possibly some other ports before returning to Rotterdam and then off to Asia.

Another general comment is that ships in the northern part of Europe, particularly those calling in the Baltic, tend to have many more previous or next destinations within the EEA. This is not surprising given that the only option close by is a few ports in the Baltic part of Russia. In southern Europe, North Africa is within the same region but outside the EEA – which means more calls are made outside the EEA.

One important point to make is that if a ship calls at a port it is there for a reason – either discharging or loading cargo. For a large proportion of calls, ships load or discharge all the cargo onboard. This means that when a ship is in the EEA area the call is largely attributable to cargo used or produced in this region.

There are exceptions, however. The most obvious one being cargo that is stored for trading purposes (mainly oil) and is discharged at a storage facility and could then be consumed elsewhere. This represents only a very small fraction of the total number of port calls made by oil tankers.

The second exception relates to part-loading. This affects most ship types in varying degrees but in terms of the overall picture it is most common for container ships.

Ships that part-load and/or part-discharge, trade between two, three or more ports that are usually located fairly close together. This means these ships generally stay within the EEA area.

The business structure of container shipping is built on the so-called hub and spoke system, where feeder vessels collect or distribute containers in the nearby region to the transshipment hub port. This applies at both ends of the seaborne leg of the system.



For instance, cargo produced in Asia for consumption in Europe will be on a direct deepsea service between transshipment hubs in Asia and Europe. The same goes for American cargo bound for Asia, which will rarely visit Europe *en route*. Instead it will be on a direct service to the transshipment hub in the vicinity of the final destination.

Although much cargo that is transported at sea is international trade, the majority of the seaborne cargo in the EEA area is bound for other EEA countries.

Our conclusion is that in the *short term* **crude oil tankers** will continue to ship oil to refineries in the EEA region regardless of the application of carbon charges for shipping activities, but European refineries' share of the total supply of refined products in Europe will be lower in the *long run* due to the expansion of refining capacity in the Middle East.

As a result, the number of calls by **product tankers** from outside the EEA is expected to make up a larger share of the total calls in the *longer term*, while the total number of calls from crude tankers is expected to fall.

An increase in cost for European refineries for crude oil transport will reduce their competitiveness and that could lead to earlier closures of refineries than might otherwise have happened. Given that oil will continue to be in demand in Europe, some carbon leakage may occur in the midterm.

Most **chemicals** are loaded and unloaded in industry terminals rather than in commercial ports, which means that there are few options for operators looking for alternative ports regardless of carbon charges on shipping activities. However, given the small cargo sizes there may be situations when cargo will move from sea to land.

Carbon leakage could occur if total costs increase too much for the industry so that it relocates outside the EEA area. If carbon charges are low compared to the total cost of production, the impact of the charges should not be overrated even though they will have a negative impact on competitiveness for extra-EEA exports.

Use of **LNG** is set to increase due to the need for energy and declining gas fields in the North Sea. Introduction of carbon charges on shipping activity in the EEA will reduce the competitiveness of LNG in the European gas market as competing gas is delivered by pipeline.

Carbon charges on shipping activity could potentially hamper the development of LNG bunkering infrastructure since higher costs for LNG transport would make LNG less competitive. The amount of potential carbon leakage in the LNG sector is believed to be very low.

Realistic alternatives to unloading **LPG ships** in EEA ports are lacking. Hence the risk of carbon leakage is minimal.

In the **other tanker** sector, most calls are generally made by small vessels operating within the EEA and there is no other real option for the vessels to avoid carbon charges on shipping activities. Therefore carbon leakage is not an issue.

Many **dry bulk** cargoes are used as input for production facilities in the vicinity of where they are unloaded and are therefore handled at industry terminals. As long as the industries remain, the need for cargo will also be there. Introduction of a carbon charge will be low per cargo unit.

Even so, the competitiveness of the industry will be impacted in comparison with non-EEA peers. Should this lead to an industry closure or reallocation outside the EEA while demand within the EEA area for the final product remains, we will see carbon leakage.

**General cargo** vessels are the most common type of vessel in the world and they frequently call at small and medium sized ports. The average cargo size handled in each port is generally small and should costs rise significantly through carbon charges, many cargoes could potentially be transported on land – particularly if the sea route is parallel with the alternative land route.

Carbon leakage could emerge in southeastern parts of Europe and elsewhere if industry closures due to higher costs lead to EEA citizens buying products that are manufactured and transported under less costly regimes.

Because of a high degree of integration in multimodal supply chains, there are no short-term options for **bulk reefers** to change their ports of call. However, in the longer term reefer carriers will continue to decline and this process could be speeded up if a carbon charge is applied on shipping activities. It follows that there is a potential for carbon leakage for the reefer fleet.

There are very few options for loading and unloading deepsea **container carriers** in non-EEA countries in northern Europe. Kaliningrad is the only port that could potentially serve as a transition hub for shipments to other Baltic Sea countries.

Around the eastern part of the Mediterranean there are more options – for example, in the Balkans and countries around the Black Sea. Ports located in EU candidate countries are less likely to attract investment to become alternative ports since EU membership would cancel the benefit of rerouteing.

In North Africa, we can already see port developments for deepsea carriers to load and unload transshipment cargoes to nearby EEA countries in the Mediterranean and central European region.

In the Middle East, countries such as Oman and Saudi Arabia are establishing themselves as key global transport and logistic hubs.

This suggests that there will be changes in traffic patterns even without a carbon charge on shipping activities. A charge would strengthen the competitiveness of these new hubs.

Carbon leakage will increase if measures are introduced to apply carbon charges, but not to a very large extent in comparison with total volumes. In the alternative ports section (see page 73) we elaborate further on this.

The introduction of carbon charges on shipping activities will probably have a very small influence on decisions of which ports should be included in the loops for **vehicle carriers**. Car manufacturers are generally very positive towards environmentally-friendly improvements in the logistics chain and are not likely to change their logistics solutions since they have invested heavily in their distribution network.

**Ro-ro** operators depend on efficient land transport infrastructure connections for the part of the operation that functions as a floating bridge and thus this activity cannot really reallocate.

Ro-ro industrial shipments could, in some cases, change their routing – just as general cargo can. Potential carbon leakage is expected to be marginal, however.

For domestic and international **ferry** services in the EEA, it is really only the latter that will be affected by a carbon levy on shipping activities since the domestic type should already be included in the carbon goals for their respective countries.

Ferry services compete with other transport modes for both goods and passengers. Given that aeroplanes will be included in a carbon scheme, the passenger side should not really be a problem from a carbon perspective. That leaves cargo, where most competition comes from other seaborne transports. Thus the risk for carbon leakage must be considered as low. However, a carbon fee on shipping activity could lead to decreased service from ferries in parts of Europe due to erosion of their competitive position.

For **cruise** operators, the option is to change their itineraries and relocate ships to other areas of the world. However, many cruise passengers in Europe are cruising in order to visit the destination (ie sightseeing), limiting the option for rerouting.

The overall conclusion, therefore, is that carbon leakage is most likely to occur in the container shipping sector and to lesser extents in other sectors. Overall activity is believed to be of limited scope, even in the container sector. This could still lead to significant impacts for individual operations, ports and industries.

## Introduction

This report aims to assist the European Commission (EC) to come forward with a proposal relating to the ongoing negotiations in the International Maritime Organization and the United Nations Framework Convention on Climate Change. This is a request from the European Parliament and the Council of the European Union. A clear picture of the ships visiting EU ports will facilitate the development of a sound policy on greenhouse gas emissions from international maritime transport. The background is that international maritime transport is a large and growing source of the greenhouse gases that cause climate change.

This report covers ships of 100gt and above engaged in international traffic. All merchant fleet vessel types are covered, including the service sector, such as tugs. The report also covers yachts and the offshore sector, which are not typically included in the merchant fleet. This follows on from the EC finding it to be of “particular importance to decide on the scope of a policy (eg which ships should be covered) and the impacts (eg which sectors will be most affected)”.

Many of the vessels engaged solely in domestic traffic are also included. Some limitations exist in the scope of passenger vessels/ferries that provide only public transport type services across rivers and in archipelagoes. This should have no impact on the purpose of this study, however.

Another segment that falls outside the scope of this study is vessels solely involved in inland waterways traffic. These vessels are only covered in the IHS Fairplay Register of Ships to a limited extent and are not required to carry an AIS transponder. As with the case above, this should have no impact on the purpose of this study.

## Overview of total trade

- In 2010, 7.9Bn tonnes were transported by sea in the World.
- EEA seaborne foreign trade totalled 1,617M tonnes. The volume of imports was more than twice as large as the volume of exports.
- Dry and liquid bulk cargoes dominated trade.
- EEA liquid bulk imports are dominated by crude oil and exports by refined oil products.
- EEA containerized cargo exports have a higher \$/ton value than imports.
- The main EEA foreign trade partners for dry bulk were the Americas, Africa and Asia. For liquid bulk imports Africa and the Middle East were the main partners while exports were to most continents.
- Containerised cargoes were mainly traded to and from Asia and the Americas.
- Other general cargoes were traded to and from all continents.

The nominal value of total international trade worldwide in 2010 amounted to \$17,400Bn, according to IHS World Trade Services. The volume of this trade was 11.2Bn tonnes, of which 7.9Bn tonnes were transported by sea. The balance was transported either by pipeline, road, rail or air.

Dry bulk cargoes dominated, at 3.4Bn tonnes (43%). These are large quantities of unpackaged, small solids that are usually dropped or poured into the ship's cargo hold. Iron ore, coal and grain are the major dry bulk cargoes and cement, steel, bauxite and alumina are a few of the numerous so-called minor dry bulk cargoes. The major dry bulk cargoes are shipped in large vessels, while smaller vessels (<50,000 dwt) are involved in the transportation of minor bulk cargoes.

Liquid bulk cargoes accounted for 40% of global seaborne trade (3.1Bn tonnes). These consist of crude oil, refined oil products, liquefied natural gas (LNG), liquefied petroleum gas (LPG), liquid chemicals and other selected liquids. Crude oil is the largest liquid bulk cargo and is transported from the oil fields to refineries. Refined oil products are transported from the refineries to terminals in ports near consumption centres.

Non-bulk cargoes are referred to as general cargo and in 2010 accounted for 17% (1.4Bn tonnes) of total seaborne trade. General cargo transported in containers accounted for the largest part of this category, with close to 1Bn tonnes.

Seaborne trade grows steadily over time, although at a slower pace in periods of business contraction. It takes a major recession, such as the most recent one, to produce negative growth in seaborne trade.

The costs for different types of bunker fuel oil form a significant part of the overall cost of seaborne transport. For some types of cargo, bunker costs also

form a significant part of the price of the transported cargo. That share could be said to be low, or even very low, for other cargo types. As prices fluctuate for both bunker fuel and transported cargoes, no definite listing can be made of the cargoes/commodities that are most exposed to changes in the price of bunker fuel oil. In addition, both bunker fuel and the freight cost share of the cargo price are a function of the size of the vessel and the distance transported.

Over the past 10 years, for example, we have seen the proportions of the price for iron ore accounted for by freight rates and bunker fuel costs range from relatively low to very high. In some cases, changes in the price of bunker fuel oil could have an impact on the importers' sourcing of commodities. In other cases, such as many of the higher value containerised cargoes, that impact is low.

Another angle on this is the impact of changing bunker fuel costs on the operation of ships. Rising bunker fuel prices put a greater degree of pressure on the high consumers, such as many operators of container ships and ferries. This is mostly the case for larger ships and high-speed vessels.

The risk of rising bunker fuel oil prices is often regulated in the different forms of contract of affreightment. These vary significantly between types of operations and types of cargo.

The bottom line is that the cost of bunker fuels is a significant part of seaborne transport costs, regardless of who picks up the bill.

## EEA seaborne foreign trade

It is estimated that EEA foreign trade totalled 1,617M tonnes of seaborne cargoes in 2010. The volume of imported goods (1,177M tonnes) was more than twice as large as the volume of exports (440M tonnes).

Table 1: Total EEA seaborne foreign trade 2010, tonnes

Metric tonnes	Afrika	Asia	Mid East	N/C America	Oceania	ROW	S America	Total
<b>Export</b>								
Dry Bulk	37,824,210	16,867,595	26,312,357	9,829,633	784,259	14,011,893	5,993,634	111,623,581
Liquid Bulk (Tanker)	23,376,465	10,970,106	5,494,960	70,037,801	325,873	44,326,173	3,388,579	157,919,956
General Cargo/Neo Bulk	11,762,352	6,349,913	4,979,035	6,608,319	1,456,286	9,621,576	1,643,767	42,421,248
Container	18,637,548	47,473,596	14,634,879	26,226,612	3,488,499	12,097,110	5,580,014	128,138,258
<b>Total exports</b>	<b>91,600,574</b>	<b>81,661,210</b>	<b>51,421,230</b>	<b>112,702,365</b>	<b>6,054,918</b>	<b>80,056,752</b>	<b>16,605,994</b>	<b>440,103,043</b>
<b>Import</b>								
Dry Bulk	89,297,962	46,293,135	6,513,086	78,156,891	39,783,283	11,813,874	183,363,965	455,222,196
Liquid Bulk (Tanker)	186,973,512	15,377,032	98,846,383	37,144,081	125,094	180,840,101	19,217,838	538,524,040
General Cargo/Neo Bulk	10,421,107	7,662,653	3,020,624	10,473,875	991,545	10,019,999	15,777,032	58,366,834
Container	11,286,068	69,046,523	8,081,214	19,051,016	1,531,108	3,898,304	11,895,712	124,789,944
<b>Total imports</b>	<b>297,978,648</b>	<b>138,379,343</b>	<b>116,461,307</b>	<b>144,825,864</b>	<b>42,431,029</b>	<b>206,572,278</b>	<b>230,254,547</b>	<b>1,176,903,014</b>
<b>Total trade</b>								
Dry Bulk	127,122,171	63,160,730	32,825,443	87,986,525	40,567,542	25,825,767	189,357,598	566,845,777
Liquid Bulk (Tanker)	210,349,976	26,347,138	104,341,342	107,181,883	450,967	225,166,273	22,606,417	696,443,997
General Cargo/Neo Bulk	22,183,459	14,012,566	7,999,658	17,082,194	2,447,831	19,641,575	17,420,799	100,788,082
Container	29,923,616	116,520,119	22,716,093	45,277,627	5,019,607	15,995,414	17,475,726	252,928,202
<b>Total</b>	<b>389,579,222</b>	<b>220,040,552</b>	<b>167,882,537</b>	<b>257,528,229</b>	<b>48,485,946</b>	<b>286,629,029</b>	<b>246,860,540</b>	<b>1,617,006,057</b>

Dry and liquid bulk cargoes dominated trade in 2010, with 1,263M tonnes of cargo and 354M tonnes of mainly manufactured goods (general cargo and containerised cargo).

**Table 2: Total EEA seaborne foreign trade 2010, regional distribution based on tonnes**

%	Afrika	Asia	Mid East	N/C America	Oceania	ROW	S America	Total
<b>Export</b>								
Dry Bulk	34%	15%	24%	9%	1%	13%	5%	100%
Liquid Bulk (Tanker)	15%	7%	3%	44%	0%	28%	2%	100%
General Cargo/Neo Bulk	28%	15%	12%	16%	3%	23%	4%	100%
Container	15%	37%	11%	20%	3%	9%	4%	100%
<b>Import</b>								
Dry Bulk	20%	10%	1%	17%	9%	3%	40%	100%
Liquid Bulk (Tanker)	35%	3%	18%	7%	0%	34%	4%	100%
General Cargo/Neo Bulk	18%	13%	5%	18%	2%	17%	27%	100%
Container	9%	55%	6%	15%	1%	3%	10%	100%
<b>Total trade</b>								
Dry Bulk	22%	11%	6%	16%	7%	5%	33%	100%
Liquid Bulk (Tanker)	30%	4%	15%	15%	0%	32%	3%	100%
General Cargo/Neo Bulk	22%	14%	8%	17%	2%	19%	17%	100%
Container	12%	46%	9%	18%	2%	6%	7%	100%

The Americas, Africa and Asia were the main EEA foreign trade partners for dry bulk imports and exports.

Liquid bulk was imported primarily from Africa, the Middle East and the Rest of the World (ROW<sup>1</sup>) and was exported mainly to Africa, North and Central America, the Middle East and the ROW.

Containerised cargoes were both imported and exported, mainly from Asia and the Americas, while general cargo/neo bulk was traded with a wider range of countries.

Total imports into the EEA were dominated by the large economies. Because of access to large ports, the Netherlands and Belgium are large importers of seaborne goods, which are re-exported or transited to countries in central and eastern Europe.

A great deal of bulk cargo is exported from the UK/Ireland, Scandinavia/Finland, Belgium and central Europe, while their imports of goods are lower because of their smaller populations.

## Dry bulk trade

The global long-haul, deepsea trade in dry bulk cargoes is dominated by iron ore, coal and grain. Most of the iron ore is shipped from Australia and Brazil to the Far East in large, specially strengthened bulk carriers and much of the coal is also transported from Australia to the Far East where the demand for construction materials and energy is strong. In 2010, cargoes destined for the EEA amounted to a total of 455M tonnes. Coal, iron ore and scrap represented 69% of total dry bulk imports in that year.

<sup>1</sup> Belarus, CIS Southeast, Croatia, Moldova, Other Europe, Other Mediterranean, Other Region, Switzerland, Ukraine.

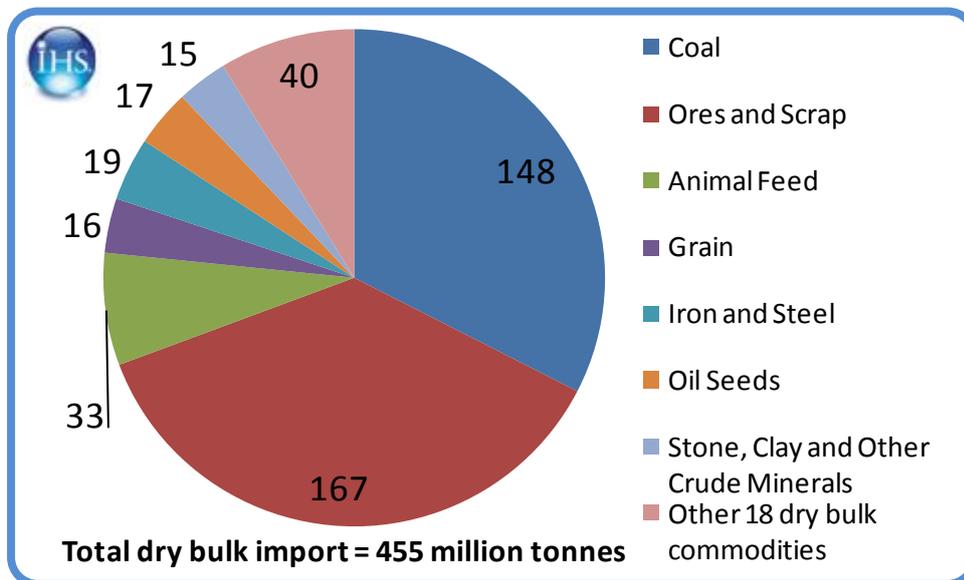


Figure 1: Dry bulk seaborne imports 2010 by commodity, tonnes

South America is the largest source of dry bulk cargoes for EEA import. In 2010, imports from South America consisted of 93M tonnes of ore and scrap, 28M tonnes of animal feed, 27M tonnes of coal, 13M tonnes of oilseeds and 12M tonnes of grain.

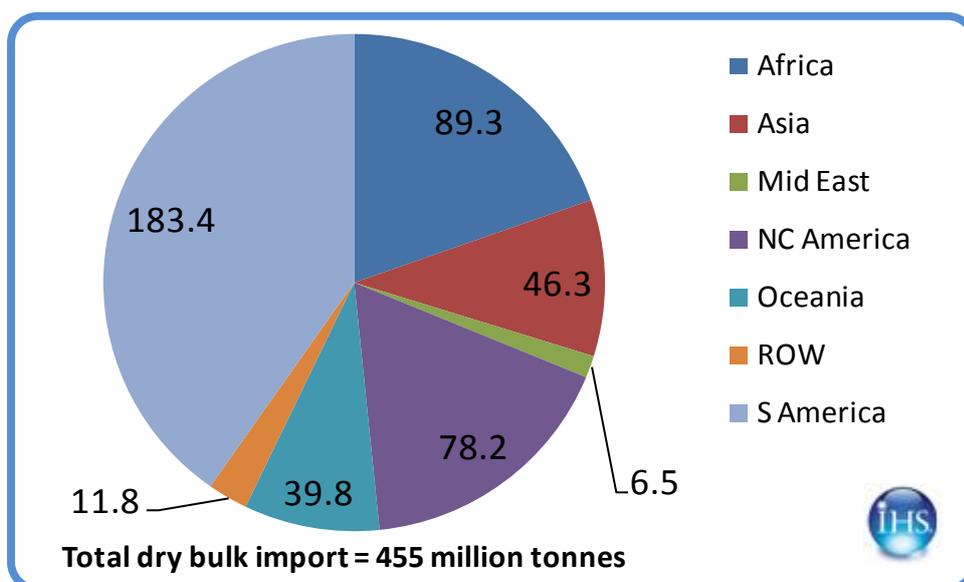


Figure 2: Dry bulk seaborne imports 2010 by region of origin, tonnes

Of the 89M tonnes of dry bulk imported from Africa, 36M tonnes were ore and scrap, 35M tonnes were coal, 6M tonnes stone, clay and other crude minerals, 3M tonnes iron and steel and 2M tonnes sugar and fertilisers.

It is estimated that 38M tonnes of coal were imported from North/Central America, plus 19M tonnes of ore and scrap and 7M tonnes of residual petroleum products. From Oceania, 28M tonnes of coal were imported and 10M tonnes of ore and scrap; from Asia, 19M tonnes of coal, 11M tonnes of iron and steel, 3.6M tonnes of iron ore and scrap and 3M tonnes of stone, clay and other minerals.



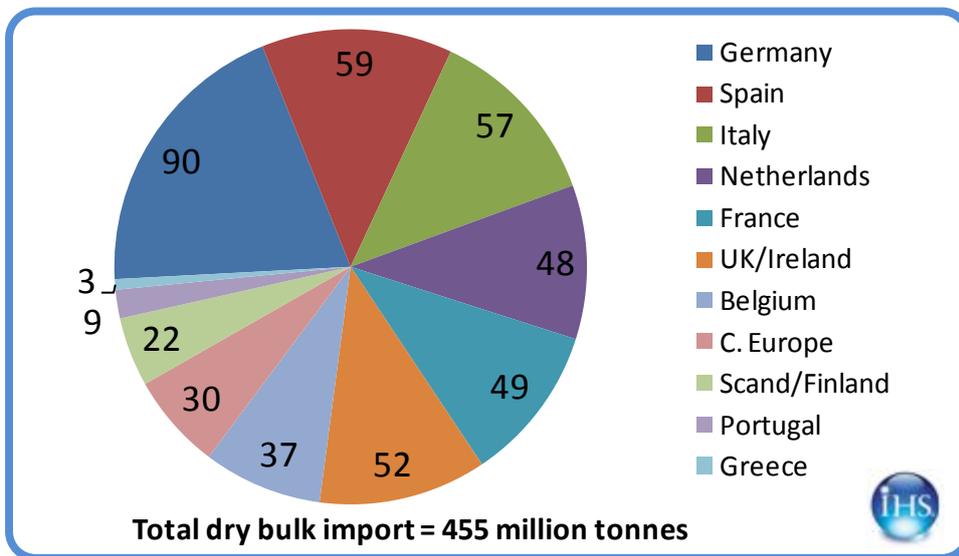


Figure 3: Dry bulk seaborne imports 2010 by country of destination, tonnes

Approximately 60% of the total 455M tonnes of dry bulk imports ended up in countries surrounding the North Sea. Dry bulk imports into the EEA are expected to increase by 24% in the next five years<sup>2</sup>.

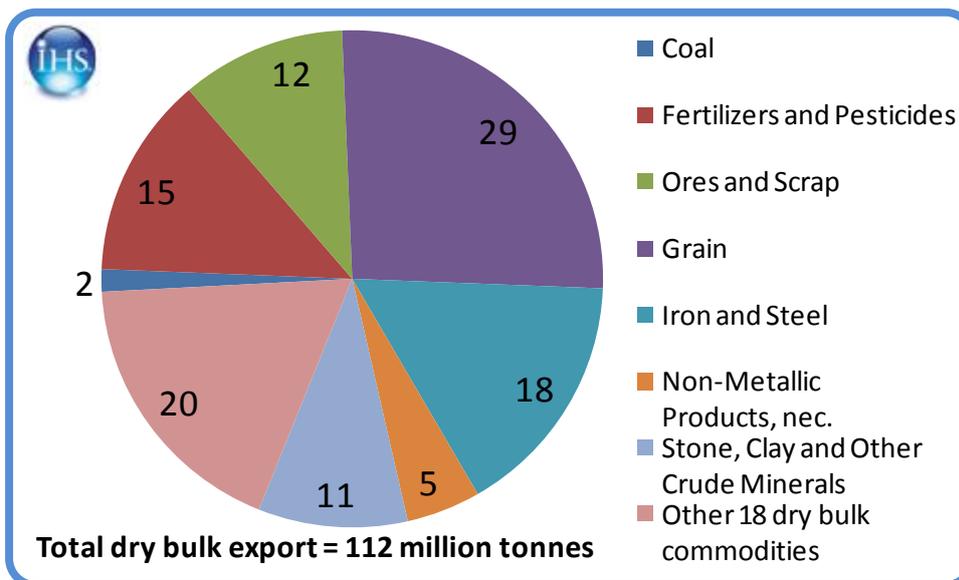


Figure 4: Dry bulk seaborne exports 2010 by commodity, tonnes

Grain, iron and steel, ore and scrap, fertilisers and pesticides represented three-quarters of total EEA export volumes in 2010.

After Africa and the Middle East, Asia was one of the major markets for exports from the EEA.

<sup>2</sup> IHS Global insight

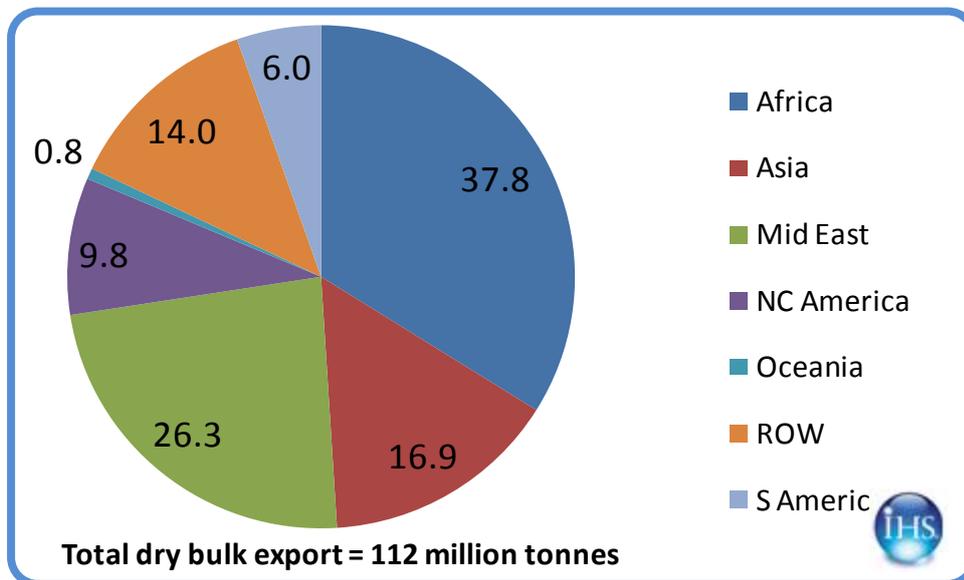


Figure 5: Dry bulk seaborne exports 2010 by region of destination, tonnes

Of the 38M tonnes of dry bulk exported to Africa, 16M tonnes were grain. Other large export products were iron and steel, ore and scrap, stone, clay and other crude minerals. Grain, ore and scrap dominated exports to the Middle East, with 8-9M tonnes each. Half of the exports to Asia consisted of iron, steel and scrap.

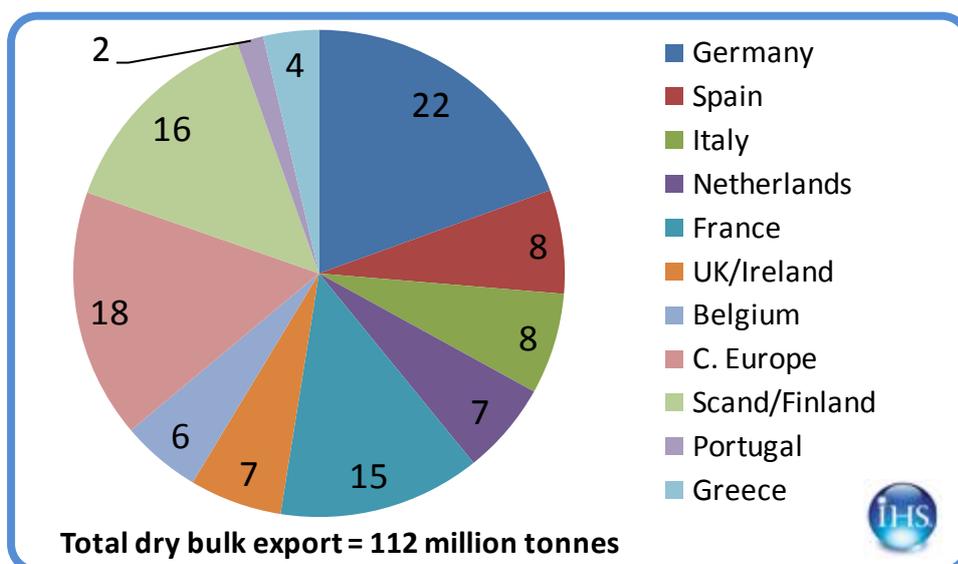


Figure 6: Dry bulk seaborne exports 2010 by country of origin, tonnes

On account of the large share of grain, steel and iron ore, dry bulk export volumes from North and Central Europe are larger than from South Europe.

Figure 7 illustrates the internal trade in dry bulk within the EEA. At 145M tonnes, volumes are somewhat higher than exports outside the EEA but considerably less than the 455M tonnes imported by the EEA.

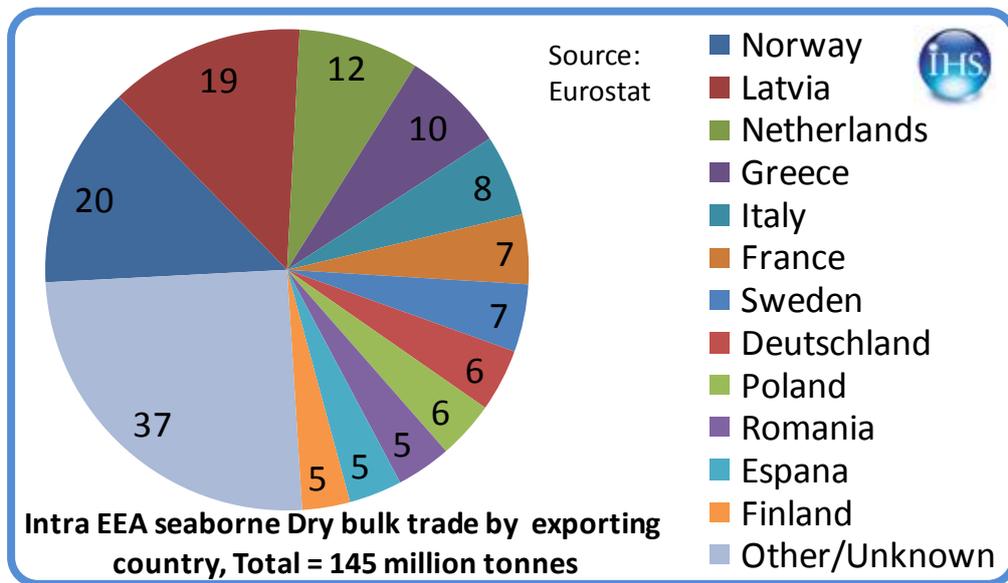


Figure 7: Intra-EEA seaborne dry bulk trade by country of origin

## Liquid bulk trade

As previously mentioned, liquid bulk cargoes consist of crude oil, refined oil products, LNG, LPG, liquid chemicals and other selected liquids.

Crude oil is generally transported from the oil fields to refineries in large crude oil carriers. Refined oil products are transported from the refineries to terminals in ports near consumption centres in either product or combined product/chemical carriers.

Gases are transported in specialised gas carriers. Each type of gas has its own specific properties. LNG is natural gas liquefied by refrigeration (<-161°C). Liquefied petroleum gases consist mainly of propane and butane and are liquefied by pressure and/or refrigeration.

European seaborne liquid bulk trade is dominated by the transportation of crude oil from the fields to refineries, as is the global trade. In 2010, a total of 539M tonnes of liquid bulk were imported to the EEA, of which 309M tonnes were crude oil.

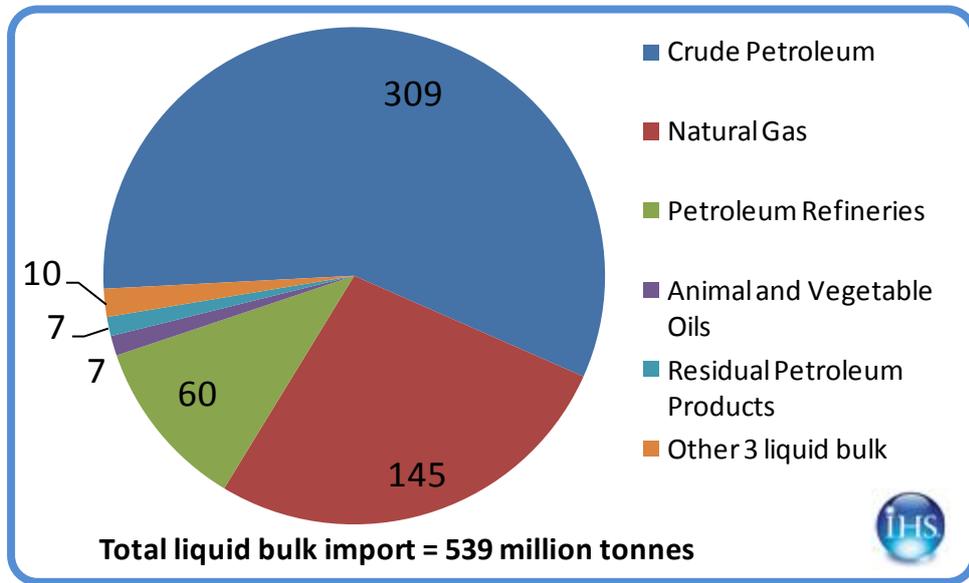


Figure 8: Liquid bulk seaborne imports 2010 by commodity, tonnes

A total of 376M tonnes of crude petroleum, refined oil products and residual petroleum products accounted for 70% of total liquid bulk imports in 2010.

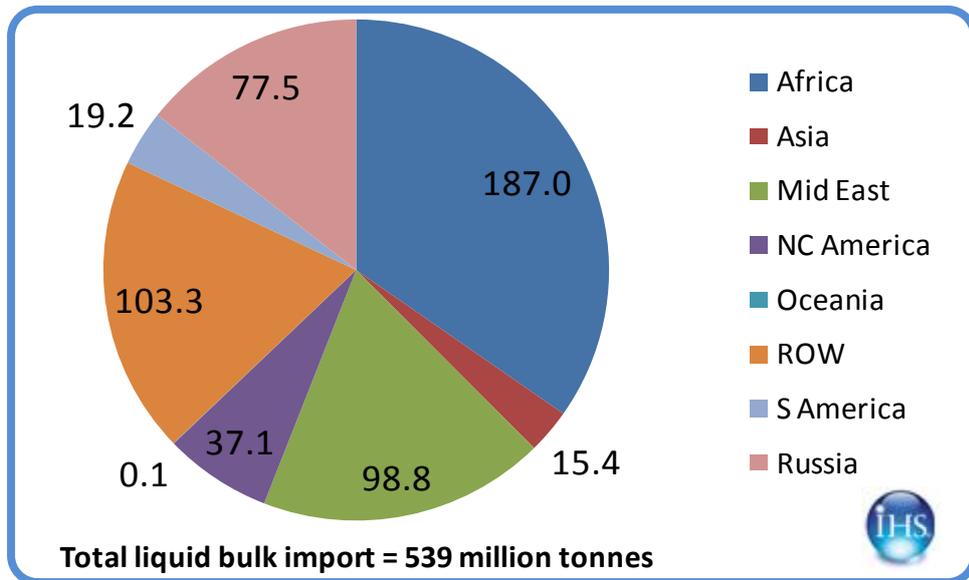


Figure 9: Liquid bulk seaborne imports 2010 by region of origin, tonnes

In 2010, 43% of crude petroleum imports to the EEA and 29% of gas imports came from Africa, 23% of crude petroleum imports came from Russia and 25% from the Middle East.

Russia is estimated to have exported around 77.5M tonnes of crude oil and oil products from Primorsk, mainly to the European market.

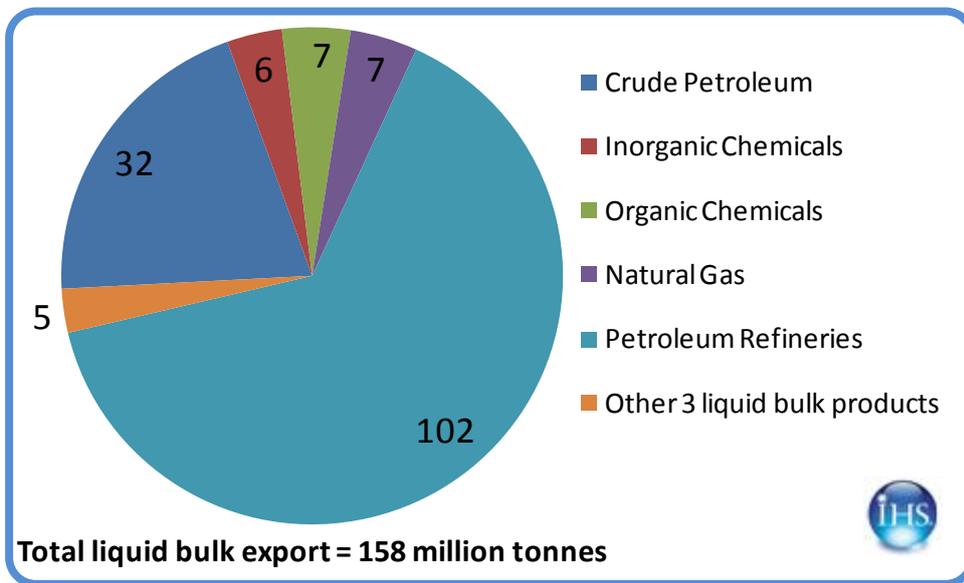


Figure 10: Liquid bulk seaborne exports 2010 by commodity, tonnes

EEA liquid bulk exports consist mainly of refined petroleum products.

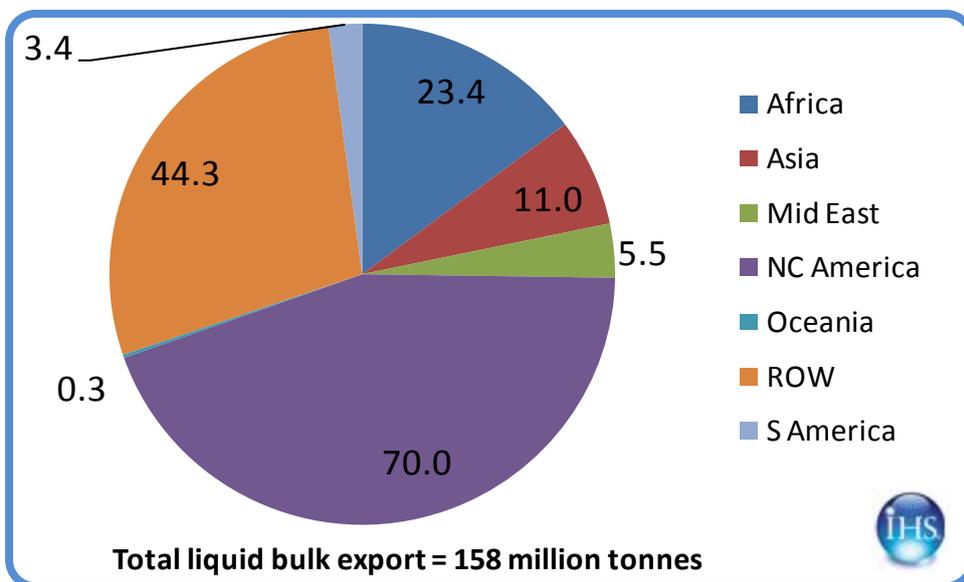


Figure 11: Liquid bulk seaborne exports 2010 by region of destination, tonnes

North and Central America are the main importers of refined oil products such as gasoline from the EEA.

Figure 12 shows that seaborne liquid bulk trade within the EEA area is 205M tonnes. This is larger than the exports but still considerably less than the EEA imports of 539M tonnes.

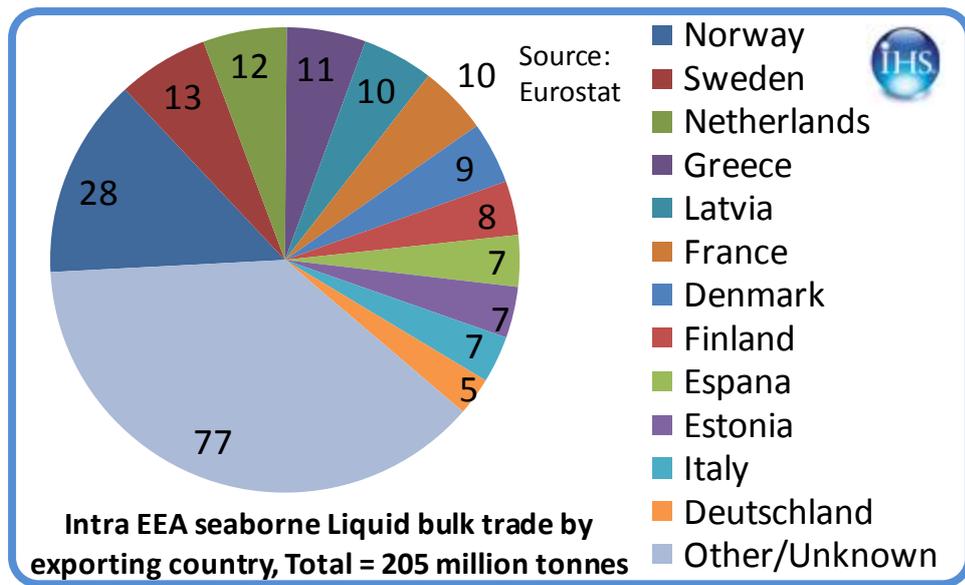


Figure 12: Intra-EEA seaborne liquid bulk trade by country of origin

### Containerised cargo trade

Containerised cargoes comprise all kinds of products. Although consumer goods are still the most common cargo, both high and low value industrial goods are increasing their shares of the total volume.

Containerised trade is a liner service in which purpose-built container ships run on a schedule, often with weekly departures. Many of the services are provided in a so-called hub and spoke system. This means that large vessels are employed on the long haul between major hub ports where the cargo is discharged for further transport on smaller vessels to end destination ports (spokes).

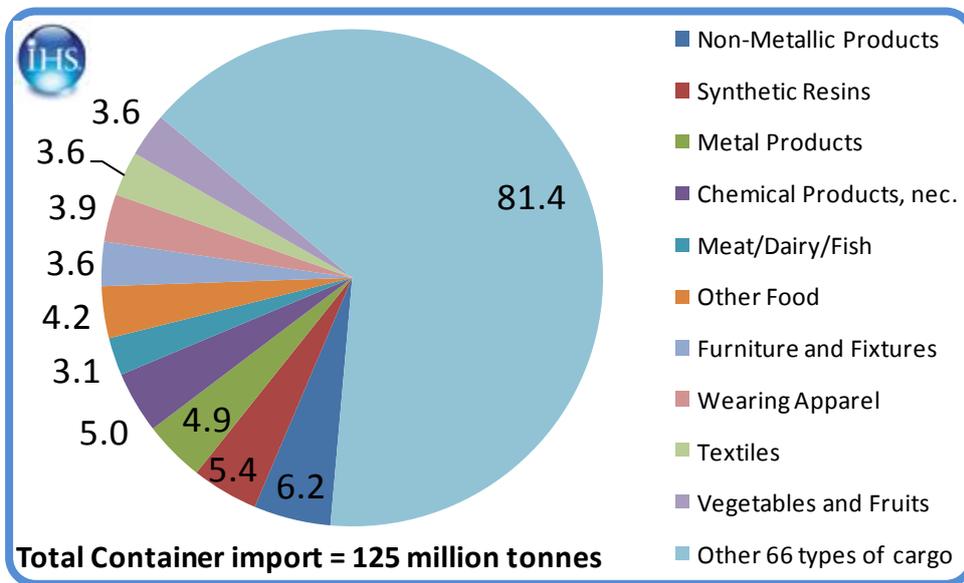


Figure 13: Containerised cargo seaborne imports 2010 by commodity, tonnes

Of the containerised goods imported into the EEA, 55% come from Asia. While all kinds of products are represented in the imports from Asia and North/Central America, imports from Africa consisted of vegetables, fruit, food, non-ferrous metals, non-metallic products, rubber, crude fertilisers and beverages.

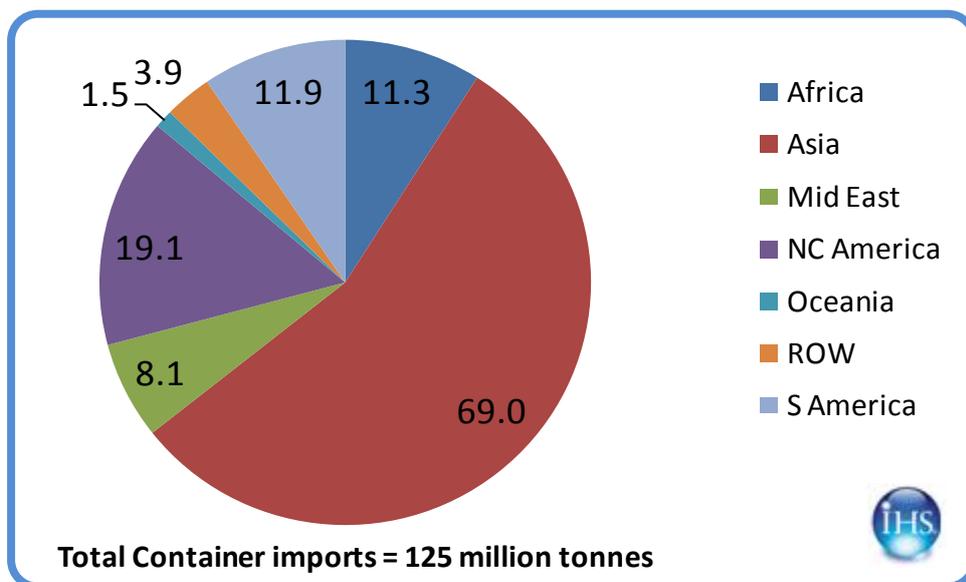


Figure 14: Containerised cargo seaborne imports 2010 by region of origin, tonnes

Container cargo imports are evenly spread across the entire EEA, with the large economies dominating together with the Netherlands and Belgium.

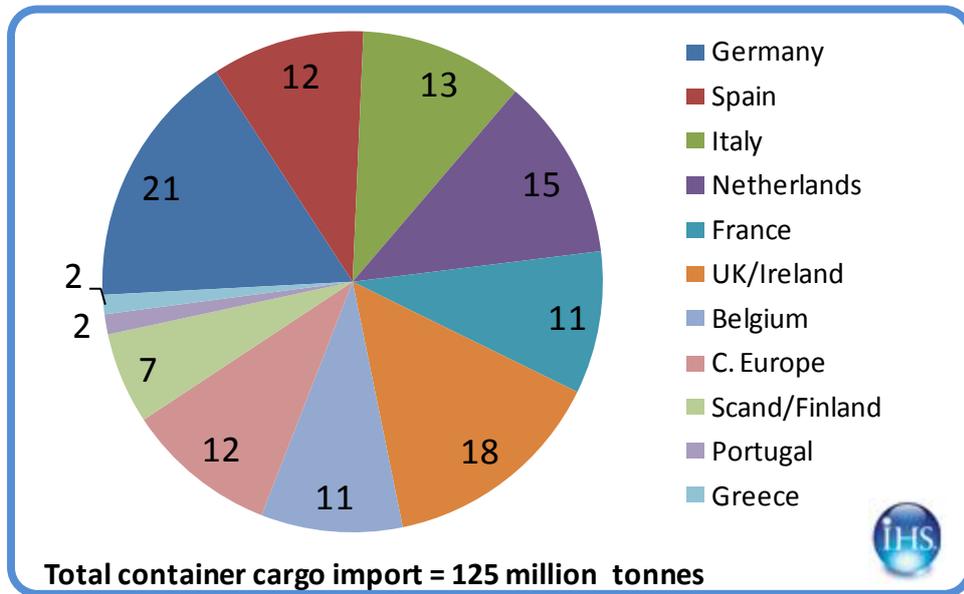


Figure 15: Containerised cargo seaborne imports 2010 by country of destination, tonnes

The few really large cargo types exported in containers are semi-bulk products that utilise the space offered in otherwise empty containers from the EEA, mainly to Asia. A great number of different commodities/products are shipped in containers (as illustrated in Figure 16 below), although a few are dominant. The 'other' category contains 60 different types of commodities/products, each smaller than those displayed in the graph.

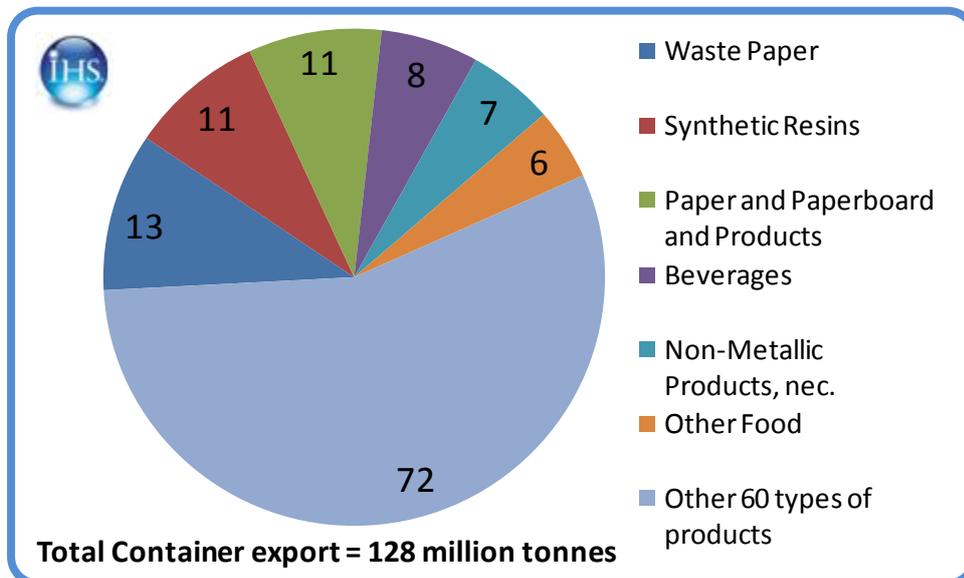


Figure 16: Containerised cargo seaborne exports 2010 by commodity, tonnes

Almost half of the containerised cargoes exported go to Asia, followed by North/Central America and Africa.



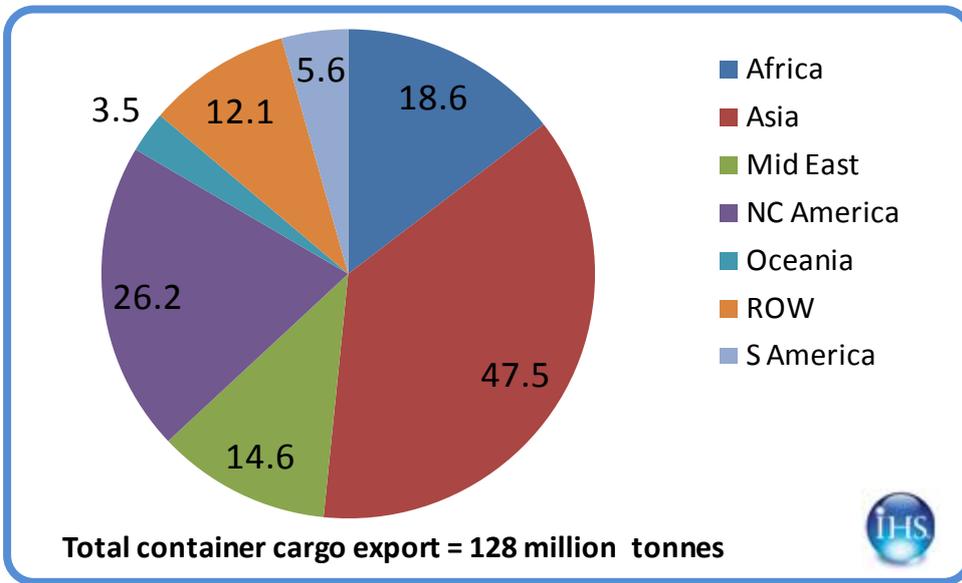


Figure 17: Containerised cargo seaborne exports 2010 by region of destination, tonnes

The large exporting countries, including Germany, the Netherlands, the UK, Scandinavia/Finland and Italy, lead the exports of containerised goods. The strong position of Scandinavia/Finland is accounted for by the large quantity of forest industry and steel products exported, which add a substantial number of cargo tonnes.

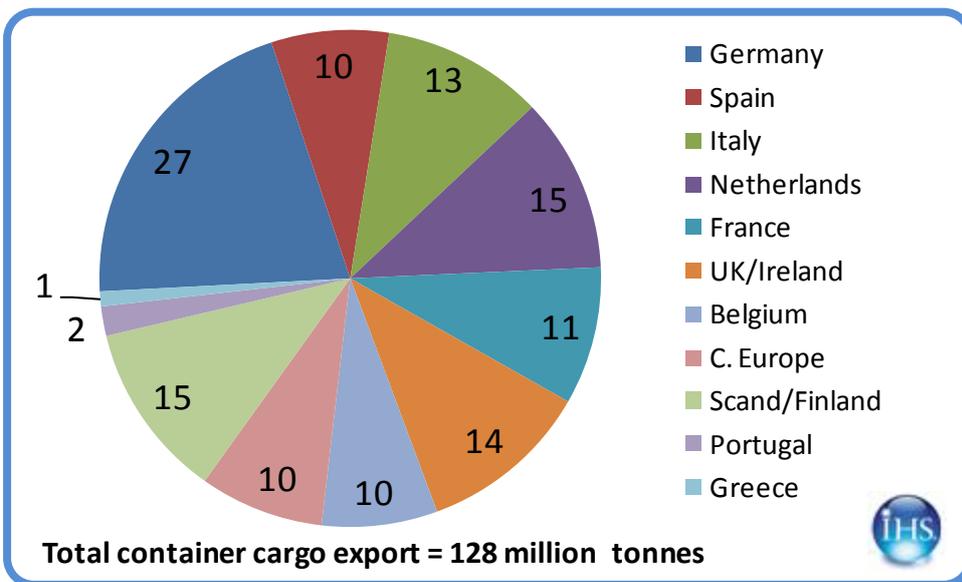


Figure 18: Containerised cargo seaborne exports 2010 by country of origin, tonnes

Figure 19 illustrates intra-EEA seaborne container trade. This is approximately two-thirds of the container trade with parties external to the EEA. When it comes to container figures, however, it is a challenge to precisely separate external trade from trade in transit.

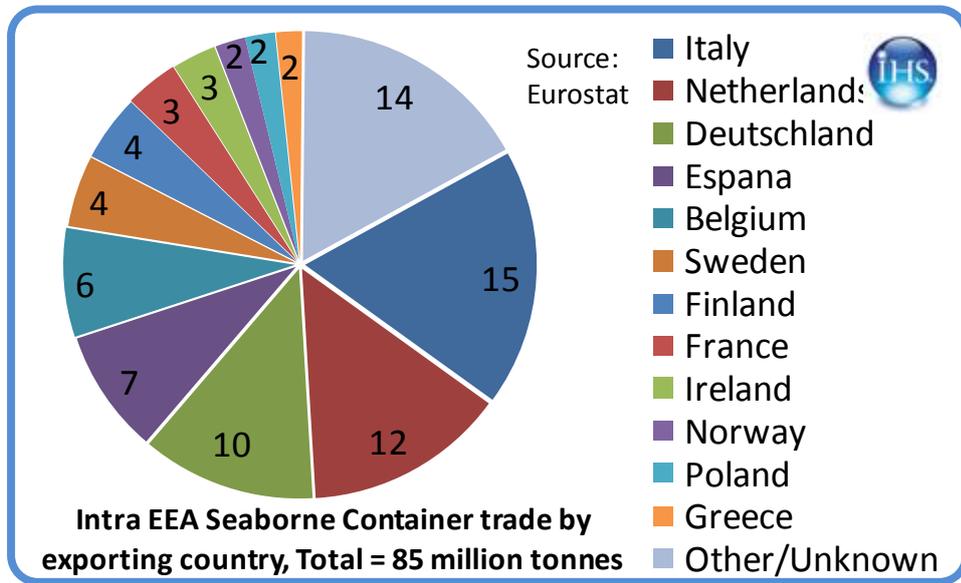


Figure 19: Intra-EEA seaborne container trade by country of origin

### Other general cargo

In 2010, a total of 58M tonnes of general cargo/neo bulk were imported to the EEA.

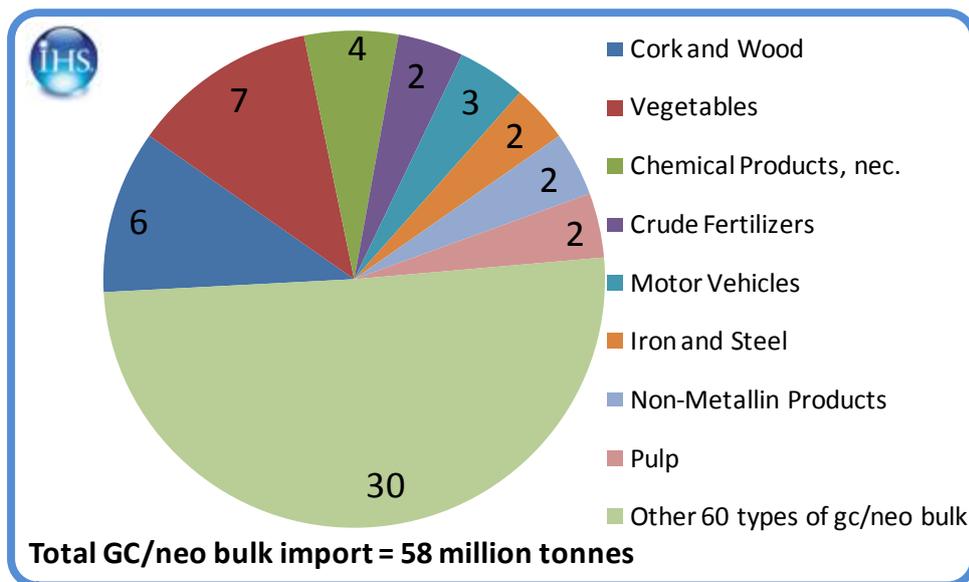


Figure 20: General cargo seaborne imports 2010 by commodity, tonnes

Almost half of these imports consisted of 60 different types of commodities such as consumer products, food, machinery, chemicals, paints, plastics, electronics, transport equipments and textiles. All of these are smaller than the eight specified in the graph (Figure 20).

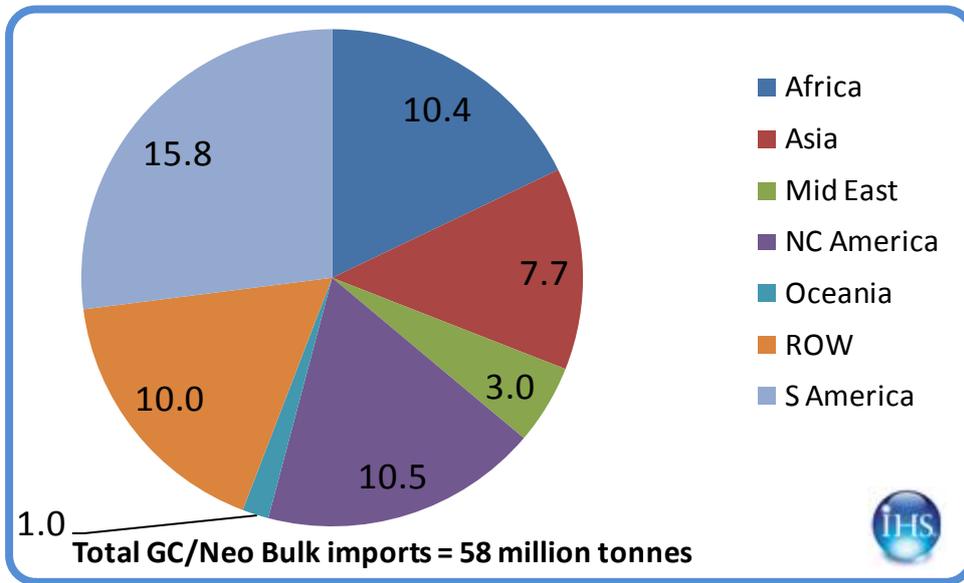


Figure 21: General cargo seaborne imports 2010 by region of origin, tonnes

General cargo/neo bulk commodities are imported from all parts of the world: from Africa, cork and wood, food, crude fertilisers, ores, non-metallic products; from Asia, iron and steel, food, non-metallic products, motor vehicles; from the Middle East, chemicals; from North/Central America, chemicals, plastic products, wood, paper, pulp, vegetables, meat, fish; and from South America, fruit and vegetables.

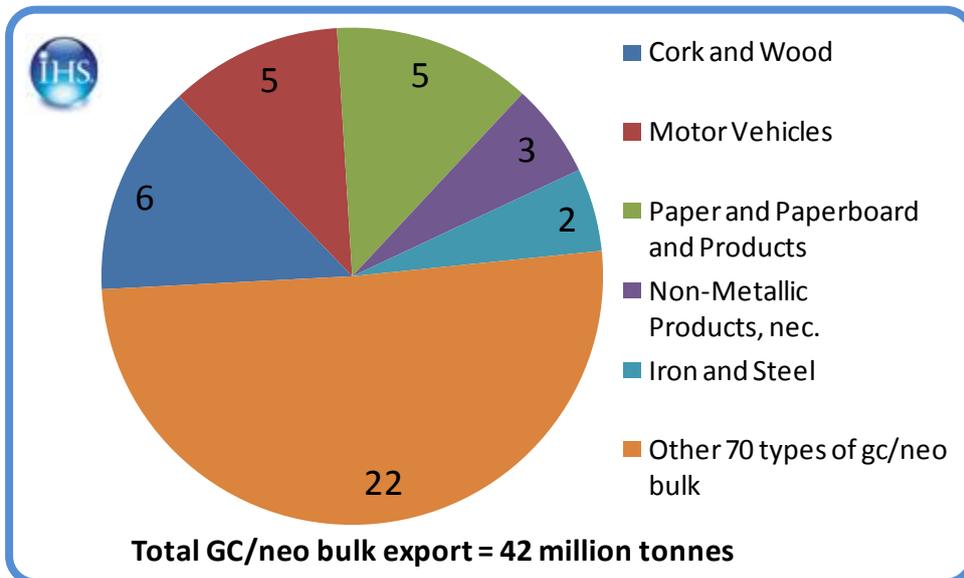


Figure 22: General cargo seaborne exports 2010 by commodity, tonnes

EEA exports of general cargo/neo bulk consist of low and high unit value products such as wood, motor vehicles and paper and paper products. The 22M tonnes that account for half of the total are the sum of 70 different types of commodities, all of which are smaller than the five specified in the graph (Figure 22).

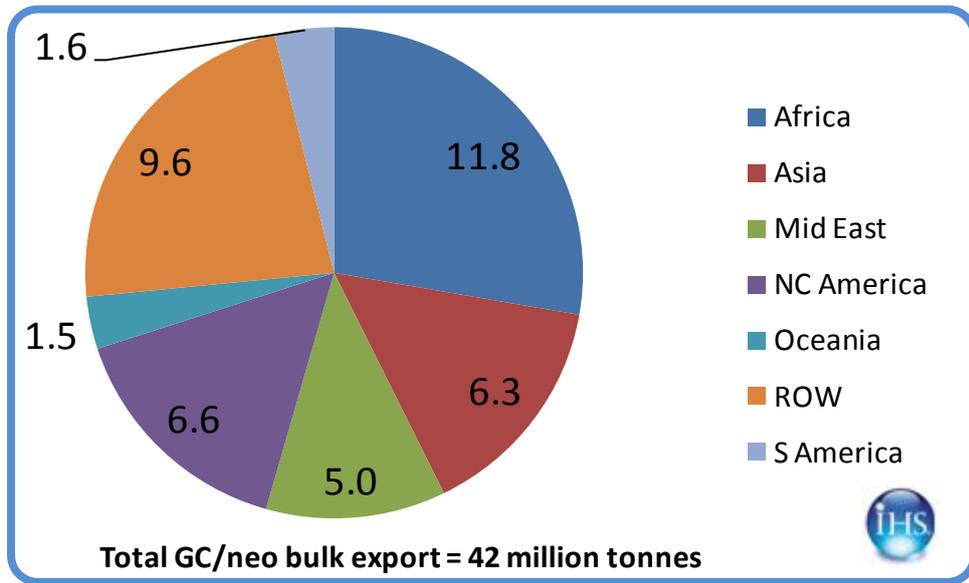


Figure 23: General cargo seaborne exports 2010 by region of destination, tonnes

Africa is the largest importer of general cargo/neo bulk products from the EEA. A large quantity of wood and paper is exported, primarily to North Africa, as well as motor vehicles.

Figure 24 illustrates the internal seaborne trade of neo bulk/general cargo within the EEA region. This amounts to 132M tonnes, which is considerably higher than the export/import from/to the EEA region.

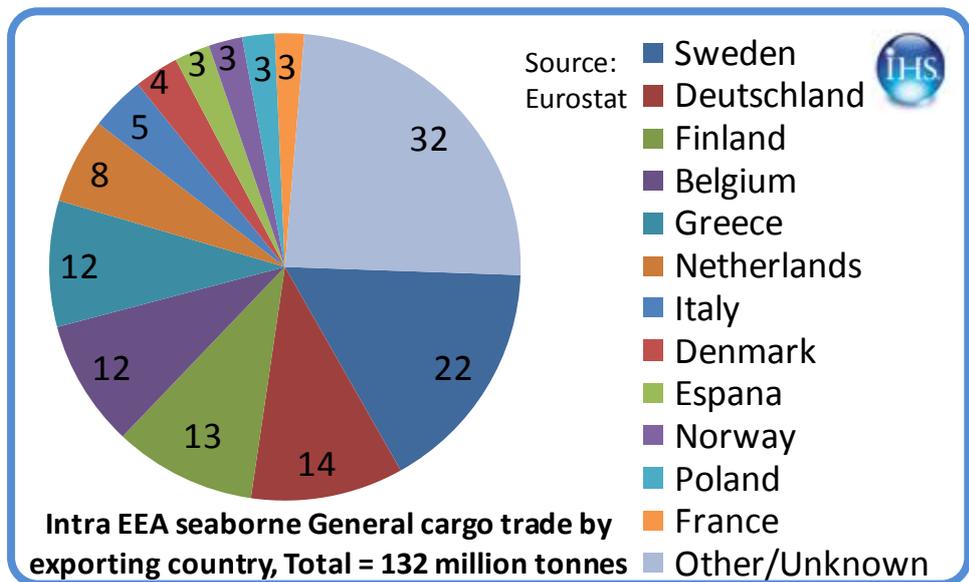


Figure 24: Intra-EEA seaborne general cargo neo bulk trade by country of origin

## Overview of port visits by ships

- 880,000 port calls in EEA ports over a 12 month period have been analyzed.
- Ferries made 460,000 of the port calls, 113,000 by general cargo ships and 68,000 by container carriers.
- In aggregated dwt ( $\approx$ cargo capacity) terms container carriers dominated followed by ferries and oil tankers.
- The United Kingdom is the country with most port calls and the highest aggregated dwt.
- A high share of the EEA port calls were followed by a port call in another EEA country.
- The average age of ships calling was 15 years.
- The average duration within a port area (excluding anchorages) was 35 hours.
- Ferries were the most frequent visitors, but several other vessel types had a high frequency of calls. Smaller ships generally had a higher frequency than larger.

The purpose of this section is to provide accurate information about port visits by ships over a 12-month period. A call is considered to be made if the ship has been at a port for more than six continuous hours, with the exception of ferries where all calls count. The period chosen is the second half of 2009 and the first half of 2010. The reason for not using only 2009 data is that traffic was unusually low as a result of the recession and financial crisis. The reason for not using only 2010 data is that the Eurostat data will not be updated due to a lag in reporting from member states.

The prime source for IHS Fairplay's assessment of port visits by ships is the historic movement database derived from AIS Live. This movement data has been linked to the IHS Fairplay Register of Ships, which has enabled further detailed analyses. Data for the ro-pax/ferry segment has been checked against data from ShipPax Information.

Ships within the size range 100-300gt (except for passenger vessels) are not required by the IMO to be equipped with an AIS transponder. Therefore, there is a potential limitation in the coverage of the movement data. However, many vessels that are not required to have a transponder do actually carry one so we have included them in the assessment.

Table 3: Number of port calls in the EEA and Russia (Baltic), July 2009-June 2010

All sizes	Ireland	United Kingdom	Denmark	Sweden	Finland	Estonia	Latvia	Lithuania	Poland	Germany	Netherlands	Belgium	France	Spain	Portugal	Italy	Greece	Cyprus	Malta	Bulgaria	Romania	Slovenia	Iceland	Norway	Russia (Baltic)	Total	
Oil Tanker	406	5,834	789	1,715	169	837	329	125	605	1,582	2,368	832	1,568	1,162	279	1,662	3,280	206	1,114	306	176	36	43	998	248	26,669	
Chemical Tanker	581	7,340	1,957	3,756	2,145	559	788	378	570	2,729	11,181	3,704	6,728	5,089	1,242	5,427	3,410	121	740	283	420	81	63	2,071	607	61,970	
LPG	104	2,170	102	412	77	6	103		76	470	1,544	978	1,042	861	445	1,356	374	2	15	9	83		6	862		11,097	
LNG		172		3	3					5	9	77	222	469	33	54	3		2	2		1			36		1,089
Other Tanker	16	387	176	129	122	5	13	2	53	130	510	86	79	232	34	800	159	16	2	3	13		1	146	5	3,119	
Bulker	161	1,650	686	757	334	107	494	240	454	1,303	2,201	749	1,165	1,897	556	1,810	681	33	14	251	430	221	69	688	571	17,522	
General Cargo	1,536	16,114	5,043	7,644	4,473	1,317	2,837	1,781	3,231	8,684	12,973	5,490	5,734	10,567	3,092	7,095	2,587	685	478	1,746	2,757	434	338	3,959	2,364	112,959	
Other Dry	25	568	135	102	29	23	35	175	134	333	819	497	252	463	134	586	86	6	51	40	112	63	35	267	659	5,629	
Container	1,237	6,840	1,162	2,036	1,553	278	345	463	1,196	8,155	9,359	5,111	4,137	9,475	2,225	7,317	1,405	643	1,657	251	575	447	317	895	1,379	68,458	
Vehicle	77	2,258	74	467	204	15	1	6	75	1,892	445	1,650	788	1,657	187	709	340	51	20	1	60	195		99	117	11,388	
Roro	418	6,518	388	2,030	2,198	86	3	103	114	1,351	2,958	3,180	1,282	1,604	140	3,102	687	264	68	69	27	45	2	580	230	27,447	
Ferry	6,515	87,100	45,385	34,823	17,455	8,814	947	728	2,575	20,738	7,084	2,818	33,620	45,380	2,013	71,882	23,937	20	962	78	126	61	1,146	45,295	277	459,779	
Cruise	136	730	348	192	301	244	60	45	127	563	187	81	595	2,051	313	3,124	902	252	246	36	55	49	79	497	301	11,514	
Yacht	3	95	62	124	32	7	2	1	7	219	117	10	438	742	18	1,113	103	14	139	2	3		1	48	7	3,307	
Offshore *	84	8,180	1,056	139	71	15	10	6	195	213	2,555	77	86	355	10	961	56	64	322	7	279	1	6	4,112	9	18,869	
Service **	201	8,251	2,723	2,316	920	374	238	248	645	4,301	7,545	1,526	1,540	2,708	198	1,781	1,103	104	261	33	137	9	43	2,117	248	39,570	
<b>Total</b>	<b>11,500</b>	<b>154,207</b>	<b>60,096</b>	<b>56,645</b>	<b>30,086</b>	<b>12,687</b>	<b>6,205</b>	<b>4,301</b>	<b>10,057</b>	<b>52,668</b>	<b>61,855</b>	<b>26,866</b>	<b>59,276</b>	<b>84,712</b>	<b>10,919</b>	<b>108,779</b>	<b>39,113</b>	<b>2,481</b>	<b>6,091</b>	<b>3,115</b>	<b>5,254</b>	<b>1,642</b>	<b>2,149</b>	<b>62,670</b>	<b>7,022</b>	<b>880,386</b>	

\* Crew /Supply Vessel, Platform Supply Ship, Offshore Tug/Supply Ship, Anchor Handling Tug Supply, Support/safety, Pipe (various), Drilling, Platform & Storage  
 \*\* Research, Tug, Dredging, SAR & Patrol, Workboats

Table 3 above summarises the port calls that are included in the report. The port calls by ferries represent more than 50% of the total due to the characteristics of much of the ferry trade. In the Ferry section we describe the reasons for this (see page 58).

General cargo ships account for the second-largest number of calls, which makes perfect sense given the number of such ships in the world fleet.

The EEA area covers basically the EU, plus Norway and Iceland, as illustrated in Figure 25.

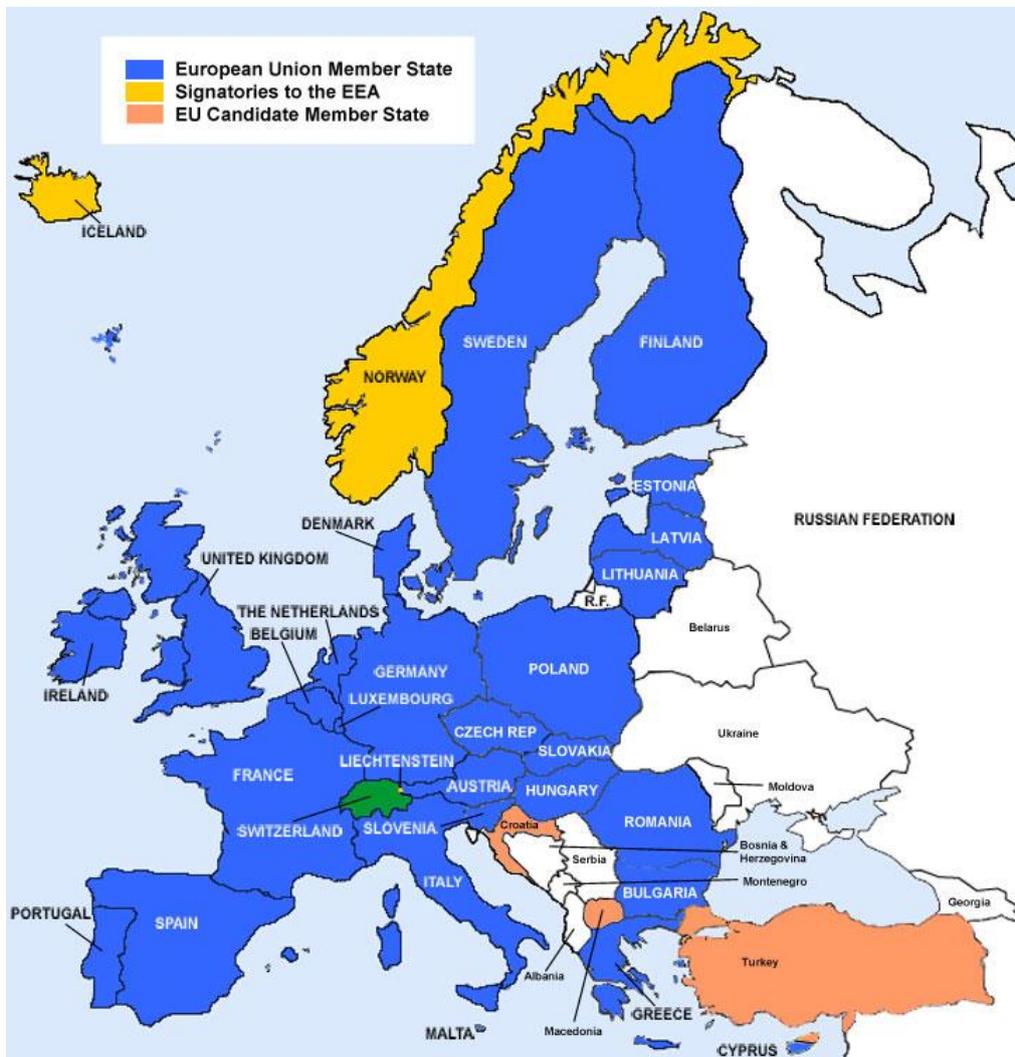


Figure 25: Map of EEA countries

To get a feeling for the size of the ships visiting the EEA, Table 4 illustrates the aggregate deadweight (dwt) capacity of ships calling at ports in the EEA. Most dwt capacity comes from the container ship segment, mainly because such ships visit several ports to load and discharge cargo unlike bulk carriers (both wet and dry) that unload all their cargo in one port.

Table 4: Aggregated dwt (≈cargo capacity) of ships calling at ports in the EEA, July 2009-June 2010

All sizes	Ireland	United Kingdom	Denmark	Sweden	Finland	Estonia	Latvia	Lithuania	Poland	Germany	Netherlands	Belgium	France	Spain	Portugal	Italy	Greece	Cyprus	Malta	Bulgaria	Romania	Slovenia	Iceland	Norway	Russia (Baltic)	Total
Oil Tanker	5,877	185,197	30,929	25,179	14,339	21,451	10,894	7,140	14,337	39,644	202,691	21,693	106,318	52,379	17,311	119,489	30,822	1,198	8,679	10,572	6,616	1,415	66	54,258	22,598	1,011,094
Chemical Tanker	7,054	83,755	15,944	43,223	26,101	9,859	13,341	6,899	5,886	26,238	159,588	37,983	79,048	75,929	17,429	97,637	23,060	1,766	15,362	3,755	5,267	2,925	993	22,304	14,214	795,557
LPG	271	12,638	360	3,109	609	93	1,153	0	389	3,082	10,492	6,858	9,810	7,952	2,821	8,751	1,806	8	71	20	437	0	13	10,348	0	81,089
LNG	0	16,114	0	18	18	0	0	0	0	31	60	6,380	11,355	29,075	2,310	2,042	247	0	168	0	84	0	0	195	0	68,097
Other Tanker	89	1,134	482	518	547	32	24	5	158	725	1,965	312	1,280	190	2,046	258	52	9	5	52	0	4	312	16	12,181	
Bulker	7,415	71,775	11,554	8,886	6,635	4,155	21,968	6,944	14,404	52,787	161,891	35,222	57,864	57,835	15,389	58,576	13,361	784	556	5,435	12,558	8,577	1,042	4,935	20,783	661,329
General Cargo	6,985	61,331	15,761	34,508	25,854	5,664	13,724	7,580	13,994	40,493	66,194	38,826	32,411	63,203	18,502	46,924	9,257	2,714	2,832	8,021	11,948	2,792	1,627	11,393	13,529	556,066
Other Dry	147	5,647	415	931	180	133	213	683	884	3,387	6,482	6,179	3,060	4,901	1,601	5,776	685	14	198	327	674	496	112	756	4,919	48,799
Container	11,780	244,314	16,789	27,603	20,805	3,742	4,686	6,888	16,809	294,585	259,586	214,526	183,329	313,353	41,450	239,207	42,791	14,279	55,743	3,862	17,712	12,020	4,078	8,066	19,893	2,077,897
Vehicle	1,091	26,630	1,049	5,941	1,378	113	8	73	642	25,658	6,255	26,599	8,916	18,592	2,471	10,755	4,471	943	315	14	430	2,423	0	486	791	146,042
Roro	2,909	65,877	3,975	25,137	25,348	946	13	1,078	768	16,468	26,799	39,641	11,213	11,732	2,385	31,677	5,301	2,169	775	577	108	487	1	3,082	2,011	280,476
Ferry	37,176	258,274	72,532	95,669	70,915	28,155	4,251	5,320	8,894	43,312	24,722	10,605	172,754	81,348	1,329	145,263	33,434	9	2,577	401	254	262	463	42,393	2,355	1,142,667
Cruise	668	4,452	1,985	924	1,460	1,409	206	157	568	2,394	845	510	3,746	13,704	1,667	21,835	4,205	907	1,623	67	126	116	365	2,869	1,658	68,466
Yacht	1	23	15	22	10	2	1	0	2	79	30	3	121	231	6	250	26	4	36	0	1	0	0	16	2	879
Offshore *	256	25,268	2,889	558	618	10	13	8	411	598	7,597	226	162	1,161	38	1,681	90	116	790	11	630	2	5	17,445	6	60,589
Service **	149	11,085	1,488	765	615	254	240	185	346	4,011	11,059	5,160	3,921	2,852	316	1,444	456	123	314	12	62	3	90	927	943	46,820
<b>Total</b>	<b>81,868</b>	<b>1,073,514</b>	<b>176,166</b>	<b>272,992</b>	<b>195,432</b>	<b>76,017</b>	<b>70,734</b>	<b>42,960</b>	<b>78,492</b>	<b>553,491</b>	<b>946,255</b>	<b>452,376</b>	<b>684,339</b>	<b>735,527</b>	<b>125,212</b>	<b>793,351</b>	<b>170,269</b>	<b>25,085</b>	<b>90,048</b>	<b>33,079</b>	<b>56,958</b>	<b>31,517</b>	<b>8,860</b>	<b>179,785</b>	<b>103,718</b>	<b>7,058,047</b>

\* Crew/Supply Vessel, Platform Supply Ship, Offshore Tug/Supply Ship, Anchor Handling Tug Supply, Support/safety, Pipe (various), Drilling, Platform & Storage

\*\* Research, Tug, Dredging, SAR & Patrol, Workboats

Gross tonnage (gt) is a measure that is often used by maritime administrations and ports for different charges. Table 5 illustrates the aggregated gt of ships that visited the EEA in the same period.

**Table 5: Aggregated gt (often used for fees and dues) of ships calling at ports in the EEA, July 2009- June 2010**

All sizes	Ireland	United Kingdom	Denmark	Sweden	Finland	Estonia	Latvia	Lithuania	Poland	Germany	Netherlands	Belgium	France	Spain	Portugal	Italy	Greece	Cyprus	Malta	Bulgaria	Romania	Slovenia	Iceland	Norway	Russia (Baltic)	Total
Oil Tanker	3,547	104,248	16,451	14,746	8,588	11,997	6,228	4,127	7,987	22,125	111,891	12,477	58,599	28,996	9,436	65,461	17,728	683	5,155	5,822	3,680	817	45	30,568	12,754	564,154
Chemical Tanker	4,720	55,098	10,483	28,744	17,587	6,314	8,619	4,409	3,836	17,067	102,256	24,580	51,472	49,131	11,314	63,190	15,309	1,154	9,761	2,427	3,407	1,834	674	14,875	9,171	517,433
LPG	285	11,160	330	2,661	531	79	966	0	347	2,686	9,375	5,967	8,267	6,499	2,396	7,719	1,657	7	61	24	382	0	13	8,677	0	70,087
LNG	0	19,546	0	23	23	0	0	0	0	39	73	7,545	14,738	36,185	2,906	2,550	293	0	198	0	99	0	0	251	0	84,469
Other Tanker	71	896	392	465	535	32	24	3	126	552	1,529	1,595	256	891	134	1,435	175	39	7	4	43	0	4	269	11	9,488
Bulker	4,252	40,126	6,855	5,651	3,970	2,420	12,566	4,231	8,667	29,975	88,515	20,132	32,105	34,023	9,010	33,652	8,030	481	311	3,348	7,413	4,992	633	3,406	12,471	377,235
General Cargo	4,945	44,016	11,847	25,475	19,375	4,235	10,311	5,400	10,120	29,365	47,229	28,177	22,780	44,567	13,439	33,084	6,482	1,962	2,181	5,595	8,502	1,985	1,151	9,027	10,511	401,762
Other Dry	131	5,617	359	893	157	131	203	668	806	3,424	6,248	6,051	3,053	4,803	1,518	5,794	646	12	183	286	627	463	110	856	4,765	47,802
Container	9,607	214,613	14,608	24,524	18,396	3,409	4,085	5,775	14,013	261,403	227,917	189,474	161,309	271,910	34,747	211,587	35,861	11,788	47,920	3,083	15,226	10,852	3,492	6,664	16,688	1,818,949
Vehicle	3,065	73,283	2,942	16,365	4,008	336	23	210	1,754	69,524	16,861	72,295	23,652	54,671	7,067	30,839	13,137	2,639	849	46	1,589	6,778	0	1,433	2,405	405,772
Roro	6,648	129,071	7,819	48,481	40,002	1,493	16	2,418	1,157	25,151	46,960	78,262	18,830	20,415	3,547	51,317	8,399	3,685	1,304	743	131	812	3	5,252	3,510	505,427
Ferry	177,136	1,250,730	376,884	499,147	510,855	180,430	22,773	16,177	46,769	208,926	112,931	46,204	848,512	429,311	3,389	627,577	161,417	51	8,769	906	498	400	3,169	210,625	8,180	5,751,765
Cruise	5,516	39,567	19,010	8,183	13,011	13,507	1,485	1,198	5,210	19,411	7,300	4,833	34,089	131,421	15,521	214,912	39,209	6,098	15,486	486	836	863	2,954	217	15,701	640,915
Yacht	1	67	54	51	15	5	2	0	4	264	77	5	418	707	19	833	86	14	136	1	1	0	2	52	5	2,820
Offshore *	290	22,987	2,701	495	571	14	20	7	406	575	6,592	175	171	1,130	44	1,692	86	128	847	13	560	1	7	18,249	8	57,770
Service **	282	9,450	1,651	1,657	1,030	240	223	211	370	4,283	8,849	3,424	3,125	2,916	359	1,560	481	162	407	22	92	4	82	1,339	675	42,895
<b>Total</b>	<b>220,496</b>	<b>2,020,476</b>	<b>472,383</b>	<b>677,563</b>	<b>638,653</b>	<b>224,643</b>	<b>67,543</b>	<b>44,836</b>	<b>101,573</b>	<b>694,771</b>	<b>794,603</b>	<b>501,196</b>	<b>1,281,377</b>	<b>1,117,576</b>	<b>114,843</b>	<b>1,353,201</b>	<b>308,996</b>	<b>28,894</b>	<b>93,573</b>	<b>22,804</b>	<b>43,083</b>	<b>29,802</b>	<b>12,338</b>	<b>336,662</b>	<b>96,857</b>	<b>11,296,741</b>

\* Crew/Supply Vessel, Platform Supply Ship, Offshore Tug/Supply Ship, Anchor Handling Tug Supply, Support/safety, Pipe (various), Drilling, Platform & Storage  
 \*\* Research, Tug, Dredging, SAR & Patrol, Workboats

In Table 6 the average time that a port call lasted is presented. The average overall (including ferries) is 35 hours. It is obvious that this differs significantly between different ship types – container carriers are a lot quicker than bulkers, for instance. It is also perfectly clear that there are marked differences between countries for the same type of ship.

**Table 6: Average duration of stay in port**

All sizes	Belgium	Bulgaria	Cyprus	Germany	Denmark	Spain	Estonia	France	United Kingdom	Greece	Italy	Ireland	Iceland	Latvia	Lithuania	Malta	Norway	Netherlands	Portugal	Poland	Romania	Russia (Baltic)	Sweden	Finland	Slovenia	Total
Oil Tanker	58	155	23	56	37	75	43	36	37	76	104	27	43	78	50	65	30	57	126	89	151	73	41	25	34	57
Chemical Tanker	49	63	103	35	26	29	34	35	33	53	51	25	20	45	39	40	22	42	38	81	78	52	24	25	33	38
LPG	35	468	85	34	111	34	23	36	23	42	42	21	30	22		32	29	33	33	90	43		23	35		34
LNG	29			27		58		46	71	86	132					189	29	42	33		14		37	43		57
Other Tanker	59	203	180	24	33	55	20	22	24	171	77	25	13	13	43	27	24	38	87	40	84	27	30	16		53
Bulker	93	154	71	66	63	67	71	82	73	112	82	71	147	70	103	142	44	72	88	159	174	95	54	52	47	80
General Cargo	55	80	57	51	50	44	76	61	43	93	63	51	50	42	47	94	34	47	52	81	94	76	40	49	57	53
Other Dry	52	301	132	56	105	44	631	30	47	96	40	78	69	369	80	43	26	68	57	237	34	158	115	32	45	77
Container	33	56	13	55	20	22	18	25	25	27	29	21	32	16	19	29	16	27	28	21	48	39	19	23	21	30
Vehicle	34	50	9	36	15	15	16	22	23	20	16	16		11	91	10	12	25	16	93	22	22	25	22	18	25
Roro	26	181	26	40	38	37	68	58	25	86	34	18	41	29	105	18	54	24	45	195	301	28	27	33	13	34
Ferry	11	149	476	14	7	8	13	7	6	21	15	8	6	15	24	57	8	11	45	28	115	16	11	9	9	10
Cruise	14	212	47	64	14	15	9	39	37	38	19	17	19	10	10	12	13	126	42	22	11	40	52	30	15	28
Yacht	53	46	689	333	78	540	45	333	428	558	336	75	48	2,605	75	455	357	389	78	135	256	113	170	213		384
Offshore *	220	693	501	282	131	173	429	194	63	579	181	100	245	53	934	251	54	99	299	334	122	32	35	145	3,965	93
Service **	178	1,330	228	220	128	277	256	239	146	192	350	258	464	569	288	264	98	121	282	343	365	229	138	262	745	185
<b>Total</b>	<b>48</b>	<b>114</b>	<b>67</b>	<b>52</b>	<b>21</b>	<b>33</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>44</b>	<b>35</b>	<b>23</b>	<b>34</b>	<b>63</b>	<b>60</b>	<b>78</b>	<b>18</b>	<b>51</b>	<b>51</b>	<b>89</b>	<b>103</b>	<b>75</b>	<b>24</b>	<b>28</b>	<b>41</b>	<b>35</b>

\* Crew/Supply Vessel, Platform Supply Ship, Offshore Tug/Supply Ship, Anchor Handling Tug Supply, Support/safety, Pipe (various), Drilling, Platform & Storage  
 \*\* Research, Tug, Dredging, SAR & Patrol, Workboats



Table 7: Average age of different ship types in the world fleet

Shiptype	Average age	Number of ships
Oil tankers	19.2	7,568
Chemical tankers	11.4	5,071
LPG	16.4	1,199
LNG	10.3	364
Other tanker	24	399
Bulker	14.3	9,100
General cargo	24.4	16,486
Other dry	20.6	2,326
Container	10.5	4,928
Vehicle	11.5	784
Roro	22.1	793
Ferry	25.3	6,364
Cruise	20.5	525
Yacht	14.1	1,523
Offshore	18.9	8,027
Service	23.5	18,406
<b>TOTAL</b>	<b>19.9</b>	<b>83,863</b>

Table 8 displays the average age of ships visiting EEA countries. It is evident that this differs substantially between countries and between ship types. Compared to the average age of the respective ship types in the world fleet (Table 7), tankers that visit EEA countries are younger whereas dry bulkers are older than the average in the world fleet.

Table 8: Average age of ships calling at an EEA country (and Baltic Russia)

All sizes	Belgium	Bulgaria	Cyprus	Germany	Denmark	Spain	Estonia	France	United Kingdom	Greece	Italy	Ireland	Iceland	Latvia	Lithuania	Malta	Norway	Netherlands	Portugal	Poland	Romania	Russia (Baltic)	Sweden	Finland	Slovenia	Total
Oil Tanker	6.7	20.3	25.2	18.1	17.4	5.5	22.4	5.5	10.5	21.7	8.6	11.1	30.8	15.6	7.4	26.2	10.5	6.9	9.8	24.0	11.1	5.5	12.5	6.5	11.0	13.2
Chemical Tanker	8.7	11.2	5.4	10.5	9.2	6.4	9.4	6.0	7.8	21.7	6.6	7.4	6.1	10.1	8.6	13.9	9.8	7.9	5.2	13.4	9.9	6.0	7.9	7.6	5.0	8.6
LPG	12.8	23.2	18.0	13.4	13.9	11.6	14.2	10.0	13.5	21.8	9.6	14.6	14.5	13.2		14.5	11.5	12.7	11.1	14.3	18.7		13.6	13.2		12.5
LNG	2.8			0.4		15.8		11.0	8.5	2.0	19.2					2.0	1.2	0.2	14.1		2.0		0.7	0.7		12.0
Other Tanker	10.9	20.7	20.1	18.1	28.4	8.9	6.4	16.6	17.5	29.6	31.2	9.2	14.0	12.5	33.0	0.5	24.3	16.5	6.7	27.2	19.1	23.4	18.8	9.4		21.3
Bulker	13.2	23.9	21.9	17.3	20.1	20.7	15.3	12.0	18.0	19.9	19.0	15.1	21.1	16.1	17.4	15.1	24.0	13.0	16.0	16.2	21.8	16.8	31.3	19.8	17.9	18.1
General Cargo	12.9	24.8	25.8	19.3	24.2	11.4	17.8	12.8	16.2	27.4	17.5	12.8	15.6	18.0	20.8	19.5	23.5	14.1	11.4	18.9	25.3	17.6	18.8	13.5	20.6	16.9
Other Dry	13.7	23.1	27.2	17.4	21.4	15.7	20.5	14.9	13.4	19.2	15.8	18.3	17.1	22.3	18.6	11.8	17.8	18.6	13.9	18.5	24.5	20.5	21.2	5.8	22.3	17.2
Container	7.7	15.0	11.8	7.0	7.3	9.5	10.5	7.8	7.9	12.0	10.9	5.1	12.5	6.3	8.2	8.9	9.1	5.9	9.1	8.1	10.9	6.7	7.7	6.7	12.1	8.2
Vehicle	9.3	28.0	10.1	10.3	11.1	10.2	3.9	12.7	11.3	11.3	8.9	13.8		3.0	10.3	13.9	11.4	10.8	12.3	15.1	7.8	7.9	9.9	10.2	12.2	10.5
Roro	12.0	15.5	31.2	16.3	8.7	17.5	11.7	18.3	13.9	32.3	24.9	7.1	41.0	25.7	4.2	20.2	23.0	15.3	19.5	17.3	33.8	22.7	10.1	12.6	18.2	16.0
Ferry	28.1	32.3	24.2	27.3	14.8	14.0	15.6	13.2	14.5	19.7	22.1	13.2	21.5	23.4	12.1	6.1	11.4	14.4	2.5	21.1	14.6	20.5	21.8	18.0	34.7	16.9
Cruise	12.7	19.5	31.2	18.7	13.3	12.8	13.4	17.2	18.5	17.2	12.7	21.4	18.7	22.5	24.6	13.1	17.6	19.3	17.6	17.2	22.6	14.9	17.0	16.9	27.7	15.5
Yacht	30.0	6.5	17.9	30.5	27.0	9.1	17.9	8.6	14.6	12.1	8.5	16.7	3.0	1.5	23.0	9.2	9.0	19.1	14.4	23.9	11.0	13.7	8.0	13.9		11.4
Offshore *	8.4	21.6	20.0	12.2	14.7	21.3	26.9	18.5	11.9	29.4	21.1	10.6	9.0	30.1	29.3	11.8	8.0	11.4	17.6	20.7	12.3	31.7	9.3	22.0	28.0	12.1
Service **	18.2	31.9	21.3	19.4	21.9	12.9	22.1	13.4	14.4	27.1	12.8	16.2	23.7	25.2	26.8	12.8	22.1	17.3	19.6	26.7	18.9	16.9	21.6	28.5	3.8	18.0
<b>Total</b>	<b>12.7</b>	<b>22.2</b>	<b>21.4</b>	<b>19.5</b>	<b>15.7</b>	<b>12.6</b>	<b>16.0</b>	<b>11.8</b>	<b>13.7</b>	<b>20.6</b>	<b>19.3</b>	<b>11.8</b>	<b>18.8</b>	<b>17.2</b>	<b>16.2</b>	<b>13.7</b>	<b>12.6</b>	<b>11.8</b>	<b>9.2</b>	<b>18.5</b>	<b>20.3</b>	<b>14.3</b>	<b>19.2</b>	<b>15.8</b>	<b>16.6</b>	<b>15.3</b>

\* Crew /Supply Vessel, Platform Supply Ship, Offshore Tug/Supply Ship, Anchor Handling Tug Supply, Support/safety, Pipe (various), Drilling, Platform & Storage

\*\* Research, Tug, Dredging, SAR & Patrol, Workboats

Table 9: World fleet, percentage of ships for different flags

World fleet, percentage of ships, by vessel type and flag																		
GROUP	Oil tanker	Chem tanker	LPG	LNG	Other tanker	Bulker	Cargo	General Cargo	Other dry	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
AUSTRIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BELGIUM	0%	1%	1%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BULGARIA	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CYPRUS	1%	1%	1%	1%	1%	3%	1%	0%	0%	4%	1%	1%	1%	1%	0%	1%	1%	1%
DENMARK	1%	2%	0%	1%	1%	0%	0%	0%	0%	2%	0%	1%	1%	0%	0%	1%	1%	1%
ESTONIA	0%	0%						0%					0%					0%
FINLAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%	1%	0%	0%	1%	0%
FRANCE	0%	1%	1%	1%		0%	0%	0%	1%	0%	0%	2%	2%	1%	0%	1%	1%	1%
GERMANY	0%	1%	1%	0%	0%	0%	0%	0%	0%	6%	0%	1%	2%	0%	0%	0%	0%	1%
GREECE	5%	2%	1%	2%	3%	3%	1%	0%	0%	1%	0%	2%	5%	2%	3%	0%	1%	2%
IRELAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ITALY	1%	3%	2%	1%	6%	1%	0%	0%	0%	0%	4%	6%	4%	3%	1%	2%	2%	2%
LATVIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LITHUANIA	0%							0%	0%	0%	0%	0%	0%			0%	0%	0%
LUXEMBOURG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
MALTA	2%	6%	3%	1%	1%	6%	2%	0%	0%	2%	2%	3%	1%	9%	4%	0%	0%	2%
NETHERLANDS	0%	5%	2%	0%	1%	0%	3%	1%	0%	1%	0%	2%	0%	5%	2%	0%	1%	1%
POLAND	0%	0%						0%					1%				0%	1%
PORTUGAL	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	3%	2%	0%	0%	0%
ROMANIA	0%	0%						0%				0%	0%		0%	0%	0%	0%
SLOVAKIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SLOVENIA																		0%
SPAIN	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%	1%	1%	0%	1%	0%	2%	1%
SWEDEN	0%	0%			1%	0%	0%	0%	0%		3%	4%	2%	0%	0%	0%	1%	1%
UNITED KINGDOM	1%	1%	1%	0%	1%	0%	1%	0%	0%	4%	3%	3%	2%	1%	14%	3%	2%	2%
ICELAND	0%						0%	0%					0%				0%	0%
NORWAY	1%	3%	3%	3%	1%	1%	1%	1%	0%	0%	6%	1%	6%	0%	0%	4%	1%	2%
<b>EEA TOTAL</b>	<b>13%</b>	<b>28%</b>	<b>15%</b>	<b>15%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>	<b>6%</b>	<b>22%</b>	<b>21%</b>	<b>33%</b>	<b>33%</b>	<b>28%</b>	<b>34%</b>	<b>12%</b>	<b>17%</b>	<b>17%</b>	
RUSSIA	4%	1%			3%	1%	5%	4%	0%	0%	2%	1%	2%	0%	1%	3%	3%	3%
OTHER EUROPE	2%	3%	3%	2%	1%	1%	3%	1%	0%	1%	1%	2%	2%	1%	9%	2%	1%	2%
NORTH AFRICA	1%	0%	1%	2%	5%	0%	0%	0%	0%	0%	3%	1%	1%	0%	0%	1%	2%	1%
MEDITERRANEAN	2%	2%	1%	0%	3%	1%	3%	1%	1%	1%	5%	4%	0%	1%	0%	1%	1%	2%
BL-SEA	1%	0%	0%		2%	0%	2%	1%	0%	0%	1%	2%	1%	0%	2%	2%	2%	1%
CANADA	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	2%	0%	1%	0%	1%	1%
USA	1%	1%			0%	1%	0%	1%	2%	2%	3%	1%	3%	5%	3%	15%	9%	4%
BAHAMAS	3%	2%	2%	14%	1%	3%	1%	5%	1%	8%	2%	1%	18%	1%	2%	0%	2%	2%
BERMUDA	0%	0%	0%	10%		0%	0%	0%	0%	0%	0%	0%	5%	2%	0%	0%	0%	0%
PANAMA	8%	12%	13%	10%	9%	27%	8%	12%	15%	15%	37%	14%	2%	8%	1%	9%	3%	9%
OTHER AMERICA	6%	3%	5%		5%	4%	11%	9%	10%	1%	10%	4%	17%	37%	12%	7%	8%	8%
CHINA	8%	5%	8%	1%	8%	15%	7%	6%	10%	4%	2%	7%	0%	0%	3%	4%	7%	7%
JAPAN	8%	9%	11%	9%	7%	5%	8%	0%	0%	7%	7%	8%	1%	0%	0%	7%	6%	6%
SOUTH KOREA	3%	4%	5%	1%	3%	3%	2%	1%	1%	1%	1%	3%	0%	0%	0%	3%	2%	2%
OTHER ASIA	23%	13%	25%	14%	21%	9%	22%	34%	13%	11%	8%	19%	3%	2%	20%	28%	21%	21%
REST OF WORLD	14%	14%	10%	22%	8%	12%	9%	16%	22%	5%	7%	5%	6%	7%	16%	6%	11%	11%
Unknown	5%	2%	2%		6%	2%	7%	4%	1%	1%	3%	5%	2%	2%	4%	6%	4%	4%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Comparing the percentage of the world fleet under different flags (Table 9), where EEA countries have a 17% share of the total, with Table 10 and Table 11 (total calls in the EEA by flag and calls of relatively large ships (20,000+ gt) by flag, respectively), where the EEA share is 77% in both cases, the importance of where the ships trade becomes obvious.

Table 10: Percentage of calls in an EEA port by flag and ship type, all ships

COUNTRY	Share of port calls in the EEA, by vessel type and flag														Total		
	Oil tanker	Chem tanker	LPG	LNG	Other tanker	Bulker	General Cargo	Other dry	Container	Vehicle	Roro	Ferry	Cruise	Yacht		Offshore	Service
AUSTRIA														0%			0%
BELGIUM	2%	1%	1%	1%		0%	1%		0%		8%		0%	0%	0%	2%	1%
BULGARIA	1%	0%	0%		0%	1%	0%		0%		0%	0%			0%	0%	0%
CYPRUS	2%	3%	3%		0%	6%	3%	1%	11%	5%	3%	3%	1%		2%	1%	4%
DENMARK	3%	8%	0%	1%	9%	0%	2%	1%	3%		4%	9%			6%	8%	6%
ESTONIA	2%	0%					0%					2%				1%	1%
FINLAND	1%	1%	0%			1%	2%	1%	1%	4%	9%	2%	1%	1%		3%	2%
FRANCE	2%	3%	0%	8%		0%	0%		1%		1%	5%	1%		0%	3%	3%
GERMANY	4%	2%	2%			1%	3%	1%	10%		2%	5%	0%	2%	0%	9%	4%
GREECE	15%	5%	2%	2%	4%	4%	1%	1%	1%		3%	5%	1%	1%	0%	3%	4%
IRELAND		0%					1%		0%		0%	0%			0%	1%	0%
ITALY	2%	10%	9%	11%	22%	3%	1%	4%	0%	15%	8%	15%	16%	2%	3%	4%	10%
LATVIA	0%	0%					0%		0%		0%	0%				0%	0%
LITHUANIA							1%	0%	0%		2%	0%				0%	0%
LUXEMBOURG		1%					0%		1%		8%		0%	1%	1%	0%	0%
MALTA	8%	13%	5%		2%	11%	6%	1%	4%	5%	4%	2%	16%	4%	2%	2%	4%
NETHERLANDS	1%	8%	11%	6%	20%	0%	16%	8%	7%		8%	1%	5%	8%	5%	16%	5%
POLAND	2%	0%					0%				0%	0%		1%	0%	2%	0%
PORTUGAL	0%	2%	2%		2%	2%	1%	1%	0%	7%	1%	0%	6%	0%	0%	0%	1%
ROMANIA	0%	0%										0%			0%	0%	0%
SLOVAKIA							0%	0%								0%	0%
SLOVENIA																0%	0%
SPAIN	1%	1%	1%	7%	4%	3%	1%	0%	0%	5%	2%	5%		1%	1%	6%	4%
SWEDEN	6%	3%			8%	3%	1%	0%		3%	11%	9%	0%	4%	0%	5%	6%
UNITED KINGDOM	8%	2%	1%			2%	3%	0%	8%	2%	7%	18%	2%	11%	20%	18%	13%
ICELAND	0%						0%					0%			0%	0%	0%
NORWAY	3%	6%	4%	4%	20%	2%	4%	3%	3%	4%	2%	10%	0%	0%	32%	5%	7%
<b>EEA TOTAL</b>	<b>63%</b>	<b>71%</b>	<b>41%</b>	<b>41%</b>	<b>91%</b>	<b>39%</b>	<b>46%</b>	<b>22%</b>	<b>46%</b>	<b>50%</b>	<b>81%</b>	<b>94%</b>	<b>50%</b>	<b>37%</b>	<b>73%</b>	<b>92%</b>	<b>77%</b>
RUSSIA	0%	1%			0%	2%	3%	1%	0%		0%	0%	0%	0%	0%	0%	0%
OTHER EUROPE	9%	9%	10%	1%		2%	9%	4%	3%	7%	2%	0%		11%	7%	2%	3%
NORTH AFRICA	0%	0%	1%	2%		0%	0%		0%		2%	1%			0%	0%	1%
MEDITERRANEAN	0%	1%	0%		0%	2%	2%	0%	2%	0%	2%	0%		0%	0%	0%	1%
BL-SEA	0%	0%			0%	1%	1%	1%	0%	0%		0%			0%	0%	0%
CANADA	0%					0%	0%					0%			0%	0%	0%
USA	0%	0%				0%	0%	0%	1%	1%				0%	0%	0%	0%
BAHAMAS	7%	2%	4%	16%	0%	7%	3%	16%	0%	9%	2%	2%	27%	1%	6%	1%	3%
BERMUDA	0%	0%		14%		0%		3%	1%		0%	1%	8%	3%	0%		1%
PANAMA	2%	3%	7%	1%	4%	16%	2%	13%	11%	21%	2%	0%	10%	1%	3%	1%	3%
OTHER AMERICAS	3%	3%	9%		1%	8%	28%	18%	18%	1%	6%	1%	1%	42%	4%	2%	6%
CHINA	1%	1%	2%		0%	5%	0%	0%	3%	0%	0%				0%	0%	0%
JAPAN	0%					0%	0%		0%	2%		0%	0%			0%	0%
SOUTH KOREA	0%	0%				0%	0%		0%			0%					0%
OTHER ASIA	2%	2%	15%	2%	1%	3%	0%	2%	2%	8%	1%	0%		1%	3%	0%	1%
REST OF WORLD	9%	8%	11%	21%	3%	15%	5%	19%	14%	2%	2%	0%	4%	4%	3%	1%	3%
Unknown	0%	0%				0%	0%		0%	0%	0%	0%		0%	0%	0%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

It is interesting to note the differences between Tables 10 and 11 since some larger ship types tend to opt for flags other than of EEA countries. The best examples are oil tankers, bulk carriers and container ships. The Bahamas flag is clearly favoured for oil tankers whereas the Panamanian flag is the choice for larger bulkers and container carriers.

However, it is still the case that for larger ships visiting EEA ports the percentage under EEA flags is substantially higher than the percentage in the world fleet.

Table 11: Percentage of calls in an EEA port by flag and ship type, ships 20,000+ gt

Share of port calls in the EEA, ships larger than 20,000 gt, by vessel type and flag																	
COUNTRY	Oil tanker	Chem tanker	LPG	LNG	Other tanker	Bulker	Cargo	dry	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
BELGIUM	0%		4%	1%		1%			0%		16%					11%	1%
BULGARIA						1%											0%
CYPRUS	2%	5%				5%	7%		3%		1%	2%	1%			11%	2%
DENMARK	3%	6%		1%		0%			6%		6%	1%					2%
ESTONIA												5%					3%
FINLAND	2%											4%					3%
FRANCE	0%	1%	3%	9%		0%			2%		0%	13%					8%
GERMANY	2%	3%	3%			0%	0%		9%		1%	3%	0%				3%
GREECE	14%	4%	1%	2%		5%			1%		1%	3%	1%				3%
ITALY	2%	17%		11%		2%	1%		1%	22%	4%	12%	20%				10%
LATVIA												1%					1%
LITHUANIA												1%					1%
LUXEMBOURG		1%							0%		8%				11%	46%	1%
MALTA	7%	11%				9%	5%		4%	4%	2%	1%	16%				3%
NETHERLANDS		0%				0%			1%		13%	1%	3%			31%	2%
PORTUGAL	0%	0%				0%				5%			3%				0%
ROMANIA												0%					0%
SPAIN	0%	2%		8%							1%	3%					2%
SWEDEN		0%								4%	21%	13%	0%				10%
UNITED KINGDOM	1%	4%				1%	1%		7%	3%	13%	29%	3%		3%		20%
NORWAY	4%	6%	48%	4%		2%	17%	5%		6%	1%	2%			3%		2%
<b>EEA TOTAL</b>	<b>38%</b>	<b>59%</b>	<b>60%</b>	<b>37%</b>	<b>0%</b>	<b>26%</b>	<b>31%</b>	<b>5%</b>	<b>34%</b>	<b>44%</b>	<b>88%</b>	<b>96%</b>	<b>48%</b>	<b>0%</b>	<b>16%</b>	<b>100%</b>	<b>77%</b>
RUSSIA	0%										0%	0%					0%
OTHER EUROPE	9%	3%		2%		3%			0%	2%							1%
NORTH AFRICA	1%	0%		2%		0%			0%		2%	0%					0%
MEDITERRANEAN	0%	0%				2%			1%		4%						0%
BL.SEA												0%					0%
CANADA	0%					1%						0%					0%
USA	0%	0%				0%			1%	2%							0%
BAHAMAS	14%	3%	6%	17%		6%	17%		1%	13%	1%	3%	25%		16%		5%
BERMUDA	1%	0%		15%		0%			2%			0%	11%				1%
PANAMA	5%	2%	5%	1%		27%	7%		24%	23%	2%	0%	13%		50%		6%
OTHER AMERICAS	1%	2%				3%	3%	22%	2%	1%	2%	0%			5%		1%
CHINA	3%	2%	2%			9%	9%	14%	6%	0%							1%
JAPAN	0%					0%	1%		0%	3%		0%	0%				0%
SOUTH KOREA	0%					1%			0%								0%
OTHER ASIA	6%	6%	15%	2%		5%	14%		5%	11%	0%						2%
REST OF WORLD	22%	22%	12%	23%	100%	17%	17%	59%	23%	2%	2%	0%	3%		13%		6%
Unknown						0%			0%	0%							0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The following three tables (Table 12 to Table 14) present the world fleet and the distribution of port calls of that fleet in the EEA by country of domicile for the operators of that fleet.

Table 15 to Table 17 present in a similar format that information by country of economic benefit from the operation of that fleet.

The conclusions are basically the same. Both EEA operators and EEA countries as the country of economic benefit have a share of the port calls in the EEA. This is perfectly natural given that you tend to do business where you know most about the business environment ie close to home.

Table 12: Total world fleet, by vessel type and operator country of domicile

World fleet, percentage of ships, by vessel type and operator country of domicile																		
GROUP	Oil		Chem		Other			General		Other		Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
	tanker	tanker	LPG	LNG	tanker	Bulker	Cargo	dry	Container	Vehicle								
AUSTRIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BELGIUM	0%	1%	2%	2%	0%	0%	0%	1%	1%	0%	3%	0%	0%	0%	0%	1%	1%	1%
BULGARIA	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CYPRUS	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%	0%	0%	0%	0%	0%
DENMARK	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ESTONIA	2%	7%	4%	2%	1%	1%	1%	1%	11%	0%	4%	1%	0%	0%	2%	2%	2%	2%
FINLAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
FRANCE	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%	1%	0%	0%	0%	0%	0%
GERMANY	0%	1%	0%	2%	0%	0%	0%	0%	5%	0%	2%	2%	1%	4%	2%	1%	1%	1%
GREECE	1%	3%	3%	1%	2%	5%	1%	16%	3%	2%	4%	1%	0%	1%	0%	1%	3%	3%
IRELAND	8%	6%	6%	3%	4%	14%	1%	3%	1%	2%	4%	4%	2%	3%	0%	1%	4%	4%
ITALY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LATVIA	1%	4%	2%	1%	5%	1%	1%	0%	0%	4%	5%	5%	1%	2%	1%	2%	2%	2%
LITHUANIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LUXEMBOURG	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
MALTA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%
NETHERLANDS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
POLAND	0%	3%	5%	0%	1%	0%	3%	7%	1%	0%	3%	0%	1%	1%	3%	3%	2%	2%
PORTUGAL	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ROMANIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
SLOVAKIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SLOVENIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SPAIN	1%	1%	0%	1%	1%	0%	0%	1%	0%	1%	2%	1%	2%	0%	0%	0%	1%	1%
SWEDEN	1%	2%	0%	0%	1%	0%	0%	0%	0%	8%	4%	2%	0%	0%	0%	0%	0%	1%
UNITED KINGDOM	3%	1%	3%	14%	1%	1%	1%	0%	1%	3%	2%	1%	5%	2%	1%	2%	2%	2%
ICELAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NORWAY	1%	6%	6%	3%	1%	1%	2%	5%	0%	21%	2%	4%	2%	0%	6%	1%	2%	2%
<b>EEA TOTAL</b>	<b>18%</b>	<b>36%</b>	<b>33%</b>	<b>29%</b>	<b>15%</b>	<b>25%</b>	<b>17%</b>	<b>21%</b>	<b>39%</b>	<b>36%</b>	<b>39%</b>	<b>25%</b>	<b>18%</b>	<b>22%</b>	<b>19%</b>	<b>17%</b>	<b>22%</b>	<b>22%</b>
RUSSIA	5%	1%	1%	1%	3%	1%	5%	5%	0%	1%	3%	1%	2%	0%	1%	3%	3%	3%
OTHER EUROPE	1%	1%	1%	0%	2%	2%	1%	1%	7%	0%	0%	2%	3%	7%	1%	0%	1%	1%
NORTH AFRICA	1%	0%	0%	0%	5%	0%	0%	0%	0%	2%	1%	0%	0%	1%	2%	1%	2%	1%
MEDITERRANEAN	2%	3%	1%	0%	3%	3%	6%	2%	3%	2%	6%	3%	1%	1%	0%	1%	3%	3%
BL SEA	1%	0%	0%	0%	2%	0%	2%	1%	0%	1%	2%	1%	0%	1%	2%	1%	2%	1%
CANADA	2%	0%	0%	2%	2%	0%	0%	0%	0%	1%	2%	1%	0%	0%	1%	1%	1%	1%
USA	4%	5%	1%	1%	1%	3%	1%	2%	2%	1%	5%	2%	35%	8%	25%	7%	6%	6%
BAHAMAS	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
BERMUDA	1%	0%	6%	6%	0%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
PANAMA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
OTHER AMERICAS	3%	1%	3%	0%	2%	1%	1%	1%	3%	1%	2%	1%	6%	0%	4%	4%	2%	2%
CHINA	8%	4%	7%	2%	7%	20%	11%	9%	17%	6%	3%	6%	0%	0%	5%	4%	8%	8%
JAPAN	7%	10%	17%	14%	8%	13%	3%	5%	5%	44%	9%	3%	1%	1%	1%	4%	6%	6%
OTHER ASIA	20%	17%	19%	32%	18%	13%	15%	15%	18%	4%	10%	13%	7%	1%	21%	21%	17%	17%
REST OF WORLD	2%	1%	1%	11%	2%	0%	1%	3%	1%	0%	1%	3%	3%	1%	4%	3%	2%	2%
Unknown	26%	18%	11%	2%	30%	13%	37%	34%	3%	4%	19%	36%	23%	59%	16%	30%	26%	26%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Table 13: Percentage of calls in the EEA area by ship type and operator country of domicile, all ships

Share of port calls in the EEA, by vessel type and operator country of domicile																		
COUNTRY	Oil		Chem		Other			General		Other		Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
	tanker	tanker	LPG	LNG	tanker	Bulker	Cargo	dry	Container	Vehicle								
AUSTRIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BELGIUM	2%	1%	4%	1%	1%	1%	5%	3%	20%	0%	0%	0%	0%	1%	3%	1%	1%	1%
BULGARIA	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CYPRUS	1%	2%	0%	0%	0%	6%	0%	0%	1%	0%	0%	3%	1%	0%	0%	0%	0%	0%
CZECH REPUBLIC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DENMARK	4%	13%	10%	1%	9%	2%	4%	4%	18%	0%	12%	4%	0%	7%	18%	7%	7%	7%
ESTONIA	1%	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
FINLAND	2%	2%	0%	0%	2%	1%	2%	1%	2%	7%	4%	1%	0%	3%	3%	3%	3%	3%
FRANCE	2%	4%	9%	0%	0%	0%	0%	8%	8%	0%	2%	8%	2%	6%	1%	3%	5%	5%
GERMANY	7%	10%	9%	7%	8%	22%	7%	21%	2%	8%	9%	2%	9%	2%	1%	9%	11%	11%
GREECE	18%	7%	7%	2%	6%	14%	1%	4%	1%	5%	5%	5%	2%	2%	0%	3%	5%	5%
IRELAND	0%	0%	0%	0%	0%	3%	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
ITALY	3%	8%	9%	8%	23%	3%	1%	1%	1%	14%	9%	14%	1%	2%	2%	3%	9%	9%
LATVIA	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LITHUANIA	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LUXEMBOURG	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
MALTA	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NETHERLANDS	1%	4%	28%	6%	20%	0%	14%	22%	6%	0%	8%	2%	1%	1%	11%	18%	5%	5%
POLAND	2%	1%	0%	0%	4%	1%	0%	0%	0%	1%	1%	0%	0%	1%	2%	1%	2%	1%
PORTUGAL	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%
ROMANIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%	0%
SLOVENIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
SPAIN	2%	1%	0%	2%	6%	2%	1%	0%	1%	5%	3%	7%	3%	0%	1%	6%	5%	5%
SWEDEN	8%	11%	1%	0%	8%	1%	4%	1%	0%	6%	7%	7%	0%	3%	0%	2%	6%	6%
UNITED KINGDOM	17%	3%	1%	14%	1%	5%	6%	0%	2%	7%	15%	3%	11%	10%	11%	11%	11%	11%
ICELAND	0%	0%	0%	0%	0%	0%	0%	5%	3%	1%	0%	0%	0%	0%	0%	0%	0%	0%
NORWAY	3%	12%	13%	5%	3%	8%	10%	21%	1%	26%	3%	9%	4%	0%	38%	6%	9%	9%
<b>EEA TOTAL</b>	<b>75%</b>	<b>79%</b>	<b>84%</b>	<b>56%</b>	<b>76%</b>	<b>57%</b>	<b>77%</b>	<b>73%</b>	<b>67%</b>	<b>56%</b>	<b>87%</b>	<b>90%</b>	<b>30%</b>	<b>29%</b>	<b>74%</b>	<b>87%</b>	<b>82%</b>	<b>82%</b>
RUSSIA	3%	1%	1%	0%	3%	3%	4%	2%	0%	0%	1%	0%	1%	0%	1%	0%	1%	1%
OTHER EUROPE	2%	2%	1%	0%	2%	4%	1%	4%	13%	0%	0%	2%	10%	8%	2%	0%	3%	3%
NORTH AFRICA	1%	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%	0%	0%
MEDITERRANEAN	1%	3%	0%	0%	1%	5%	5%	4%	3%	2%	3%	0%	1%	0%	0%	0%	1%	1%
BL SEA	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CANADA	3%	0%	0%	5%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	3%	5%	0%	0%	2%	0%	2%	0%	0%	0%	0%	0%	50%	11%	16%	0%	2%	2%
BAHAMAS	0%	0%	0%	0%	1%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%	1%	1%
BERMUDA	0%	0%	6%	9%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
PANAMA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
OTHER AMERICAS	1%	0%	0%	0%	2%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%
CHINA	0%	0%	0%	1%	0%	5%	0%	1%	5%	1%	0%	0%	0%	0%	0%	0%	0%	1%
JAPAN	1%	1%	2%	4%	1%	7%	0%	11%	2%	37%	0%	1%	0%	3%	0%	0%	1%	1%
OTHER ASIA	2%	2%	1%	9%	3%	1%	0%	0%	4%	1%	1%	0%	3%	0%	3%	0%	1%	1%
REST OF WORLD	0%	0%	0%	13%	0%	0%	0%	0%	1%	2%	0%	0%	0%	0%	1%	0%	0%	0%
Unknown	6%	6%	5%	4%	18%	7%	10%	2%	3%	0%	4%	6%	4%	50%	3%	10%	7%	7%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Table 14: Percentage of calls in the EEA area by ship type and operator country of domicile, 20,000+ gt

Port calls in the EEA, ships larger than 20,000 gt, by vessel type and operator country of domicile																			
COUNTRY	Oil	Chem			Other			General		Other	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
	tanker	tanker	LPG	LNG	tanker	Bulker	Cargo	dry											
BELGIUM	1%		4%	1%			1%	0%					28%				11%	57%	2%
BULGARIA							1%												0%
CYPRUS	0%	6%					1%	3%			0%				2%				0%
DENMARK	7%	24%	0%	1%			2%	0%			18%	0%	18%	3%					6%
ESTONIA														6%					4%
FINLAND	6%												3%	10%	0%				6%
FRANCE	0%	2%		10%			0%	1%			11%	0%	1%	14%					10%
GERMANY	4%	5%	2%	7%			4%	11%	59%		15%		1%	4%	8%				5%
GREECE	19%	11%	7%	2%			21%	0%			1%	5%	2%	3%	1%				4%
IRELAND	0%														2%				2%
ITALY	4%	16%		9%			4%	4%			0%	20%	6%	8%			21%		7%
LATVIA	0%	1%																	0%
LUXEMBOURG							0%												0%
NETHERLANDS		1%					0%	1%	14%		0%	0%	9%	6%			11%	31%	5%
POLAND	0%						6%							1%					1%
PORTUGAL	0%	0%					0%												0%
ROMANIA		1%					0%						1%	0%					0%
SLOVENIA							0%							1%					1%
SPAIN	1%	2%		2%			1%						1%	4%	5%				3%
SWEDEN	2%	0%									9%	13%	11%				13%		8%
UNITED KINGDOM	7%	1%	2%	15%			4%	1%					6%	19%	2%				13%
NORWAY	4%	6%	13%	5%			2%	29%	5%		0%	27%	0%	2%	4%		13%		3%
<b>EEA TOTAL</b>	<b>55%</b>	<b>77%</b>	<b>29%</b>	<b>53%</b>	<b>0%</b>	<b>47%</b>	<b>49%</b>	<b>78%</b>	<b>45%</b>	<b>62%</b>	<b>90%</b>	<b>95%</b>	<b>22%</b>	<b>0%</b>	<b>68%</b>	<b>89%</b>	<b>80%</b>	<b>0%</b>	<b>0%</b>
OTHER EUROPE	5%	5%	2%		18%		4%	8%			26%	0%		3%	13%		8%		6%
NORTH AFRICA	2%	0%					0%						2%	0%					0%
MEDITERRANEAN	1%	0%					2%				3%	0%	4%						1%
BL SEA		0%					0%							0%					0%
CANADA	9%	0%		5%			3%	6%						0%			3%		1%
USA	9%	5%	4%				3%	0%			0%	0%			59%		3%	11%	3%
BAHAMAS							1%	0%											0%
BERMUDA	1%	0%	59%	10%			5%	15%			0%								1%
OTHER AMERICAS	0%	0%			82%		0%				3%	0%							0%
CHINA	1%	0%		1%			10%	6%	22%		9%	1%							2%
JAPAN	3%	2%	3%	4%			15%	4%			4%	35%		0%	1%				3%
OTHER ASIA	5%	6%		9%			7%	9%			7%	1%	2%		4%		18%		2%
REST OF WORLD	0%	1%		14%			0%	1%			2%								0%
Unknown	2%	2%	3%	4%			4%	1%			1%	0%	2%	1%	1%				1%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Table 15: World fleet, percentage of ships by type and country of economic benefit

World fleet, percentage of ships, by vessel type and country of economic benefit																			
GROUP	Oil	Chem			Other			General		Other	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
	tanker	tanker	LPG	LNG	tanker	Bulker	Cargo	dry											
AUSTRIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BELGIUM	0%	1%	1%	2%	1%	0%	0%	1%	1%	0%	2%	0%	0%	0%	0%	0%	0%	1%	0%
BULGARIA	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CYPRUS	0%	1%	1%	0%	0%	1%	1%	1%	1%	0%	1%	0%	1%	0%	0%	0%	0%	0%	1%
CZECH REPUBLIC		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DENMARK	1%	3%	3%	2%	1%	1%	1%	0%	2%	0%	3%	1%	0%	0%	0%	2%	1%	1%	0%
ESTONIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
FINLAND	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	4%	1%	1%	0%	0%	0%	0%	1%	0%
FRANCE	0%	1%	1%	1%	0%	0%	0%	0%	2%	0%	2%	1%	1%	5%	2%	1%	1%	1%	0%
GERMANY	2%	6%	4%	1%	1%	3%	6%	3%	36%	1%	4%	2%	3%	1%	0%	2%	2%	2%	5%
GREECE	10%	8%	8%	3%	4%	17%	2%	3%	5%	7%	4%	6%	4%	7%	1%	1%	1%	5%	0%
HUNGARY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
IRELAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
ITALY	1%	3%	3%	1%	6%	1%	1%	1%	0%	4%	4%	6%	4%	4%	1%	2%	2%	2%	0%
LATVIA	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LITHUANIA	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
LUXEMBOURG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%
MALTA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
NETHERLANDS	0%	7%	2%	0%	1%	0%	3%	4%	1%	0%	2%	1%	2%	2%	3%	2%	2%	2%	0%
POLAND	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	1%	0%
PORTUGAL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%
ROMANIA	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SLOVENIA		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SPAIN	0%	1%	0%	1%	1%	0%	0%	1%	0%	1%	1%	1%	2%	2%	0%	2%	0%	2%	1%
SWEDEN	1%	2%	0%	0%	1%	0%	0%	0%	0%	3%	4%	2%	0%	0%	0%	1%	1%	1%	0%
UNITED KINGDOM	1%	1%	2%	10%	1%	1%	1%	0%	3%	4%	4%	2%	3%	9%	3%	2%	2%	2%	0%
ICELAND	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NORWAY	1%	5%	7%	6%	3%	2%	3%	5%	1%	10%	2%	6%	1%	0%	7%	1%	3%	1%	0%
<b>EEA TOTAL</b>	<b>20%</b>	<b>39%</b>	<b>32%</b>	<b>28%</b>	<b>21%</b>	<b>28%</b>	<b>20%</b>	<b>21%</b>	<b>53%</b>	<b>31%</b>	<b>39%</b>	<b>33%</b>	<b>25%</b>	<b>40%</b>	<b>20%</b>	<b>18%</b>	<b>25%</b>	<b>0%</b>	<b>0%</b>
RUSSIA	5%	2%	0%	1%	3%	1%	6%	5%	1%	1%	3%	1%	2%	0%	1%	3%	0%	1%	3%
OTHER EUROPE	1%	1%	1%	1%	3%	2%	1%	2%	3%	1%	1%	3%	5%	21%	1%	1%	1%	1%	2%
NORTH AFRICA	1%	0%	1%	2%	5%	0%	1%	0%	0%	0%	3%	1%	1%	0%	2%	2%	1%	1%	0%
MEDITERRANEAN	2%	4%	1%	0%	3%	3%	7%	3%	2%	2%	7%	4%	1%	1%	0%	1%	3%	1%	0%
BL SEA	1%	0%	0%	0%	3%	0%	2%	1%	0%	0%	1%	2%	1%	0%	1%	0%	1%	2%	1%
CANADA	0%	0%	0%	4%	0%	1%	0%	0%	1%	0%	1%	2%	0%	1%	0%	2%	1%	1%	0%
USA	2%	1%	1%	3%	0%	3%	1%	2%	3%	6%	3%	3%	34%	15%	27%	9%	6%	6%	0%
BAHAMAS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
BERMUDA	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
PANAMA	1%	0%	0%	0%	1%	0%	1%	1%	0%	0%	1%	0%	0%	0%	1%	1%	1%	1%	0%
OTHER AMERICAS	4%	1%	3%	0%	3%	1%	2%	2%	1%	0%	3%	3%	15%	9%	7%	5%	4%	1%	0%
CHINA	9%	6%	10%	1%	8%	21%	12%	11%	13%	8%	3%	7%	1%	1%	4%	5%	9%	9%	0%
JAPAN	11%	17%	19%	24%	11%	18%	10%	4%	6%	37%	10%	8%	1%	0%	1%	7%	10%	10%	0%
SOUTH KOREA	3%	5%	5%	7%	3%	4%	2%	2%	3%	4%	1%	3%	0%	0%	0%	3%	3%	3%	0%
OTHER ASIA	28%	16%	19%	22%	25%	11%	23%	35%	13%	9%	10%	19%	6%	3%	26%	31%	23%	3%	0%
REST OF WORLD	3%	2%	1%	7%	4%	1%	2%	5%	1%	0%	3%	5%	5%	4%	5%	5%	5%	5%	3%
Unknown	8%	4%	4%	0%	7%	4%	9%	5%	1%	3%	8%	6%	3%	4%	3%	5%	6%	5%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Table 16: Percentage of calls in an EEA port by vessel type and country of economic benefit, all ships

Share of port calls in the EEA, by vessel type and country of economic benefit																		
COUNTRY	Oil tanker	Chem tanker	LPG	LNG	Other tanker	Bulker	Cargo	General dry	Other	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
AUSTRIA								0%		0%								0%
BELGIUM	1%	1%	3%	1%			0%	0%	5%	1%		17%			0%	1%	2%	1%
BULGARIA	1%		0%				2%	0%	0%			0%					0%	0%
CYPRUS	1%	1%	2%			0%	6%	1%	3%	1%		1%	0%	0%	1%	1%	0%	1%
CZECH REPUBLIC																		0%
DENMARK	3%	8%	16%	1%	9%	1%		3%	2%	3%		6%	9%		0%	5%	7%	7%
ESTONIA	2%	0%						2%	1%	0%		0%	3%				0%	2%
FINLAND	2%	1%	0%					2%	1%	1%	4%	9%	3%	1%			3%	2%
FRANCE	2%	4%	0%	8%			0%	0%		3%		1%	6%	2%	6%	1%	3%	4%
GERMANY	7%	14%	18%	0%	1%	8%	28%	13%	55%	5%	6%	6%	9%	2%	1%	11%	13%	13%
GREECE	21%	8%	11%	2%	5%	16%	2%	7%	3%	12%	4%	6%	6%	3%	2%	3%	6%	6%
HUNGARY																		0%
IRELAND	0%	0%				0%		2%		0%		0%	1%			0%	1%	1%
ITALY	2%	9%	11%	11%	22%	3%	1%	4%	0%	15%	7%	15%	10%	3%		5%	4%	10%
LATVIA	0%	0%						2%	1%				0%	0%				0%
LITHUANIA								1%	1%			2%	0%					0%
LUXEMBOURG		0%								0%					1%			0%
MALTA	4%	1%	0%			0%	0%					0%	0%		2%	0%	1%	0%
NETHERLANDS	2%	8%	10%	6%	20%	0%	15%	11%	6%	0%	6%	3%	3%	7%	11%	20%	6%	6%
POLAND	2%	1%					3%	1%				1%	1%			1%	2%	1%
PORTUGAL							1%	0%	0%	0%			0%	2%			0%	0%
ROMANIA		0%					0%	0%	0%				0%			0%	0%	0%
SLOVENIA							0%	0%					1%			0%	0%	0%
SPAIN	2%	1%	1%	4%	6%	2%	1%	0%		5%	2%	6%	6%	2%	1%	6%	6%	4%
SWEDEN	9%	9%			8%	1%	3%	1%		5%	11%	8%	0%	3%	1%	6%	6%	6%
UNITED KINGDOM	15%	2%	2%	5%		4%	4%	0%	2%	7%	17%	7%	16%	12%	20%	12%	20%	12%
ICELAND	0%						0%	0%	4%	1%			0%			0%	0%	0%
NORWAY	4%	11%	10%	13%	21%	10%	12%	17%	1%	9%	4%	10%	1%	0%	39%	6%	10%	10%
<b>EEA TOTAL</b>	<b>79%</b>	<b>80%</b>	<b>83%</b>	<b>52%</b>	<b>92%</b>	<b>61%</b>	<b>83%</b>	<b>71%</b>	<b>78%</b>	<b>57%</b>	<b>85%</b>	<b>95%</b>	<b>48%</b>	<b>48%</b>	<b>80%</b>	<b>96%</b>	<b>88%</b>	<b>88%</b>
RUSSIA	3%	1%	1%	2%	0%	4%	4%	1%	1%	0%	1%	0%	0%	1%	0%	0%	0%	1%
OTHER EUROPE	2%	2%	3%	7%	3%	3%	2%	3%	6%	7%	0%	0%	12%	21%	2%	0%	2%	2%
NORTH AFRICA	1%	0%	1%	4%		0%	1%		1%		2%	1%				0%	0%	1%
MEDITERRANEAN	1%	5%	0%		1%	5%	5%	5%	2%	2%	3%	0%	1%	0%	0%	0%	0%	2%
BL SEA	0%	0%			0%	0%	1%	0%	0%	0%	0%	0%			0%		0%	0%
CANADA	1%	0%		3%		1%	0%		0%			0%	0%		0%	0%	0%	0%
USA	1%	0%	0%	1%		1%	0%	0%	1%	1%	1%	0%	36%	14%	11%	0%	0%	1%
BAHAMAS		1%				0%	0%									0%	0%	0%
BERMUDA	0%	0%	1%	0%		0%	0%		0%			0%		0%	0%	0%	0%	0%
PANAMA	0%	0%	1%			0%	0%		0%		0%	0%		0%		0%	0%	0%
OTHER AMERICAS	2%	0%	0%		1%	2%	0%	1%	0%		0%	0%	1%	7%	0%	0%	0%	0%
CHINA	1%	0%	2%	0%	0%	6%	1%	1%	5%	2%	2%	0%	0%		0%	0%	0%	1%
JAPAN	2%	2%	4%	14%	1%	9%	0%	11%	2%	23%	0%	1%				0%	0%	1%
SOUTH KOREA	0%	0%				1%	0%	1%	1%	2%		0%					0%	0%
OTHER ASIA	5%	5%	4%	7%	1%	3%	0%	1%	2%	6%	0%	0%	1%	1%	3%	1%	1%	1%
REST OF WORLD	0%	0%	0%	8%		0%	0%		1%	0%	0%	0%	1%	0%	1%	0%	1%	0%
Unknown	3%	1%	0%	2%	2%	3%	2%	5%	1%	1%	5%	2%	1%	6%	1%	2%	2%	2%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Table 17: Percentage of calls in an EEA port by type and country of economic benefit, ships 20,000+ gt

Port calls in the EEA, ships larger than 20,000 gt, by vessel type and country of economic benefit																		
COUNTRY	Oil tanker	Chem tanker	LPG	LNG	Other tanker	Bulker	Cargo	General dry	Other	Container	Vehicle	Roro	Ferry	Cruise	Yacht	Offshore	Service	Total
BELGIUM	0%	0%	4%	1%						2%		23%				11%	46%	2%
BULGARIA						1%												0%
CYPRUS	1%	3%				1%	2%		1%		1%						11%	0%
DENMARK	3%	5%		1%		1%			6%		10%		1%					2%
ESTONIA													5%					3%
FINLAND	6%										1%	6%	0%					4%
FRANCE	0%	2%	1%	9%		0%	1%		6%		1%	14%				3%		10%
GERMANY	8%	18%	2%	0%	43%	5%	18%	59%	32%	0%	1%	4%	9%					9%
GREECE	25%	14%	9%	3%		25%	0%	5%	15%	1%	3%	4%						6%
IRELAND	0%	1%				0%	0%					3%						2%
ITALY	3%	18%		11%		2%	1%		1%	22%	4%	11%	13%					9%
LATVIA	0%	1%																0%
LITHUANIA													1%					1%
LUXEMBOURG										0%								0%
MALTA												0%	0%					0%
NETHERLANDS	1%	4%				1%		14%	1%	0%	9%	8%			5%	43%	6%	6%
POLAND						6%	0%					1%						1%
PORTUGAL						0%												0%
ROMANIA		1%				0%						0%						0%
SLOVENIA						0%												0%
SPAIN	1%	2%		4%		0%						1%	3%	9%				3%
SWEDEN	2%	0%									5%	22%	13%					9%
UNITED KINGDOM	5%	1%	2%	5%		2%	3%		4%	3%	6%	21%	7%		13%			14%
NORWAY	9%	3%	67%	14%		3%	33%	5%	1%	10%	1%	2%	0%		16%			3%
<b>EEA TOTAL</b>	<b>64%</b>	<b>74%</b>	<b>81%</b>	<b>48%</b>	<b>43%</b>	<b>48%</b>	<b>59%</b>	<b>78%</b>	<b>56%</b>	<b>55%</b>	<b>87%</b>	<b>42%</b>	<b>37%</b>	<b>54%</b>	<b>82%</b>	<b>82%</b>	<b>82%</b>	<b>82%</b>
RUSSIA	7%	2%	1%	2%		0%			0%		0%	0%						0%
OTHER EUROPE	3%	3%	4%	7%	18%	4%	0%		12%	5%	0%	14%		24%				3%
NORTH AFRICA	2%	0%	1%	4%		0%			0%		2%	0%						1%
MEDITERRANEAN	1%	2%				2%			1%	0%	4%							1%
BL SEA	0%					0%						0%						0%
CANADA	1%	0%		3%		2%			1%			0%						0%
USA	2%	0%	1%	1%		2%	5%		2%	1%	2%		42%	16%				2%
BAHAMAS						0%												0%
BERMUDA	1%	0%		0%		1%	4%											0%
PANAMA	0%					0%												0%
OTHER AMERICAS	0%	0%			39%	0%			0%				0%					0%
CHINA	3%	2%	2%	0%		10%	6%	20%	11%	2%	3%	1%						3%
JAPAN	5%	3%	3%	15%		19%	7%		5%	23%		0%	1%					3%
SOUTH KOREA	0%	0%				2%	0%		2%	3%								0%
OTHER ASIA	9%	11%	2%	7%		5%	15%		5%	8%	0%	0%		5%				2%
REST OF WORLD	0%	1%	1%	9%		0%	1%		2%									0%
Unknown	1%	1%	1%	2%		1%	2%	1%	2%	1%	6%	1%	1%		8%			1%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

## Oil tankers

Crude oil tankers carry oil to refineries. Product tankers carry semi-final petroleum products between refineries or final petroleum products to end-users.

In general, all sizes below Panamax (60,000+ dwt) are considered to be product tankers by brokers in the market. In reality, however, there are several oil tankers larger than 100,000dwt that only carry products (from refineries) as well as carriers smaller than 10,000dwt that only lift crude (to refineries).

The fleet of oil tankers will grow over the coming years, mainly within the 60,000+ dwt size segments.

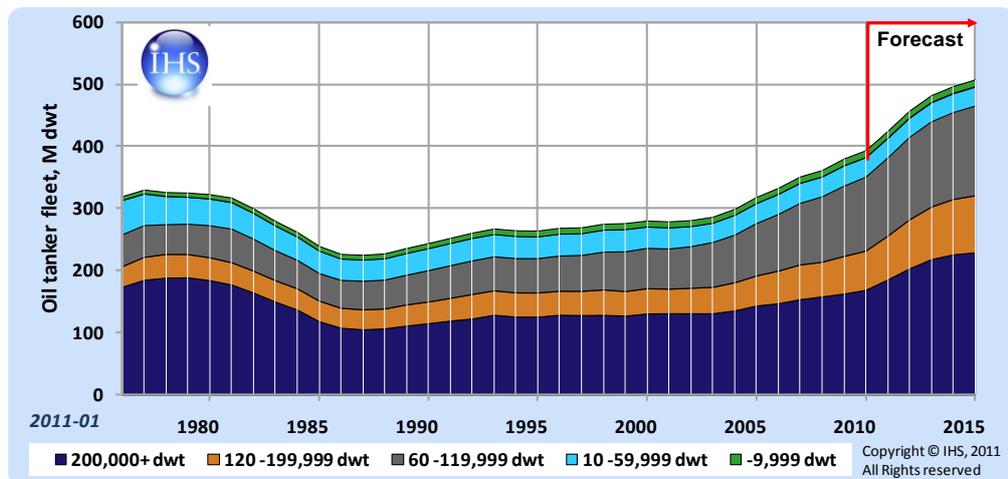


Figure 26: Oil tanker fleet, M dwt

However, this new additional capacity will not mean that the number of port calls by oil tankers in Europe will increase dramatically since refinery capacity is forecast to remain approximately the same over the next 20 years as it is today. The number of calls by product tankers might increase to some extent as the cross-trade with semi-final oil products is expected to increase.



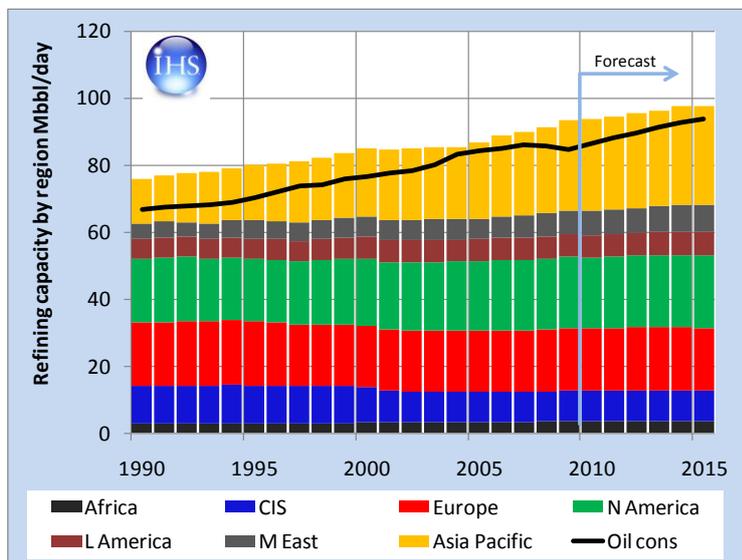


Figure 27: Global refining capacity, M bpd

There are potentially situations where higher (longer term) freight prices will lead to a closure of refineries in Europe in favour of increased imports of refined products from non-European refineries (primarily Russia, North Africa and the Middle East). This is a consequence of small refinery margins, operational costs and the challenges and costs related to investments in existing refineries. Adding extra costs reduces an already small margin and makes the import option more competitive.

Refinery closures mean that crude oil terminals will be shut. It is almost impossible to pinpoint which refineries are at risk since it is mostly down to commercial decisions on the market by private owners. Refineries that are closed down will probably be used for storage and transit of oil products to the same final destination ports as before since demand for storage capacity for refined products will increase. The cost for the final product would thus be approximately the same as before.

Crude oil tankers unload their cargoes directly at the refineries or at terminals linked to inland refineries by pipelines.

A total of 26,421 port calls were made by oil tankers in EEA countries during the report period. Of these, 77% were made in countries with more than 1,000 calls.

These countries were the UK, Greece, the Netherlands, Sweden, Italy, Germany, France, Spain and Malta.

Tankers of 50,000+ gt (approximately=100,000+ dwt) accounted for 24% of all calls. They called most frequently at ports in countries such as the UK, the Netherlands, Italy and France, and these countries accounted for 65% of the total number of calls in the EEA. In the Netherlands, France and Italy, tankers of this size dominated calls, with more than 50% of their total tanker calls. In Russia and Finland, they represented 80% and 70% of all calls respectively.

Tankers of 20,000-50,000gt (approximately=15,000-35,000dwt) accounted for 10% of total calls, mainly in the Netherlands, the UK, Italy and France. Less than 1% of all calls were made by tankers of 10,000-20,000gt (7,500-15,000dwt).

Approximately two-thirds (17,231) of all calls were made by tankers of 9,999gt or below.

Tankers of these size categories are usually shipping oil products from refineries to distribution terminals and to major end-users such as industries and utilities. They also distribute bunker fuel to ships.

In countries such as Ireland, Sweden, Greece, Cyprus, Malta and Iceland these vessels accounted for more than 85% of all tanker port calls.

Of all oil tankers, 82-83% were arriving from, or leaving, other EEA ports: 1% arrived or left for a Russian port in the Baltic Sea; 4% from or to a port in the Mediterranean; and 12% from or to a port outside the EEA.

The ongoing renewal of the tanker fleet means that the average age of a vessel is low. The average age of vessels calling in the EEA was 13.2 years in the report period. The average age of vessels calling at Cyprus, Malta, Poland, Estonia and Bulgaria was more than 20 years.

The average call duration time was 57 hours, with the lowest in Finland, Ireland and Norway at under 30 hours. Average call duration times in some ports are distorted because many vessels have been idle and these times are not representative of regular port calls.

Table 18: Top 20 ports, oil tankers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Rotterdam	NL	1 835	182 901	100 363	56	6.8	76%	80%	72%	74%	3%	3%	1%
Gothenburg	S	1 087	17 686	10 256	49	14.4	98%	97%	94%	92%	0%	0%	0%
Piraeus	GR	1 027	3 362	1 972	162	20.3	98%	97%	98%	97%	0%	0%	0%
Immingham	GB	946	15 443	8 854	35	10.3	96%	97%	94%	95%	0%	0%	0%
Eleusis	GR	802	3 338	2 026	47	19.8	98%	98%	98%	98%	0%	0%	0%
Agios Theodoroi	GR	703	9 705	5 585	20	22.5	86%	86%	86%	86%	0%	0%	9%
Marsaxlokk	MLT	570	7 000	4 137	33	24.4	93%	92%	93%	92%	0%	0%	3%
Fawley	GB	552	24 551	13 951	27	7.9	90%	89%	86%	85%	2%	1%	0%
Valletta	MLT	544	1 679	1 018	99	28.2	99%	99%	99%	99%	0%	0%	0%
Milford Haven	GB	543	21 626	12 317	28	10.9	91%	91%	87%	88%	0%	0%	1%
Algeciras	E	535	8 785	4 888	76	4.2	77%	76%	77%	76%	0%	0%	19%
Antwerp	B	491	19 698	11 252	72	7.7	78%	77%	76%	72%	3%	2%	1%
Tallinn	EST	478	19 583	10 875	39	19.2	88%	77%	87%	76%	4%	2%	0%
Aspropyros	GR	466	3 806	2 289	17	16.9	91%	92%	91%	92%	0%	0%	6%
Hamburg	D	463	7 870	4 493	75	18.5	98%	99%	97%	98%	0%	0%	0%
Fos	F	435	44 248	23 865	31	5.3	57%	59%	57%	59%	0%	0%	15%
Hull	GB	431	385	250	64	14.1	100%	100%	100%	100%	0%	0%	0%
Mongstad	N	395	23 633	13 164	25	8.0	91%	83%	44%	36%	1%	1%	0%
Le Havre	F	383	38 320	21 090	37	5.6	70%	74%	68%	66%	4%	4%	2%
Trieste	I	382	40 717	21 994	94	6.9	53%	57%	53%	57%	0%	0%	25%
Other	OTH	13 601	516 757	289 516	57	12.3	87%	87%	84%	83%	1%	1%	3%
		26 669	1 011 094	564 154	57	13.2	87%	87%	84%	84%	1%	1%	3%

The 20 largest oil ports cater for almost half of all port calls by oil tankers in the EEA. The average number of calls in those ports was 653 during the report period; of these, 561 were intra-EEA port calls and 92 extra-EEA. The average size of the vessels calling was 38,000dwt.

Rotterdam is the major oil refining centre in Europe and by far the largest port for oil tankers. In the report period, close to 7% of all calls in the EEA and 16% of all calls by tankers arriving from outside the EEA, Russia and Med/Black Sea

areas entered Rotterdam. Measured in dwt, 18% of all calls in the EEA were made in Rotterdam.

Other major oil refining centres, such as Trieste in Italy and Le Havre and Fos in France, are receiving large volumes of crude from suppliers outside the EEA, Russia and Med/Black Sea areas.

From these three centres and from Mongstad in Norway, Tallinn in Estonia and Antwerp in Belgium, large volumes of oil were shipped to destinations outside the EEA, Russia and Med/Black Sea areas.

Together with Fawley, Milford Haven and Immingham in the UK and Gothenburg in Sweden they also registered the largest volumes of oil shipped to or from other EEA ports.

The average age of oil tankers calling at the 20 largest ports was 13.9 years, compared to 12.3 years in the other ports. The most extreme deviation in average age was registered by oil tankers calling at Piraeus in Greece whose average age was 26.3 years. The extremely high average call duration time there indicates that vessels idled or drydocked at the shipyard are included in the statistics. These idled and drydocked vessels are probably older than those actively trading oil, which partly explains the difference. With the exception of Piraeus, the average age for the other 19 largest ports was 13.2 years and the average duration time 49 hours.

- **Our conclusion is that in the short term crude oil tankers will continue to ship oil to the refineries in the EEA region regardless of the application of new carbon charges on shipping activities, but the share of the total supply of refined products in Europe from European refineries will be lower in the long run because of new refining capacity in the Middle East.**
- **This means that in the longer term the number of calls by product tankers from outside the EEA is expected to account for a larger share of total calls, while the total number of calls by crude tankers is expected to fall.**
- **When it comes to carbon leakage, an increased cost for refineries to transport crude oil will reduce the competitiveness of European refineries and that could lead to earlier closures of refineries than might otherwise have happened. Given that oil will be used in Europe anyway, some carbon leakage may occur in the medium term.**

## Chemical tankers

The chemical tanker fleet in this report comprises both combined product/chemical tankers and the more sophisticated pure chemical carriers. Product/chemical tankers compete extensively with product carriers and thus carry refined products from the refineries. The reason for having them as one

fleet is that there is a substantial overlap in many sub-markets. Pure chemical tankers work more closely with the industries they service and represent more of an industry shipping market, while the product/chemical fleet is employed on a spot basis to a larger extent.

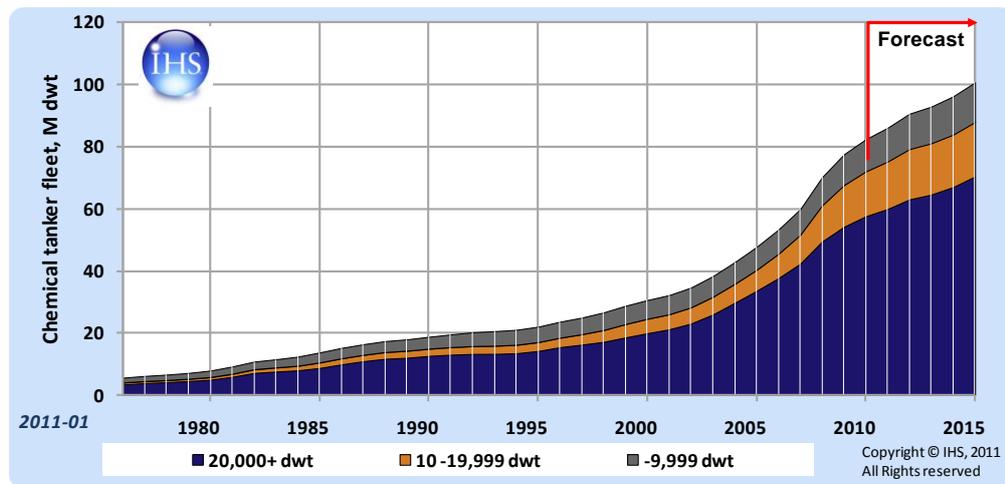


Figure 28: Chemical tanker fleet, M dwt

Product/chemical tankers fall under the same line of reasoning as the oil tankers that carry refined products. Globally the fleet will grow but will be employed in Asia rather than in Europe and an increasing proportion of the products will be sourced outside the EEA area.

Pure chemical tankers are not forecast to see a significant market increase in the EEA in the next 20 years either. As for their sisters, their new markets will be dominated by Asia.

There were 61,343 port calls in the EEA during the report period. The combined product/chemical and pure chemical tanker market was dominated by small tankers below 20,000gt, which accounted for 73% of the total calls in the EEA.

The chemical tanker fleet is younger than most other fleets. The average age of the vessels calling in the EEA was under 10 years during the report period.

The average call duration was 42 hours, which reflects the fact that pure chemical tankers are on average smaller than oil tankers.

Those countries with the largest number of oil refineries were also the countries with the largest number of calls. Unsurprisingly, the Netherlands, the UK, France, Italy, Spain, Sweden, Greece, Belgium, Germany and Norway registered the largest number of calls by product/chemical and pure chemical tankers during the report period.

Calls to these countries represented 84% of the total number of calls within the EEA. Their share was approximately the same in all size segments.

Table 19: Top 20 ports, chemical tankers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Rotterdam	NL	8 274	115 270	73 959	42	8.1	91%	92%	90%	90%	2%	2%	0%
Antwerp	B	3 037	33 212	21 571	52	9.0	90%	95%	89%	93%	1%	1%	1%
Amsterdam	NL	1 616	32 693	20 733	52	6.3	88%	81%	86%	79%	2%	2%	0%
Le Havre	F	1 145	15 146	9 831	44	7.2	93%	94%	93%	92%	1%	1%	0%
Augusta	I	1 119	18 854	12 410	72	5.8	89%	87%	89%	87%			4%
Hamburg	D	1 105	12 375	7 979	36	8.9	93%	92%	90%	90%	4%	3%	1%
Gothenburg	S	1 074	12 674	8 416	28	6.8	97%	97%	88%	87%	1%	1%	0%
Lavera	F	1 070	12 642	8 099	31	5.4	91%	90%	91%	90%	0%	0%	3%
Immingham	GB	1 029	12 653	8 203	28	7.1	94%	95%	92%	93%	1%	1%	0%
Teesport	GB	1 020	7 212	4 922	30	12.5	99%	99%	97%	95%	0%	0%	0%
Milford Haven	GB	956	15 632	10 201	30	5.2	91%	89%	90%	89%	0%	0%	0%
Piraeus	GR	908	3 328	2 126	124	27.2	98%	97%	98%	97%			1%
Tolkinen-Tolkis	SF	863	12 313	8 253	24	6.8	98%	96%	97%	95%	1%	2%	
Agioi Theodoroi	GR	847	8 402	5 589	20	12.4	85%	84%	85%	84%			10%
Fawley	GB	830	10 357	6 670	30	8.2	95%	91%	94%	90%	0%	1%	
Algeciras	E	828	10 247	6 704	26	5.0	80%	73%	80%	73%	0%	0%	9%
Barcelona	E	722	12 040	7 701	28	6.9	86%	89%	86%	89%			3%
Brofjorden	S	718	10 128	6 765	21	5.3	98%	95%	93%	93%	0%	0%	0%
London	GB	715	8 780	5 748	27	6.3	94%	98%	93%	96%	0%	1%	1%
Tarragona	E	711	11 937	7 694	30	5.6	82%	87%	81%	87%			5%
Other	OTH	33 383	419 665	273 859	35	8.8	92%	92%	87%	88%	1%	1%	2%
<b>Total</b>		<b>61 970</b>	<b>795 557</b>	<b>517 433</b>	<b>38</b>	<b>8.6</b>	<b>92%</b>	<b>92%</b>	<b>89%</b>	<b>89%</b>	<b>1%</b>	<b>1%</b>	<b>2%</b>

For chemical tankers, the 20 largest ports represented 46% of the total number of calls in the EEA in the report period. The average number of calls in these ports was 1,429, with 10 ports accounting for more than 1,000 calls.

The share of intra-EEA port calls was 95%, which is somewhat higher than for oil tankers. Of the average number of port calls, 1,300 were intra-EEA and 129 extra-EEA. The average size of the vessels calling was 13,000dwt.

The refinery centres already mentioned were also important in the chemical trade. In addition to Rotterdam and Antwerp, Amsterdam was the port with the largest number of calls by chemical tankers. Together, these three ports registered 23% of all calls (measured in dwt) by chemical tankers in the EEA, which indicates that they were handling the largest volumes of chemicals. Port calls at Augusta in Italy followed, measured in dwt.

In the trade outside the EEA, Russia and the Med/Black Sea areas, Rotterdam, Amsterdam, Algeciras in Spain and Milford Haven in the UK were the most important ports.

The average age of the ships calling at the 20 largest ports was under 8.3 years, with the exception of a few older ones. The most extreme deviation in average age was registered by chemical tankers calling at Piraeus in Greece. The reason behind this is probably the same as for oil tankers. The high call duration time in Augusta might also be affected by vessels calling at the shipyard there.

With the exception of Piraeus and Augusta, the average age of vessels calling was 7.4 years and the average duration time 32 hours.

- **Most chemicals are loaded and unloaded at industry terminals rather than in commercial ports, which means that the options for operators to choose alternative ports are few, regardless of carbon charges on shipping activities.**
- **Given the small cargo sizes, however, in some cases there may be situations when cargo will move from sea to land.**

- Carbon leakage could occur if the total cost increases too much for the industry so that it moves out of the EEA area. In the case that carbon charges are low compared to the total cost of production, the impact of the charges should not be overrated even though they will have a negative impact on the competitiveness of extra-EEA exports.

## LNG tankers

Liquefied Natural Gas (LNG) is carried by tankers when it is not possible to use a pipeline. An LNG tanker is a costly construction due to the containment system that protects the hull of the ship from the -161C degrees LNG cargo.

Terms and conditions in the LNG market are mostly long-term, with operators very closely related to the buyers or sellers of the gas.

LNG is more expensive than natural gas and is seen more as a complement than an alternative to natural gas. Should the costs for transporting LNG by vessels rise, this will favour the transport of natural gas by pipeline.

The LNG tanker market is currently characterised by oversupply of tonnage but this is expected to decline during the next three to four years as the global demand for LNG transport is expected to increase when new LNG production capabilities start to operate.

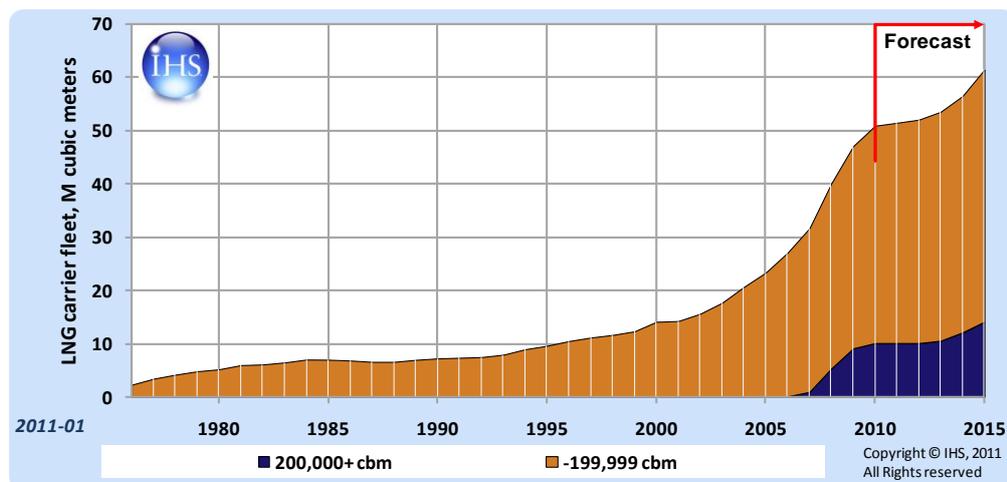


Figure 29: LNG carrier fleet, M m<sup>3</sup>

There are an increasing number of older vessels in the fleet, but many of them are well maintained and are expected to continue operating for another five to 10 years.

This year and next the LNG tanker fleet will see no increase at all but later on it will increase by an average of 6% annually. In the large size segment (200,000+ m<sup>3</sup>) capacity is expected to grow at an annual average of 11%, while the smaller size category (-199,999 m<sup>3</sup>) is expected to grow at an annual average of 4.8%.

LNG is sourced from natural gas. The three biggest LNG exporters are Qatar, Malaysia and Indonesia. Most of the increase in liquefaction capacity is in the Middle East and Australia, where a very large number of new liquefaction projects are expected to be developed. The biggest importers are Japan, Korea and Taiwan. Spain is the largest European importer of LNG but regasification facilities have been built in the UK and Italy.

During the report period, only 1,089 calls were made by LNG carriers in EEA ports, of which 469 calls were in Spain. France and the UK registered around 200 calls each and the remaining 226 calls were mainly divided between Belgium, Italy, Norway and Portugal.

Two-thirds of the calls were made by LNG carriers of 50,000+ gt size, primarily in Spain, France, Belgium and Portugal, while 26% of calls were made by 20,000-50,000gt carriers in Spain, France and Italy.

Calls by smaller LNG carriers were mostly made in Norway, but also in Sweden, Finland, Germany, the Netherlands, Portugal and Italy.

The average age of ships calling in the EEA was 12 years. The average age of vessels calling in Spain, Portugal and Italy was 16.2 years.

Duration of the calls was 57 hours on average.

A majority of the calls (58%) were made by vessels arriving from, or destined for, ports outside the EEA. For the largest vessels (50,000+ gt), the share was 71% and among the second-largest size (20,000-50,000+ gt) it was 38%. The remaining calls in these size classes involved carriers arriving from, or leaving for, another EEA country port.

Almost 100% of the smaller LNG carriers calling at EEA ports came from or left for another EEA country. Of the 76 calls, 31 were made in Norwegian ports.

Table 20: Top 20 port calls, LNG tankers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	From EEA	Next EEA	From EU	Next EU	Share of total portcalls:			
											From Russia	Next Russia	From Med/Black Sea	To Med/Black Sea
Fos	F	154	5 071	7 931	30	13.2	55%	57%	55%	57%				
Barcelona	E	121	6 542	8 184	27	21.9	40%	39%	40%	39%				
Huelva	E	99	5 631	6 977	26	16.6	38%	38%	38%	38%				
Sagunto	E	90	5 416	6 540	25	16.3	47%	51%	47%	51%				
Milford Haven	GB	88	10 111	12 172	47	1.9	11%	11%	10%	11%			1%	1%
Zeebrugge	B	72	6 349	7 506	29	2.9	11%	8%	10%	8%				
Cartagena (Spain)	E	56	3 584	4 508	27	15.4	27%	32%	27%	32%				
Thamesport	GB	53	4 622	5 478	29	9.2	25%	30%	25%	30%				
Bilbao	E	52	4 143	5 263	29	5.0	25%	29%	25%	29%				
Ferrol	E	47	3 561	4 494	320	10.2	45%	15%	45%	15%				
La Spezia	I	44	1 505	1 913	33	20.3	70%	73%	70%	73%				
Sines	P	33	2 310	2 906	33	14.1	30%	27%	27%	27%				
Donges	F	31	2 506	3 183	29	5.5	13%	35%	13%	35%				
Montoir	F	31	2 563	3 230	31	6.5	19%	23%	19%	23%				
Grenland Harbour	N	23	141	180	37	0.5	100%	100%	65%	65%				
Southampton	GB	23	1 189	1 661	272	34.8	96%	91%	96%	91%				
Kaarsjö	N	8	49	63	15	0.6	100%	100%	38%	38%				
Mberdijk	NL	6	37	47	44	0.3	100%	100%	17%	50%				
Teesport	GB	6	37	47	25	0.7	100%	100%	67%	80%				
Antwerp	B	5	31	39	37	0.6	100%	100%	80%	80%				
Other	OTH	47	1 800	2 149	249	6.3	77%	62%	53%	36%			11%	11%
		1 089	68 097	84 469	57	12.0	41%	41%	38%	38%			1%	1%

LNG trade in the EEA was highly concentrated. More than 93% of all calls were made at the 16 largest LNG terminals, with 64 calls on average during the report period. Six of the largest terminals were in Spain. Their average number of calls was 77 and their share of the total number of calls was 47.5%.

Spain, France and the UK are the largest LNG trading markets in the EEA.

Fos in France registered 154 calls, the highest number of all ports. Measured in dwt, it was outnumbered by Milford Haven in the UK, Barcelona in Spain and Zeebrugge in Belgium. These four terminals accounted for 43% of the total calls (in dwt) in the EEA.

In contrast to the other tanker types, 58% of calls were made at terminals outside the EEA. Of the calls in Milford Haven and Zeebrugge, 90% were made by tankers that left to call at a non-EEA terminal.

The average size of vessel by call was 63,000dwt in the 20 largest ports but 38,000dwt in the other ports.

The average age of LNG tankers calling in the EEA was 12 years. The youngest were less than one year and the oldest almost 35 years. LNG tankers can be even older as they are usually very well maintained.

The average call duration was 31 hours in 18 of the 20 largest ports (excluding Southampton and Ferrol).

The only alternative to unloading LNG ships in EEA ports is to import the gas in pipelines from abroad. As indigenous natural gas production in OECD Europe declines, import demand increases, driving much of the growth in pipeline-traded gas. The Nord Stream pipeline from Russia and the Galsi pipeline from Algeria could push additional natural gas supplies into OECD Europe as early as 2012 and 2014. The decline in North Sea natural gas supplies is also bringing new Atlantic and Middle East LNG suppliers into the trade.

- **Introduction of carbon charges on shipping activity in the EEA will reduce the competitiveness of LNG in the European gas market where competing gas is delivered by pipeline from Russia and North Africa.**
- **However, given the need for energy and the declining gas fields in the North Sea, use of LNG will increase. An additional factor that affects LNG positively is the issue of energy security, in which both pipeline and LNG have a place.**
- **Carbon charges on shipping activity would also potentially hamper development of the necessary infrastructure for increased use of LNG as a bunker fuel in ships. Higher LNG transport prices could jeopardise the viability of LNG as an alternative source of fuel for ships in comparison with competitors such as methanol, dimethyl ether (DME) or the use of scrubbers.**
- **Carbon leakage in the LNG sector will be very low – if any at all.**

## LPG tankers

LPG ships carry petrochemical and hydrocarbon gases such as ethylene, ethane and polypropylene as well as LPG, which is butane, propane or blends



thereof. The ships can also carry clean oil products. LNG ships can also carry LPG so competition from them is possible but not common.

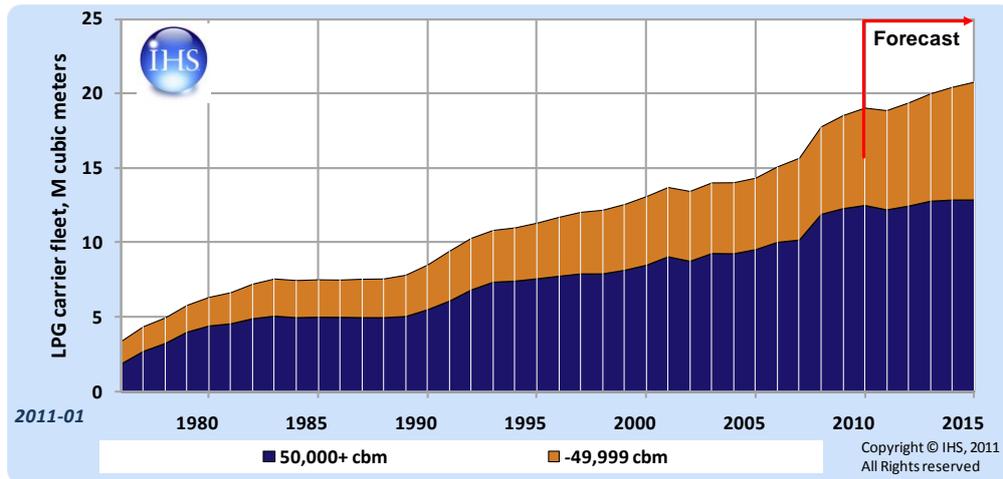


Figure 30: LPG tanker fleet, M m<sup>3</sup>

Global LPG fleet capacity is expected to decline this year because removals of old ships will exceed the number of new ships delivered from shipyards. In the next five years, capacity is expected to grow by an annual average of 2.8%. The smaller size category (-49,999m<sup>3</sup>) LPG tanker fleet is expected to grow by an average of 4.4%, while the larger size category (50,000m<sup>3</sup>) is expected to grow by an average of 1.8%.

LPG is sourced from oil and natural gas exploration and is mainly imported to Europe from the Middle East, North Africa and North Sea offshore fields.

LPG is an important source of energy for households, transport and industries, particularly in Asia. In Europe, demand is stagnating as LNG is taking a larger share of the gas market.

A total of 11,097 port calls were registered during the report period. Most of the LPG is shipped to countries that are major importers of oil and gas, such as the UK, the Netherlands, Italy, France, Belgium, Norway and Spain. Together these countries registered 79% of the total number of calls in the EEA area.

Of the total calls, 80% were made by vessels in the 2,000-10,000gt size segment, 13% by vessels larger than 10,000gt and 7% by vessels under 2,000gt.

The average age of ships calling in the EEA was 12.5 years, but in Bulgaria, Greece, Romania and Cyprus the average age was generally much higher (20.5 years).

Vessels arriving from, or destined for, other EEA ports accounted for 93% of calls. No vessels arrived from, or left for, Russia (Baltic). The corresponding figure for calls by ships arriving from, or leaving for, the Mediterranean/Black Sea was 1% and to and from other parts of the world 6%.

Table 21: Top 20 ports, LPG tankers

Port Name	Country Code	Calls	Dwt ('000)	Gr ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:								
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea		
Antwerp	B	862	6 235	5 467	34	12.6	97%	96%	86%	87%					1%
Teesport	GB	752	3 894	3 397	22	13.1	98%	99%	88%	85%					
Terneuzen	NL	520	3 448	3 158	25	13.0	97%	97%	94%	92%					0%
Rotterdam	NL	492	2 791	2 467	33	13.5	98%	98%	86%	88%					1%
Grenland Harbour	N	362	3 001	2 561	43	13.3	99%	99%	69%	71%					
Bridisi	I	341	2 044	1 823	29	9.0	90%	93%	90%	93%					5%
Augusta	I	327	1 614	1 430	74	9.6	94%	96%	94%	96%					
Butzflieth	D	316	1 776	1 494	23	13.0	98%	100%	91%	93%					
Immingham	GB	311	1 068	995	19	14.4	97%	98%	94%	96%					
Kaarsto	N	301	4 630	3 890	16	10.0	97%	96%	72%	69%					0%
Fawley	GB	300	1 140	1 067	25	14.0	91%	86%	90%	86%					0%
Vlissingen	NL	276	2 873	2 513	38	11.0	90%	88%	82%	79%					0%
Lavera	F	234	3 725	3 106	45	10.1	70%	74%	68%	70%					6%
Grangemouth	GB	209	894	771	21	13.1	97%	100%	93%	99%					
Tarragona	E	204	2 621	2 193	33	9.4	82%	78%	81%	77%					1%
Sines	P	198	1 460	1 247	27	11.0	86%	90%	81%	86%					1%
Stenungsund	S	196	2 267	1 892	23	11.9	96%	96%	55%	59%					1%
Milford Haven	GB	191	1 593	1 378	29	11.8	93%	99%	77%	86%					
Aspropyros	GR	184	803	752	39	22.3	89%	86%	89%	86%					7%
Ravenna	I	170	888	833	26	9.7	96%	96%	96%	96%					2%
Other	OTH	4 351	32 264	27 654	38	12.6	91%	91%	86%	86%					2%
		11 097	81 088	70 087	34	12.5	93%	93%	85%	86%					1%

In the LPG trade, 60% of the total number of calls were made in the 20 largest ports. This was a higher share than in the oil and chemical tanker trades. The average number of calls in the 20 largest ports was 337. The share of intra-EEA port calls was 95%, which is the same as for chemical tankers. Of the average number of calls, 313 were intra-EEA port calls and 24 extra-EEA. The average size of the vessels calling was 7,300dwt.

Only six ports registered calls above the average number, with Antwerp and Teesport in the UK alone accounting for 15% of the total calls in the EEA.

Antwerp and Kaarstoe in Norway were the largest ports in calls measured by dwt, followed by Teesport and Terneuzen in the Netherlands. Lavera in France and Tarragona in Spain were the largest ports in terms of extra-EEA LPG trade.

The average age of the vessels calling at the 20 largest ports was 12.3 years and in the remaining EEA ports 12.6 years. Among those, Aspropyros in Greece registered the highest average age of vessels calling. During the report period it was 22.3 years.

The average duration time for tankers calling at that particular port was 39 hours, which was slightly higher than the average 29 hours for the other ports (excluding Augusta in Italy).

- **The only realistic alternative to unloading ships in EEA ports is to import the gas in pipelines from abroad. No such pipelines exist today. Transferring LPG gas from larger to smaller carriers is not a viable option either.**
- **Introduction of carbon charges on shipping activities in the EEA area would therefore not change the overall pattern of LPG transport. Hence carbon leakage would be minimal.**

### Other tankers

The 'other tankers' category comprises other types, including barges, bitumen/asphalt and special tankers, such as juice or wine carriers.

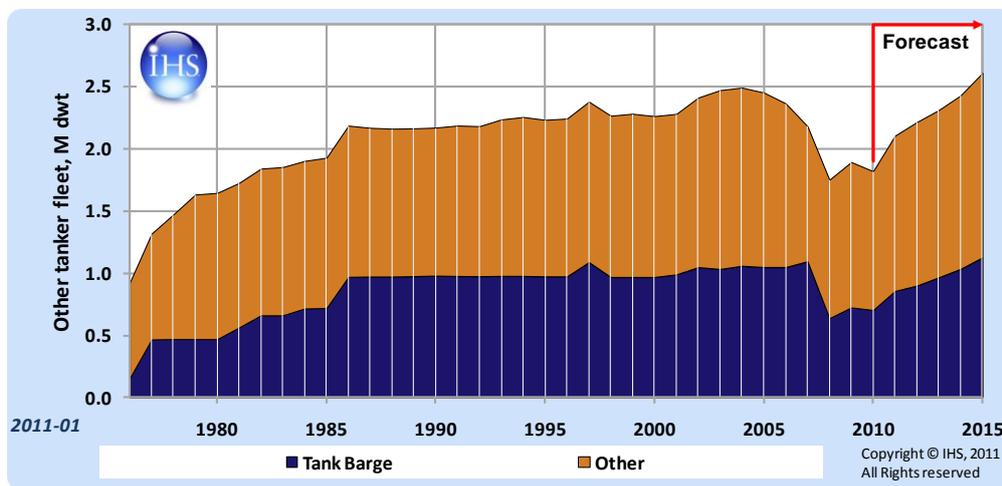


Figure 31: Other tankers, M dwt

Fleet capacity has declined in recent years as many vessels have been removed from the fleet through recycling of old ships. The average age is high and this is reflected in the registered port calls in the EEA, where the average age was 21.3 years. In countries such as Lithuania, Italy and Greece the average age was 10 years higher.

With deliveries increasing strongly this year and removals falling, fleet capacity is forecast to begin growing again.

During the report period, only 3,119 calls were made by 'other tankers', with Italy and the Netherlands in the lead, followed by the UK and Spain. Together they represented 62% of all calls. Of all calls in the EEA, 89% were made by vessels arriving from, or leaving for, other EEA ports. The average size of the fleet is very small and 96% of the calls were made by vessels below 10,000gt.

With an average size of 3,034gt, this tanker category represents the smallest cargo-carrying vessels calling at European ports. Average call duration is almost on a par with oil tankers, despite the fact that this category is much smaller.

The average age of 21.3 years is almost 10 years higher than for the other types of tanker.

Table 22: Top 20 ports, other tankers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:							
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea	
Rotterdam	NL	330	1 452	1 096	42	15.6	92%	91%	91%	91%	0%			
London	GB	219	555	442	22	15.9	100%	100%	92%	92%				
Palermo	I	180	351	223	47	30.8	99%	99%	99%	99%				
Augusta	I	174	597	437	55	28.4	92%	94%	92%	94%			5%	
Terneuzen	NL	150	347	294	25	18.4	100%	100%	99%	99%				
Naples	I	146	230	151	67	37.2	99%	100%	99%	100%				
Gioia Tauro	I	145	281	180	27	38.6	100%	100%	100%	100%				
Grenland Harbour	N	128	270	232	25	23.3	100%	100%	91%	90%				
Tolkinen-Tolks	SF	79	282	279	12	9.2	100%	100%	99%	97%				
Hamburg	D	75	247	192	25	18.2	100%	99%	65%	67%				
Hull	GB	72	217	158	22	13.2	100%	100%	100%	100%				
Piraeus	GR	71	80	47	183	37.4	97%	99%	97%	99%				
Tarragona	E	66	386	262	32	5.8	82%	79%	82%	79%			6%	
Fredericia	DK	65	137	116	32	25.1	100%	100%	12%	11%				
Teesport	GB	60	167	143	22	22.6	100%	100%	92%	93%				
Brake	D	45	127	91	26	19.9	100%	98%	100%	98%			2%	
Livorno	I	45	270	211	49	6.6	84%	84%	84%	84%			13%	
Nyborg	DK	43	105	80	24	36.6	100%	100%	100%	100%				
Ebusis	GR	41	57	37	13	37.9	95%	100%	95%	100%			2%	
Antwerp	B	39	305	320	40	11.5	85%	82%	85%	77%	3%			
Other	OTH	946	5 721	4 497	84	17.7	86%	85%	83%	82%	0%	0%	6%	
<b>Total</b>		<b>3 119</b>	<b>12 161</b>	<b>9 486</b>	<b>53</b>	<b>21,3</b>	<b>93%</b>	<b>93%</b>	<b>89%</b>	<b>88%</b>	<b>0%</b>	<b>0%</b>	<b>2%</b>	

In the 20 largest EEA ports, 70% of the total numbers of calls in the report period were made by 'other tankers', with 109 calls on average during the period.

Rotterdam and London registered the largest number of calls. Together with six other ports they had more than 100 calls each and 47% of all calls in the EEA were made in these ports. Italian ports alone accounted for 21% of total calls.

Less than 7% of calls were made by vessels arriving or leaving for ports outside the EEA, and these were mainly to and from Rotterdam, Antwerp, Tarragona and Livorno.

The difference in years between the youngest and oldest vessels calling was substantial. Vessels calling at Tarragona were on average 5.8 years old while vessels calling at five Italian, Greek and Danish ports were more than 35 years old on average.

The average size of the vessels calling at all EEA ports was 4,000dwt.

The average call duration time for 19 of the 20 largest ports was 32 hours.

- **Since most of the calls are made by small vessels operating within the EEA, there is no other real option for vessels to avoid carbon charges on shipping activities and thus carbon leakage is not an issue.**

## Dry bulkers

The majority of the bulker fleet, measured in capacity, is dedicated to transporting iron ore and coal. Both these commodities are used for the production of steel. Therefore, China's infrastructure growth in the past decade has been a great driver for this segment.

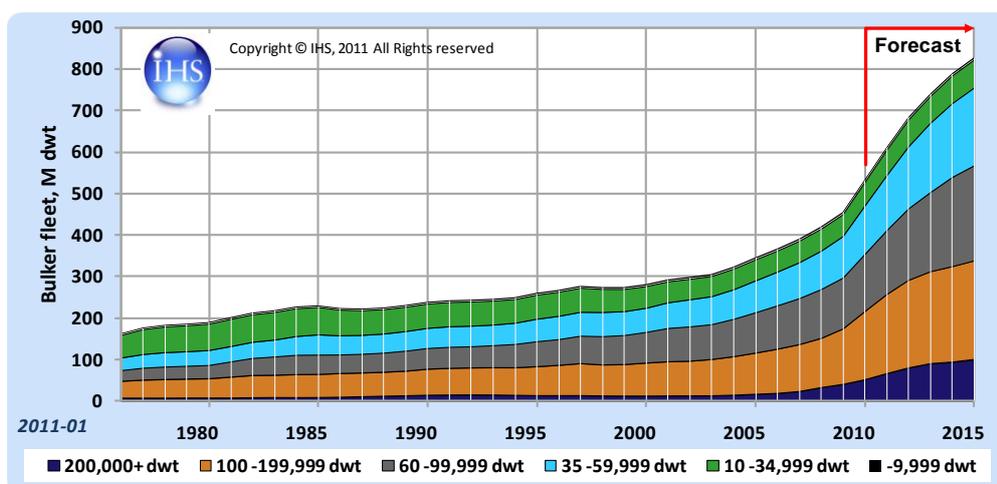


Figure 32: Bulker fleet, M dwt

Because of the rapid growth in iron ore trade, which involves the largest vessels, growth in total fleet capacity has accelerated in the past five years

and is expected to increase even more in the coming five as the size of the newbuilding orderbook is approximately 50% of the existing fleet.

Within the EEA, large bulkers represent a rather small share of total calls. During the report period, 50,000+ gt bulkers registered 7% (1,189) out of 16,951 calls, while the other size segments registered 93% of the total number of calls. Of those, 33% of the calls were registered within the 20,000-50,000gt size segment, 22% within the 10,000-20,000gt segment and 20% within the 2,000-10,000gt segment.

Because the dry bulk trade in Europe is dominated by intra-regional trade, the transport market is dominated by small and medium sized vessels. Two-thirds of the total calls were made by vessels arriving from, or leaving for, another EEA port. Within the 2,000-10,000gt segment the share was 96%.

In the Netherlands, 2,201 calls were registered in the report period and more than 1,000 calls in Spain, Italy, the UK, Germany and France, followed by around 500 calls for each of Scandinavia, Poland and Russia.

The average age was 18.8 years, with the lowest average age for vessels calling at Lithuania and Cyprus (12 and 13 years respectively). Iceland and the UK had the highest average ages, with 31.3 years and 23.9 years respectively.

Average call duration time was 98 hours but given the difference in size between the smallest and largest vessels, this does not give any clear indication.

**Table 23: Top 20 ports, bulkers**

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Rotterdam	NL	1 039	91 019	48 862	76	12.4	46%	62%	45%	61%	1%	3%	2%
Amsterdam	NL	482	27 605	16 154	78	14.1	58%	62%	57%	61%	7%	8%	1%
Antwerp	B	417	20 594	11 773	98	12.7	59%	48%	59%	48%	2%	4%	8%
Hamburg	D	405	28 182	15 348	79	13.1	62%	50%	61%	49%	2%	4%	3%
Constantza	R	399	11 170	6 630	159	22.1	35%	42%	35%	42%	1%		28%
Venice	I	396	8 636	5 336	59	19.4	73%	64%	73%	64%	1%	0%	8%
St Petersburg (Russia)	RU	336	10 074	6 350	119	17.2	81%	47%	79%	46%	4%	4%	4%
Riga	LAT	333	13 534	7 879	65	17.6	90%	81%	89%	81%	2%	3%	2%
Ghent	B	331	14 454	8 270	87	14.0	53%	55%	52%	55%	14%	14%	5%
Dunkirk	F	315	23 910	12 775	77	10.1	54%	46%	54%	45%	1%	3%	2%
Ravenna	I	301	8 115	5 013	68	20.6	55%	44%	55%	43%	0%	1%	6%
Immingham	GB	271	21 908	11 750	59	14.9	74%	57%	74%	56%	3%	6%	
Rostock	D	261	3 777	2 330	60	25.2	92%	77%	81%	67%	3%	4%	2%
Bremen	D	258	6 939	4 223	60	16.4	84%	85%	84%	84%	6%	8%	1%
Aalborg Portland	DK	253	1 179	809	26	18.9	98%	99%	90%	89%	1%	1%	
Umeiden	NL	252	25 550	13 424	66	10.2	55%	63%	52%	61%	2%	4%	0%
Klaipeda	LIT	240	6 944	4 231	103	17.4	77%	36%	73%	31%	4%	11%	3%
Rouen	F	239	7 261	4 349	74	14.2	64%	36%	64%	36%	0%	0%	23%
Thessaloniki	GR	225	4 103	2 491	78	14.8	71%	71%	71%	71%			3%
Koper	SLO	221	8 577	4 992	47	17.9	61%	81%	61%	81%			4%
Other	OTH	10 543	317 797	184 243	81	19.6	71%	72%	65%	66%	2%	2%	5%
		17 522	661 329	377 235	80	18.1	68%	67%	64%	63%	2%	3%	5%

The 20 largest ports accounted for 40% of all dry bulk port calls in the EEA in the report period. The average number of calls in those ports was 349. Of these, 67% (235) were intra-EEA port calls and 114 calls were to extra-EEA ports. In comparison with other ship types this is an unusually high share of the total. The main reason behind this is that dry bulk cargoes are to a higher degree discharged at end-user ports and not transited further by ship.

The average size of all vessels calling at all EEA ports was 38,000dwt. In the 20 largest ports it was 49,000dwt and in the others 30,000dwt.

Rotterdam is the major dry bulk port in Europe. Measured in dwt, 14% of all calls in the EEA were made in Rotterdam and 6% measured in number of calls. Amsterdam and IJmuiden are two other large dry bulk cargo ports in which 8% of all EEA calls (in dwt) were made during the report period. Other dry bulk ports with large number of calls were Hamburg, Dunkirk, Immingham and Antwerp.

The average age of bulkers calling at the 20 largest ports was 16.2 years, compared to 19.6 years in the other EEA ports.

The average call duration time was 68 hours in the 17 ports with the shortest duration time (excluding Constanta, St Petersburg and Klaipeda).

- **A large share of dry bulk cargoes is handled at industry terminals and used as input in production facilities in the vicinity of where it was unloaded. The industries will be there and need their cargo regardless of a new carbon charge.**
- **However, as with refineries, this is a sector where the industry that uses the cargo will be less competitive compared to its non-EEA peers and in some cases that industry may face problems and shut down. The increase in cost will in most cases be very low compared to the other costs of running the business so this will not be a major issue.**
- **However, if the industry closes and consumption of the final product is within the EEA area we will see carbon leakage.**

## General cargo

General cargo ships are the original ships for carrying dry cargo and the general cargo fleet is the largest sector of the merchant fleet by far in terms of numbers, even though its capacity is clearly smaller than many others due to the small size of most general cargo ships.

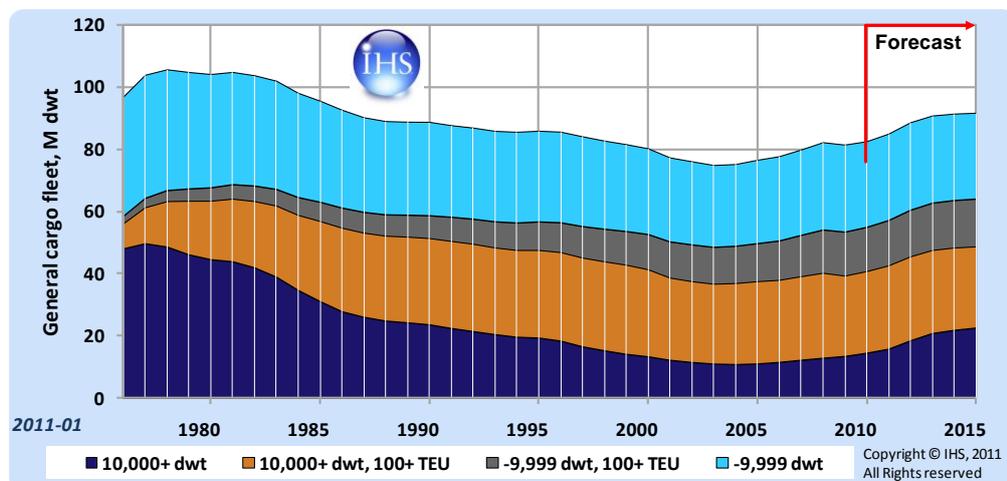


Figure 33: General cargo fleet, M dwt

After 25 years of decreasing capacity, the general cargo fleet started to grow again in 2005. A small set-back in 2009 was followed by a small recovery last

year. Large numbers of deliveries of new ships and a falling number of removals from the fleet indicate that the fleet will grow further in the coming years, particularly in the 10,000+ dwt size segment (=approximately 7,000gt).

During the report period, 110,595 calls (or on average 4,600 calls per country) were registered in the EEA. Of those, 66% (72,946) were by vessels between 2,000gt and 10,000gt and 31% between 400gt and 2,000gt. With an average size of 3,523gt, general cargo vessels represent the smallest cargo-carrying vessels calling at European ports next to 'other tankers'.

More than 16,000 calls were registered in the UK in the report period, almost 13,000 in the Netherlands and 10,500 in Spain – together accounting for 36% of the total number of calls in the EEA. Germany, Italy, France, Belgium, Sweden, Denmark and Finland also registered above average numbers of port calls by general cargo vessels.

The average age for the total number of calls was 16.9 years. Vessels calling at Greece, Cyprus, Bulgaria, Romania, Norway and Denmark had the highest average age at around 25 years. The average age of vessels calling at the other countries varied from 11.4 to 20.8 years.

Of the total calls, 87% were made by vessels calling at other ports in the EEA and 13 % from other ports.

Table 24: Top 20 ports, general cargo

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Rotterdam	NL	6 549	33 825	24 334	44	14,1	92%	95%	89%	91%	3%	3%	1%
Antwerp	B	3 556	27 977	20 208	60	12,8	86%	82%	85%	81%	3%	3%	3%
Constantza	R	2 433	10 406	7 402	94	25,3	46%	42%	46%	42%	0%	0%	34%
Hamburg	D	2 157	11 354	8 588	47	17,4	96%	93%	88%	87%	1%	3%	1%
St Petersburg (Russia)	RU	1 879	10 205	7 992	75	17,6	79%	75%	78%	74%	18%	18%	1%
Riga	LAT	1 844	9 355	7 025	47	17,5	96%	95%	94%	94%	3%	3%	0%
Klaipeda	LIT	1 781	7 580	5 400	47	20,8	96%	95%	93%	91%	3%	2%	0%
Amsterdam	NL	1 658	6 416	4 623	43	17,1	95%	97%	93%	94%	1%	2%	1%
Szczecin	PL	1 490	5 867	4 225	87	18,4	94%	93%	89%	90%	4%	3%	0%
Ghent	B	1 489	7 244	5 263	48	14,0	87%	92%	84%	90%	6%	4%	2%
Bitao	E	1 335	8 985	6 461	58	11,3	89%	86%	88%	85%	2%	1%	3%
Rostock	D	1 299	4 518	3 391	41	22,7	97%	95%	95%	93%	1%	3%	1%
Bremen	D	1 142	8 309	5 682	47	16,5	92%	90%	88%	84%	3%	4%	2%
Moerdijk	NL	1 066	4 297	3 039	40	13,7	95%	98%	87%	96%	2%	1%	1%
Belfast	GB	1 049	3 513	2 474	38	16,8	99%	99%	97%	98%	0%	0%	0%
Ravenna	I	1 043	5 481	3 843	62	19,2	56%	64%	55%	64%	0%		25%
Terneuzen	NL	1 029	5 153	3 613	42	12,6	97%	98%	92%	95%	0%	0%	2%
Immingham	GB	982	4 009	3 032	31	14,1	96%	97%	94%	90%	1%	1%	1%
Varna	BG	953	4 656	3 223	98	25,0	47%	50%	47%	50%	0%		31%
Lisbon	P	908	5 542	4 084	49	11,4	80%	79%	80%	79%	0%	0%	4%
Other	OTH	77 317	371 374	267 858	52	17,1	89%	88%	84%	84%	2%	2%	5%
<b>Total</b>		<b>112 959</b>	<b>556 066</b>	<b>401 762</b>	<b>53</b>	<b>16,9</b>	<b>88%</b>	<b>88%</b>	<b>84%</b>	<b>84%</b>	<b>2%</b>	<b>2%</b>	<b>5%</b>

One-third of the total number of calls in the EEA were made in the 20 largest ports, with an average of 1,792 calls per port and by vessels of an average size of 5,000dwt.

Two-thirds of the total number of calls in the EEA were made in a large number of small ports.

Rotterdam and Antwerp alone accounted for 9% of the total calls measured by numbers and 11% by dwt. Ports in countries such as Romania, Bulgaria, Russia, Latvia, Lithuania and Poland have large numbers of calls by general cargo vessels.

The number of calls made by vessels arriving from, or leaving for, ports outside the EEA was few, mainly to and from Constanta in Romania and Varna

in Bulgaria (where there are shipyards). In Antwerp, such calls were made by vessels arriving from, or leaving for, more distant countries.

The general cargo fleet comprises a large number of small vessels with a high average age. The average age for all vessels calling at EEA ports was 17 years, which was also the average age for vessels calling at the 20 largest EEA ports. Vessels calling at ports in Spain and Portugal had an average age of only 11.4 years, while vessels calling at Romania and Bulgaria had an average age of 25 years.

The average call duration time for the 20 largest ports was 34 hours, which was approximately the same as for the other EEA ports (excluding Constanta, Varna, St Petersburg, Szczecin and Klaipeda).

- **General cargo vessels are the most common vessel type in the world – the real workhorse, calling at small and medium sized ports. The average size of cargo loaded or unloaded in each port is generally small and should costs rise significantly through carbon charges, many cargoes could potentially be transported by land.**
- **Obviously this is especially true when the sea route is parallel with the potential land route – as in Scandinavia down to the continent or in comparison with parts of the inland waterways.**
- **Carbon leakage could emerge in southeastern parts of Europe and elsewhere if industry closures due to higher costs make EEU citizens buy products that have been manufactured and transported under less costly regimes.**

## Other dry cargo carriers

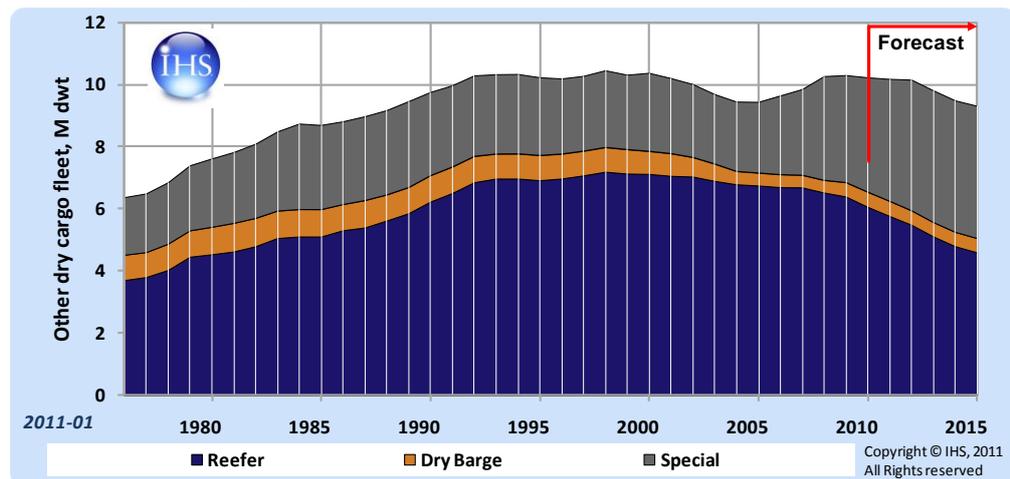


Figure 34: Other dry cargo fleet, M dwt

The category 'other dry cargo vessel' includes vessel types such as reefers, dry barges and other specialised vessels.

Dry barges are towed or pushed by specially built tugs and transport cargoes such as sand, minerals and waste. Because the barge is unmanned it is used for storage of goods and the average call duration time is therefore



substantial. During the report period, the average call duration in Estonia was 631 hours or 26 days, mainly because of the use of barges.

Other specialised dry cargo vessels are carriers of heavy loads, livestock, pulp and radioactive waste.

Reefer vessels are used mainly for transporting refrigerated cargoes of fruit and vegetables and frozen meat and fish. Other cargoes such as dairy products, pharmaceuticals (medical substances) and flowers are also shipped in reefer vessels. The seasons for transporting fruit and vegetables are generally very short and instead of idling vessels they are used for shipping other types of cargoes, including second-hand cars, between continents.

The world fleet of reefers and barges is declining while the fleet of specialised vessels is increasing. The number of reefer vessels is decreasing because more and more goods are transported in reefer containers on board container carriers equipped with specialised slots. Instead of storing the refrigerated goods in the port, they can be transported directly to the distributor. Refrigerated goods in containers can thus be shipped through many more ports than bulk reefer goods.

The number of calls of 'other dry cargo' vessels in the EEA was below 5,000 in the report period and with a high degree of concentration in the major European countries such as the UK, the Netherlands, Italy, Belgium, Spain, Germany and France. Outside the EEA, 659 calls were registered in Russia (Baltic).

The international nature of the trade in refrigerated goods explains why almost 40% of the calls were made by vessels arriving from, or leaving for, destinations outside the EEA.

Of the calls, 91% were made by vessels between 2,000gt and 20,000gt and the average age of the vessels calling was 17.2 years. The average age of bulk reefers is significantly higher than this as fleet renewal is almost non-existent.

Table 25: Top 20 ports, other dry cargo carriers

Port Name	Country Code	Calls	Dwt ('000)	Ct ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
St Petersburg (Russia)	RU	635	4 795	4 654	157	20.5	38%	42%	35%	36%	14%	14%	4%
Antwerp	B	420	5 245	5 219	55	13.4	53%	58%	53%	58%	1%	0%	0%
Rotterdam	NL	331	3 197	3 145	60	19.9	82%	55%	82%	55%	1%	4%	1%
Umsiden	NL	208	915	890	88	18.2	66%	57%	46%	49%	16%	9%	4%
Hamburg	D	198	2 295	2 327	44	17.9	82%	70%	81%	70%	1%	1%	
Quilano Terminal	I	196	2 682	2 681	21	10.8	63%	78%	63%	78%	1%	2%	3%
Klaipeda	LT	175	683	668	80	18.6	62%	60%	44%	42%	24%	28%	3%
Vlissingen	NL	173	1 910	1 740	70	18.0	54%	25%	54%	24%	11%	23%	5%
Portsmouth (United Kingdom)	GB	149	1 724	1 614	42	9.2	48%	68%	48%	68%			
Dover	GB	119	1 295	1 439	16	12.9	10%	100%	10%	100%			
Tarragona	E	116	1 312	1 203	23	15.3	57%	88%	57%	88%	2%		
Sheerness	GB	107	1 322	1 225	21	21.9	58%	83%	58%	83%		5%	4%
Valencia	E	104	1 527	1 612	11	9.2	97%	40%	97%	40%			1%
Genoa	I	96	772	767	40	19.6	89%	61%	89%	61%			3%
Civitavecchia	I	94	952	930	21	17.9	70%	45%	70%	45%			10%
Aalesund	N	79	204	234	31	14.5	86%	87%	56%	59%	14%	11%	
Livorno	I	78	787	796	27	13.7	76%	81%	76%	81%			3%
Le Havre	F	77	880	826	24	13.2	92%	10%	92%	9%	1%		
Zeebrugge	B	75	897	800	36	15.7	79%	97%	79%	97%			
Lisbon	P	72	1 012	933	50	13.3	31%	89%	31%	89%			7%
Other	OTH	2 127	14 391	14 101	93	18.2	64%	67%	56%	59%	8%	6%	8%
		5 629	48 799	47 802	77	17.2	62%	62%	57%	57%	7%	6%	4%

'Other dry cargo' vessels are generally very small. The average size of the vessels calling at the 20 largest ports was 9,800dwt and for the remaining

ports 6,800dwt. On account of this, 69% of the calls (measured in dwt) were made in the 20 largest EEA ports but only 62% measured in number of calls.

The average number of calls in the 20 largest ports was 175 over the report period – with six ports exceeding the average, led by St Petersburg, Antwerp and Rotterdam. Together these three accounted for 25% of the number of calls.

Vessels arriving or leaving for ports outside the EEA accounted for 38% of calls; 15% were vessels calling in Russia (Baltic) and Med/Black Sea and 23% other countries. It was mainly the three largest ports that were visited by vessels also calling at non-EEA ports.

The average age for all vessels calling at EEA ports was 15.7 years, while it was 18.2 years for vessels calling at other ports.

Average call duration time for the 19 largest ports was 40 hours, except for St Petersburg where the call duration time was four times longer.

- **Because of a high degree of integration in multimodal supply chains, there are no short-term options for bulk reefers to change ports of call. However, in the longer term reefer carriers will continue to decline and this process could be accelerated if a carbon charge on shipping activities is applied. This could only happen if container ship operators adapt better to the new rules – and they are probably in a better position to do so.**
- **From this it follows that there is a potential for carbon leakage for the reefer fleet.**
- **When it comes to barges and heavy-lift ships, the chances of changing the transport pattern are slim to non-existent and thus carbon leakage is a not an issue.**

## Container ships

The box ship has a big advantage since it can carry most kinds of cargoes and thus build liner networks. The global fleet has grown dramatically over the past decade and will continue to do so.

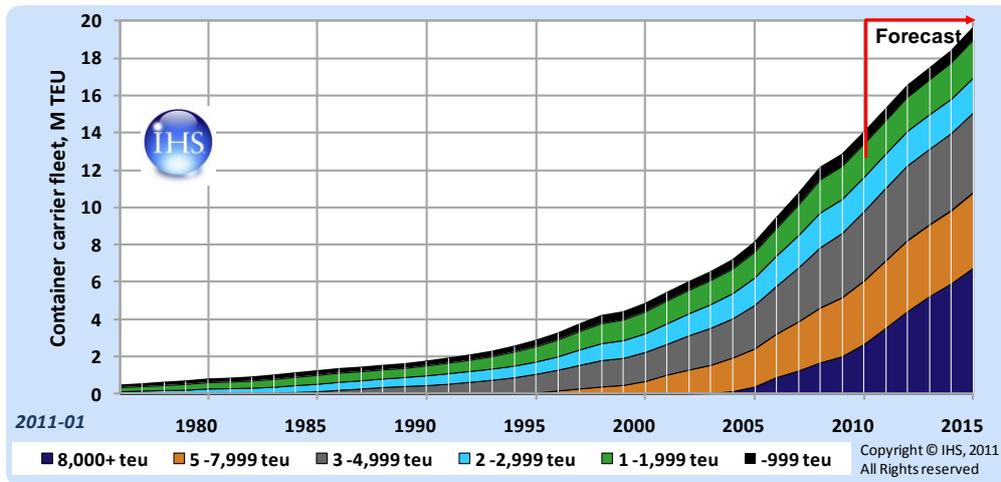


Figure 35: Container fleet, M teu

The average size of the fleet has increased dramatically in the past decade as new large size classes have been added because economy of scale is such a powerful tool in lowering the cost per unit transported. The largest carriers (8,000teu<sup>3</sup> and above) are used on the so-called trunk lines between Asia, Europe and North America. They mostly use the largest ports in Europe (Rotterdam, Antwerp, Hamburg, Bremerhaven, Valencia, Felixstowe, Algeciras and Gioia Tauro) from where containers are feedered to other regional ports in the EEA and Russia (Baltic), mainly in vessels smaller than 2,000teu. More and more ports in Europe are being visited by large carriers.

Container carriers made 68,458 port calls in the EEA area (including Russia) during the report period. Of these, 82% were calls made by vessels arriving from, or leaving for, another EEA port, 2% were calls to or from Russia/Baltic Sea countries, 6% to and from ports in the Mediterranean/Black Sea and 10% calls to or from other countries outside the EEA area.

Spain, the Netherlands, Germany, Italy and the UK were the five countries that registered the largest number of calls during the report period. Of the total number of calls by container carriers in the EEA, 61% were made in ports in these countries.

Of the calls in these countries, 83% were made by vessels also calling at other EEA ports, 2% calling at Russia/Baltic ports, 5% calling at Mediterranean/Black Sea ports and 11% calling at ports outside the EEA area.

Of the total port calls in Scandinavia and other Baltic Sea countries, and in Russia and Portugal, 92% were made by vessels arriving from, or leaving for,

<sup>3</sup> TEU=twenty foot equivalent unit

another EEA port, mainly a continental deepsea port. Of the total port calls, 5.5% were made by vessels also calling at ports in Russia/Baltic Sea, 1% calling at ports in the Mediterranean/Black Sea region and 4.6% calling at ports outside the EEA area.

The division between large and small container vessels reflects traffic patterns both within the EEA and between the EEA and the rest of the world.

Of the total number of calls made by container carriers in the EEA, 39% were made by vessels larger than 20,000gt and 61% by vessels smaller than 20,000gt. The small carriers were operating mainly as feeder vessels and 88% of their next calls were made in ports situated within the EEA, compared with 74% for the carriers larger than 20,000gt.

Among the five largest countries, the share of larger vessels was slightly higher (42%) and the share of feeder vessels smaller than 20,000gt was 58%.

Belgium and France registered the highest share of large vessels calling at their ports – 65% compared with 35% by feeder vessels. In the Scandinavian countries, together with Finland, Poland and Russia, less than 10% of the total number of calls were made by large container carriers. These countries are almost entirely dependent on feeder vessel services from continental deepsea ports. Estonia, Lithuania and Portugal were also highly dependent on feeder vessel services.

The 50,000+ gt size segment, which comprises primarily deepsea container carriers, represented 18% of the total number of calls in EEA ports (including Russia). The five largest countries' share of the total number of calls within this size segment was 71%.

Port handling costs for containers represent a significant part of the total cost for transporting containers from sender to receiver. Any additional transshipment is avoided unless savings in time and costs are substantial. Feeder vessels changing ports in order to avoid carbon charges on shipping activity means in practice that the final destination cannot be reached without lorries crossing borders. Crossing borders on land between EEA and non-EEA-countries takes time and costs money.

Table 26: Top 20 ports, container carriers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:							
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea	
Rotterdam	NL	9 132	255 066	223 980	26	5.8	85%	93%	82%	91%	3%	3%	2%	
Hamburg	D	4 733	176 953	158 735	37	5.8	92%	88%	90%	86%	4%	8%	0%	
Antwerp	B	4 031	158 041	137 936	36	8.6	83%	83%	82%	82%	2%	2%	2%	
Bremerhaven	D	3 179	114 326	100 014	32	8.5	88%	82%	83%	78%	5%	7%	0%	
Valencia	E	2 744	122 224	107 500	22	10.1	69%	60%	69%	60%			10%	
Felixstowe	GB	2 229	119 755	105 900	21	7.6	85%	88%	85%	88%			6%	
Le Havre	F	2 060	113 597	99 962	24	6.6	86%	54%	86%	54%			1%	
Barcelona	E	1 983	72 428	63 136	20	9.8	83%	67%	83%	67%			8%	
Algeciras	E	1 788	68 775	59 095	24	7.7	44%	43%	44%	43%			15%	
Marsaxlokk	MLT	1 618	55 251	47 517	26	8.8	51%	56%	51%	56%			25%	
Genoa	I	1 430	57 121	51 681	28	10.1	81%	83%	81%	83%			7%	
St Petersburg (Russia)	RU	1 303	19 052	15 971	39	6.7	98%	98%	98%	98%	1%	1%		
Zeebrugge	B	1 005	55 535	50 743	22	4.5	89%	89%	88%	89%	5%	0%		
Tilbury	GB	968	28 690	23 879	17	5.4	86%	94%	86%	94%	2%	0%	3%	
La Spezia	I	963	38 628	33 034	25	11.0	72%	85%	72%	85%			18%	
Gothenburg	S	946	15 790	13 904	19	7.7	99%	97%	86%	88%	1%	2%		
Dublin	IRL	899	8 779	7 166	23	5.0	99%	100%	99%	100%	0%		1%	
Praeus	GR	887	32 902	27 898	27	10.9	62%	62%	62%	62%			25%	
Lisbon	P	869	13 302	10 827	34	9.0	82%	73%	82%	73%			5%	
Leixoes	P	810	9 928	8 115	20	8.8	86%	91%	86%	91%			4%	
Other	OTH	24 881	541 756	471 957	33	9.4	83%	83%	80%	81%	2%	1%	6%	
		68 458	2 077 897	1 818 949	30	8.2	82%	82%	80%	80%	2%	2%	5%	

There is a high level of concentration in the European container carrier market on the continental ports for deepsea traffic such as Rotterdam, Antwerp and Hamburg. The 17,896 calls (590M dwt) in these ports represented 28% of all EEA calls measured in dwt in the report period and 26% measured in number of calls. In the remaining 20 largest ports for deepsea traffic, the share of all EEA calls was 38% in number of calls and 46% in deadweight tonnage. Altogether the share of 20 largest ports was 64% of calls and 74% of dwt.

The average size of the vessels calling at the 20 largest ports was 35,000dwt and for vessels calling at the other ports 22,000dwt.

Of all calls, 18% were made by vessels calling at non-EEA ports immediately before or after calling at the EEA port. The share was much higher in South European ports such as Algeciras (Spain), Le Havre, Marsaxlokk (Malta), Valencia, Piraeus and Lisbon as these are the European ports that are called at first and/or last by carriers on the major trunk lines between Asia and Europe.

The average age of container carriers calling at the 20 largest EEA ports was 7.9 years, compared to 9.4 years for the remaining ports.

The average call duration in the 20 largest ports was 26 hours and 33 hours in the other ports. In Rotterdam, the average call duration time was 26 hours, in Hamburg and Antwerp 36 hours and in Bremerhaven 32 hours.

Deepsea container carriers either load or unload their containers in one or two major hub ports in the main source/destination area, from/to which the containers are transited by rail, road or ship.

- **The options for loading and unloading deepsea container carriers in non-EEA countries in Northern Europe are very few. Today, Kaliningrad is the only port that could serve as a transition hub for shipments to other Baltic Sea countries. Around the eastern part of the Mediterranean there are more options.**
- **In North Africa, we can already see port developments for deepsea carriers to load and unload transshipment cargoes to nearby EEA-countries in the Mediterranean and Central European region.**
- **In the Middle East, countries such as Oman and Saudi Arabia are establishing themselves as key global transport and logistic hubs.**
- **The above suggest that there will be changes in traffic patterns regardless of whether a carbon charge on shipping emissions is introduced or not. A charge would obviously increase the speed and scope of this development.**
- **This means that carbon leakage will increase due to the introduction of measures, but not to a very large extent if compared to total volumes. In the alternative ports section (see page 73) we elaborate further on this.**

## Vehicle ro-ro carriers

Vehicle ro-ro carriers are specialised vessels for carrying new cars between the major continents. Capacity is measured in ceu<sup>4</sup>. In the past decade, new vessels have been designed for carriage of cargo other than cars. The decks have been strengthened, allowing the carriers to become multi-purpose.

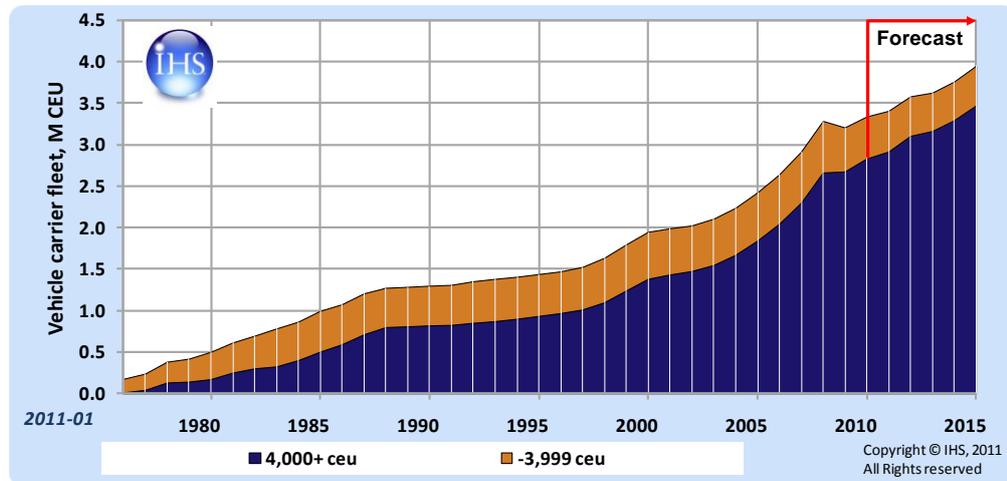


Figure 36: Vehicle carrier fleet, M ceu

The global fleet grew from around 400 vessels at the beginning of the 1990s to 814 in 2008, when a large number of older vessels were removed from the fleet. New large vessels were ordered in 2007 and 2008 and these are now being delivered, which means that the fleet is growing again.

During the report period, 11,271 calls by vehicle carriers were registered in the EEA. Nearly two-thirds of these calls were made in the UK, Germany, Belgium and Spain. Another 24% of the calls were made in France, Italy, Sweden, the Netherlands and Greece.

Of these calls, 73% were made by carriers in the 20,000+ gt size segment, followed by 19% in the 2,000-10,000gt segment and 11% in the 10,000-20,000gt segment.

The vehicle carriers calling in the EEA were generally very young, with an average age of 10.5 years.

Since many vehicle carriers operate in fixed loops with many regional ports involved, the number of calls by vessels arriving from, or leaving for, another EEA port is therefore high – 88% of the total number of calls. Around 8.5% of calls were made in ports connecting the EEA with other continents.

Belgium, the UK, Germany and Spain were the countries with the highest number of calls from large (20,000+ gt) vehicle carriers. These countries registered 65% of all calls in this size class.

In the size segments below 20,000gt, 95% of calls were intra-EEA.

<sup>4</sup> CEU=car equivalent unit

Average port handling time was 25 hours, which is low compared to the size of the vessels. Only ferries have lower average port handling times.

Table 27: Top 20 ports, vehicle carriers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Zeebrugge	B	989	13 446	37 537	28	9.8	87%	96%	87%	96%	3%	0%	2%
Bremerhaven	D	867	14 692	40 241	40	6.9	85%	91%	78%	83%	1%	0%	1%
Southampton	GB	662	11 610	31 885	28	9.0	98%	55%	98%	55%	0%	0%	0%
Emden	D	644	5 492	15 536	36	12.4	84%	88%	83%	88%	4%	0%	0%
Antwerp	B	589	11 890	31 014	45	9.1	91%	76%	91%	76%	0%	0%	2%
Barcelona	E	470	5 977	17 960	15	8.1	79%	87%	79%	87%	0%	0%	5%
Le Havre	F	430	5 575	14 661	23	12.9	97%	86%	97%	86%	0%	0%	1%
Newcastle upon Tyne	GB	386	2 521	7 619	24	14.4	95%	93%	94%	92%	4%	6%	0%
Grimsby	GB	362	1 175	3 129	20	14.8	100%	100%	100%	100%	0%	0%	0%
Livorno	I	353	4 945	14 684	13	8.6	70%	93%	70%	93%	0%	0%	7%
Bristol	GB	349	5 110	14 677	20	9.6	94%	98%	94%	98%	0%	0%	2%
Piraeus	GR	322	4 282	12 594	18	11.1	63%	68%	63%	68%	0%	0%	16%
Vigo	E	306	3 054	8 732	16	12.2	88%	90%	88%	90%	0%	0%	1%
Valencia	E	247	3 068	9 291	14	7.8	85%	91%	85%	91%	0%	0%	7%
Sheerness	GB	229	1 712	5 268	14	10.0	95%	95%	95%	95%	0%	0%	1%
Hamburg	D	219	4 198	10 281	36	10.0	82%	92%	82%	92%	0%	0%	2%
Amsterdam	NL	195	2 885	6 919	29	13.8	69%	94%	69%	94%	1%	4%	0%
Koper	SLO	195	2 423	6 778	18	12.2	65%	83%	65%	83%	0%	0%	11%
Setubal	P	179	2 321	6 626	15	12.6	97%	99%	97%	99%	0%	0%	2%
Malmö	S	171	1 531	4 470	26	9.1	96%	90%	96%	89%	4%	9%	0%
Other	OTH	3 204	37 936	105 870	22	10.6	91%	90%	90%	89%	1%	2%	5%
		11 388	146 042	405 772	25	10.5	88%	88%	87%	87%	1%	1%	3%

Concentration of vehicle carrier traffic on the 20 largest EEA ports is even higher than for container carrier traffic, with 72% of the total number of calls. The five largest ports (Zeebrugge, Bremerhaven, Southampton, Emden and Antwerp) accounted for 33% of the total.

The average size of all vessels calling was close to 12,800dwt, with only small differences between those calling at the largest and the smallest ports.

Southampton, Antwerp and Bremerhaven were the ports with the highest number of calls made by vessels also calling at a non-EEA port immediately before or after calling at an EEA port.

Not only are these large ports but they are also the starting points for many of the loops in EEA vehicle carrier traffic.

The average age of vehicle carriers visiting EEA ports was 10.8 years and the average call duration time 24 hours.

- **Because the EEA loops for vehicle carriers are designed to minimise transport/terminal handling times both for land and sea transport, introducing carbon charges on shipping activities in the entire EEA will probably have a very small influence on decisions of which ports should be included in the loops.**
- **Car manufacturers are generally very positive towards environmentally-friendly improvements in the logistics chain and are not likely to change their logistics solutions because of actions taken to improve environmental indices.**
- **The conclusion is therefore that the risks for carbon leakage are small.**

## Ro-ro

Cargo ro-ro vessels transport cargo units on wheels, such as lorries, trailers or rolling cassettes carrying containers or other cargoes. A cargo ro-ro vessel can also bring a maximum of 12 lorry drivers onboard. Other lorries have to be unaccompanied by their drivers.

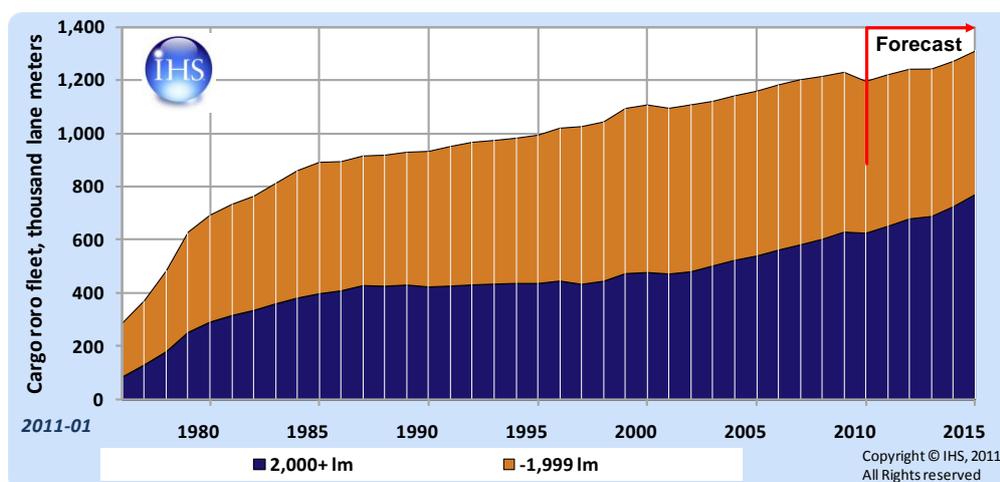


Figure 37: Cargo ro-ro fleet, 1,000 lane-metres

The global cargo ro-ro fleet has been growing slowly but steadily since 1985 but from the beginning of the last decade the share of large (2,000+ lane-metre) vessels has increased.

A total of 27,217 calls were made in the EEA by ro-ro ships in the report period, with most of the calls being to ports in the North Sea area. The number of calls in the UK, the Netherlands, Belgium, Sweden, Germany and Norway totalled 16,037, or 59% of the total number of calls. Of the calls, 26% were to France, Spain, Italy, Greece, Cyprus and Malta. Finland is one of the countries most reliant on ro-ro traffic and its share of the total number of calls was 8%.

The average port call duration in the major ro-ro countries in the North Sea area was around 25 hours and it was 44 hours in the Mediterranean area. The average age of the ro-ro vessels calling at ports in the North Sea area was 15 years, while it was 23 years in the Mediterranean area.

Very few cargo ro-ro vessels call at ports outside the EEA, Russia and Mediterranean/Black Sea area. During the report period, only 3% (approximately 800) of the calls were made by vessels either arriving in or leaving this area. Of these calls, 364 were made by the largest size ro-ro vessels (20,000+ gt), mainly to and from Spain where traffic to the Canary Islands dominated. Ro-ro vessels calling in Italy, Portugal, France and the Great Britain also registered large numbers of calls outside the area.



Table 28: Top 20 ports, ro-ro carriers

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:						
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea
Zeebrugge	B	2 289	24 866	54 127	18	11.7	100%	99%	100%	99%	0%		
Rotterdam	NL	1 904	18 587	34 819	21	13.9	100%	100%	100%	100%	0%		
London	GB	1 671	15 523	31 700	12	16.0	100%	100%	100%	100%	0%		
Gothenburg	S	1 419	19 467	39 352	18	7.0	100%	100%	96%	99%	0%		
Immingham	GB	1 193	13 420	26 057	18	11.8	98%	99%	91%	89%	0%		1%
Killingholme	GB	853	11 550	28 576	16	4.2	100%	100%	100%	100%			
Marseille	F	716	6 385	10 269	47	22.3	60%	60%	60%	60%			33%
Antwerp	B	661	12 375	16 736	52	15.4	90%	86%	90%	86%			3%
Vlissingen	NL	625	4 444	6 963	19	19.1	99%	99%	99%	99%	1%	1%	
Livorno	I	602	5 078	8 076	21	29.8	93%	95%	93%	95%	0%		3%
Trieste	I	574	6 793	15 012	23	10.0	67%	66%	67%	66%			26%
Genoa	I	545	6 365	8 724	55	26.5	78%	77%	78%	77%			16%
Hanko	SF	510	7 207	11 737	16	7.9	95%	95%	95%	95%	5%	5%	
Piraeus	GR	453	3 299	5 257	100	32.2	90%	87%	90%	87%			7%
Kotka	SF	444	4 658	7 230	44	17.2	99%	98%	99%	98%	1%	2%	
Tilbury	GB	436	4 631	8 229	39	15.4	100%	100%	100%	100%			
Teesport	GB	409	4 383	7 850	13	16.5	100%	100%	100%	100%			
Dublin	IRL	375	2 626	5 902	18	7.3	99%	99%	99%	99%			0%
Rauma	SF	336	3 436	5 086	39	13.1	98%	99%	98%	99%			
Bergen	N	313	1 491	1 997	23	24.2	100%	100%	58%	59%			
Other	OTH	11 119	103 893	171 729	45	18.0	88%	89%	85%	85%	2%	2%	5%
		27 447	280 476	505 427	34	16.0	92%	92%	90%	90%	1%	1%	4%

Of all port calls made by cargo ro-ro vessels in the EEA, 59% were in the largest ports. Measured in dwt, the share was even higher at 63%.

Three British ports were among the six largest ro-ro ports but the Belgian port of Zeebrugge was the largest.

Very few ro-ro vessels were calling at non-EEA ports immediately before or after they had visited an EEA port. Less than 8% of the calls were made by such vessels, mostly in Bergen (Norway), Marseille, Trieste, Genoa and Piraeus.

The average age of cargo ro-ros visiting the largest EEA ports was 16 years, and 18 years for vessels calling at the other ports.

The only major exceptions were vessels calling at Piraeus, where it was 32 years, for vessels calling at Livorno in Italy (30 years) and for vessels calling Genoa (26.5 years).

The average call duration time for 19 of the largest ports was 27 hours. In Piraeus the call duration time was 100 hours.

- **Ro-ro operators depend on efficient land transport infrastructure connections for the part of the operation that functions as a floating bridge and thus this activity is hardly moveable.**
- **For the part of ro-ro activity that services industry shipments, alternative routes and ports could in some cases become a reality, as for general cargo. The effect of an industry moving completely should not be disregarded either but we underline that this cost will be low in comparison with the total cost and thus the effects and the potential carbon leakage from this will be low.**

## Ferries

Capacity growth in the global ferry fleet is levelling out. While the fleet of ro-pax vessels (which carry passengers, cars and lorries) continues to build, growth of the passenger ferry and overnight ferry fleets stagnates.

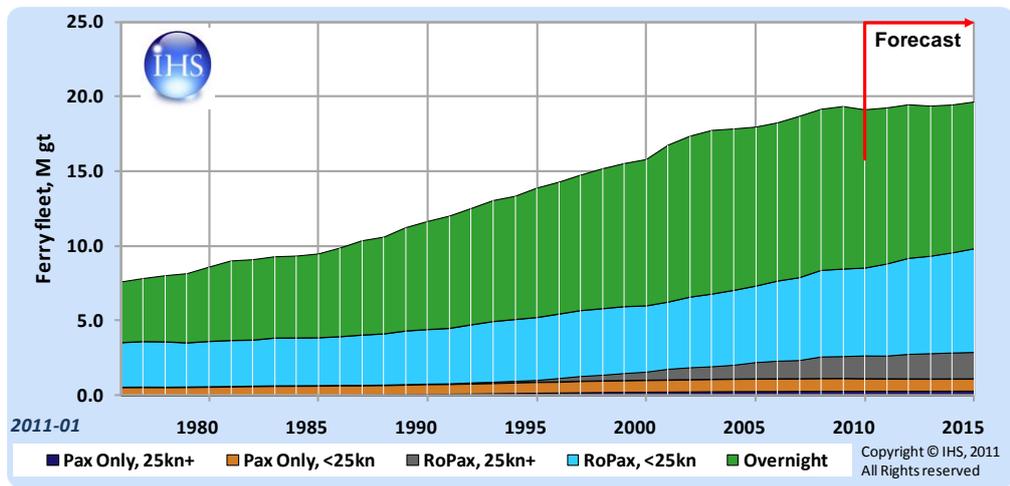


Figure 38: Ferry fleet, M gt

The difference between cargo ro-ro vessels and ro-pax ferries is that the latter can carry more than 12 passengers/drivers. Overnight ferries are generally also ro-pax ferries but with night cabins. Ro-pax and overnight ferries are generally much larger than passenger-only ferries.

In the ferry segment, we have used AIS data and data from ShipPax Information.

Table 29 is derived from the AIS systems, as were all the other calls. For ferries though, this is not complete by any means but conclusions can still be drawn since the ferries are operating on very standardised routes. Ferries of or below 10,000gt – a size category that is dominated by passenger-only ferries – accounted for 59% of calls. Of the total calls, 27% were made by vessels in the 20,000-50,000gt size segment, where ro-paxes are more frequently represented.

Table 29: Top 20 ports, ferries

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:								
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea		
Naples	I	22 161	14 539	59 137	16	19.8	100%	100%	100%	100%				0%	
Dover	GB	19 556	119 543	572 763	2	13.0	100%	100%	100%	100%				0%	
Piraeus	GR	18 505	24 791	130 778	21	19.2	99%	99%	99%	99%			0%	0%	
Algeciras	E	17 861	18 079	129 719	6	16.6	66%	66%	66%	66%				33%	
Calais	F	16 033	98 479	446 247	2	15.3	100%	100%	100%	100%					
Portsmouth (United Kingdom)	GB	13 731	19 409	113 793	6	14.2	97%	97%	97%	97%					
Gothenburg	S	9 227	13 680	71 943	10	22.8	100%	100%	100%	100%					
Southampton	GB	7 916	5 054	28 137	7	14.3	100%	100%	100%	100%					
Moss	N	7 333	14 422	43 982	2	10.3	100%	100%	0%						
Ceuta	E	6 748	4 513	38 851	2	9.1	100%	100%	100%	100%				0%	
Stavanger	N	6 739	2 387	10 060	7	11.6	100%	100%	0%	0%					
Rostock	D	6 515	30 582	131 186	5	26.5	100%	100%	100%	100%					
Pozzuoli	I	6 450	3 457	11 875	4	31.8	100%	100%	100%	100%					
Cowes	GB	6 375	4 536	25 207	1	14.8	100%	100%	100%	100%					
Helsinki	SF	6 356	22 553	180 256	8	8.9	99%	99%	99%	99%	1%	1%		0%	
Tallinn	EST	6 337	25 955	170 537	6	9.6	100%	100%	100%	100%	0%	0%		0%	
Horten	N	6 325	11 203	34 131	6	11.1	100%	100%	0%	0%					
Trelleborg	S	6 272	36 021	165 980	4	19.0	100%	100%	100%	100%					
Ibiza	E	6 234	7 211	36 505	9	14.7	100%	100%	100%	100%					
Stockholm	S	5 288	10 500	101 580	20	29.7	99%	99%	99%	99%	0%	0%			
Other	OTH	257 817	655 752	3 249 096	12	17.1	97%	97%	88%	88%	0%	0%		1%	
			459 779	1 142 667	5 751 765	10	16.9	97%	97%	87%	87%	0%	0%		2%

Most ferries are operating on very short international and domestic routes and we have registered, despite only hourly monitoring, 460,000 port calls during the report period. Ferry traffic related to Great Britain represents approximately one-fifth of the total number of registered calls, and the Mediterranean ferry traffic and ferry traffic related to Scandinavia and the Baltic Sea countries represent roughly one-third each.

Table 30 illustrates our estimate (based on ShipPax data) of port calls in EEA countries by ferries that travel more than 6nm.

Table 30: Port calls by ferries in the EEA region 2009

Number of port calls by ferries * in the EEA 2009					
Country	Domestic	Intra EEA	Extra EEA	Total	%
Sweden	10,467	134,412		144,879	7.8%
Finland	7,858	30,525		38,383	2.1%
Estonia	26,500	11,348		37,848	2.0%
Latvia		824		824	0.0%
Lithuania		1,449		1,449	0.1%
Poland		7,616		7,616	0.4%
Denmark	81,809	150,079		231,888	12.4%
Germany	18,960	74,606	152	93,718	5.0%
Netherlands	62,860	7,586		70,446	3.8%
Belgium		3,010		3,010	0.2%
GB	219,937	67,835		287,772	15.4%
Ireland		12,623		12,623	0.7%
France	22,019	58,838	3,073	83,930	4.5%
Spain	43,969	1,311	13,772	59,052	3.2%
Portugal	56,100	350		56,450	3.0%
Italy	344,547	32,606	5,901	383,054	20.5%
Greece	138,253	20,643	2,665	161,561	8.6%
Malta	365	692		1,057	0.1%
Iceland	1,270	52		1,322	0.1%
Norway	183,525	7,967		191,492	10.2%
<b>Total</b>	<b>1,218,439</b>	<b>624,372</b>	<b>25,563</b>	<b>1,868,374</b>	<b>100.0%</b>
<b>%</b>	<b>65.2%</b>	<b>33.4%</b>	<b>1.4%</b>	<b>100.0%</b>	
Source: Market 10/ShipPax Information					
*) Calls by ferries travelling 6 nautical miles per trip or longer. Calls by touring vessels are not included					

Although the numbers are very much higher than in the table previously presented, all small ferry lines (mostly domestic) in cities across rivers and the like are excluded.

Almost two-thirds of the total calls by ferries in the EEA in 2009 were made by ferries in domestic traffic and one-third by ferries in intra-EEA traffic. In 2009, Italy registered the largest number of calls by ferries with 20% of the total, followed by Great Britain and Denmark. In Italy, 90% of all calls were made by ferries in domestic traffic between the mainland, Sardinia and Sicily. In Great Britain, domestic ferry traffic is concentrated mainly on ports in Scotland, the Hebrides, the Shetland and Orkney Islands, and also in Northern Ireland, the Isle of Man and Channel Islands and the Isle of Wight.

Norway has a long coast with many coastal villages served by ferries. The Greek archipelago has few options other than ferry traffic. Although Denmark also has a large number of domestic ferry lines, the largest number of calls are made by ferries in intra-EEA traffic, mainly traffic from Sweden and Germany.

Sweden has almost as many calls by ferries from other EEA countries, mainly Denmark, Finland and Germany. Next to these three countries, Germany, Great Britain and France registered a large number of calls by ferries from neighbouring EEA countries.

Except for a small number of calls by ferries arriving from Russia, all other calls from non-EEA countries are made in the Mediterranean Sea. More than 50% of such calls are made in Spain, followed by Italy, France and Greece. The calls are made by ferries arriving primarily from Morocco, Tunisia, Montenegro and Albania.

- **There are two main types of ferry services in the EEA – domestic and international. It is really only the latter that will be affected by a carbon levy for shipping activities since the domestic type should already be included in the carbon goals of the respective countries.**
- **Most of the international ferry lines are ro-pax ferries that carry both cargo and passengers. One is not more important than the other and competitiveness is a function of both markets being served properly. If one fails the line is usually in big trouble.**
- **This means that the ferry industry competes with other transport modes for both goods and passengers. Given that aeroplanes will be included in a carbon scheme, the passenger side should not really be a problem. That leaves cargo, where most competition is from other seaborne transport. Thus the risk for carbon leakage must be considered as very low – but a carbon fee on shipping activity could lead to a decrease in services from ferries in parts of Europe due to a reduction in their competitive position.**

## Cruise ships

The global cruise industry has been growing rapidly over the past 15 years and is expected to continue to grow at an even higher rate than before. The size of the average cruise vessel tends to become larger and larger, with the average for vessels on order now 83,650gt.

The Mediterranean and Atlantic islands continue to be the most popular destinations in Europe, with 2.8M passengers visiting these regions in 2009. Northern Europe had a 20% increase in the number of cruise visitors to 884,000. In 2010, the European cruise industry was projected to grow by 2.5%.

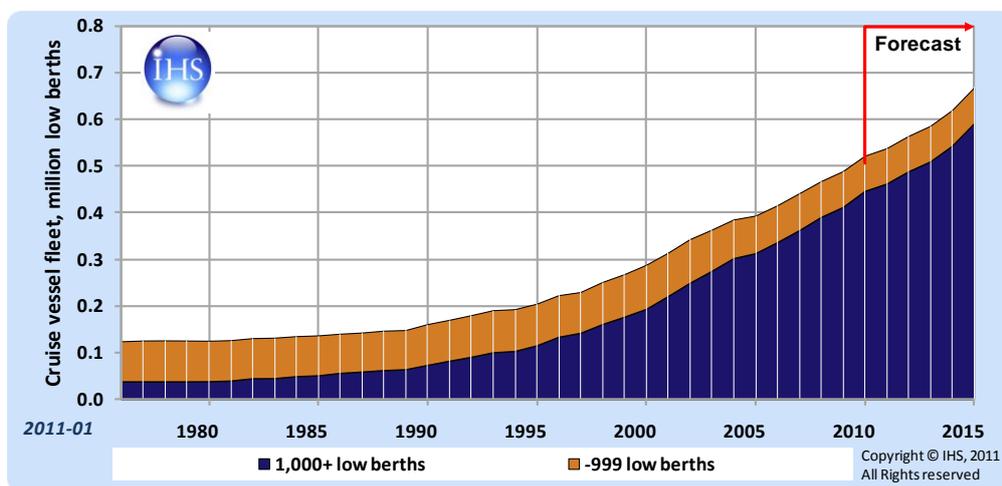


Figure 39: Cruise fleet, M lower berths

In the report period, 11,514 calls by cruise vessels were registered in the EEA. Of these, 65% (7,483) were made in countries on the Mediterranean Sea, followed by 2,194 calls in countries on the North Sea and 1,317 in countries on the Baltic Sea.

Vessels larger than 50,000gt accounted for 47% of calls, vessels in the 20,000-50,000gt size segment for 27% and in 2,000-20,000gt size segment for 21%. The average age of the vessels was 15.5 years.

The duration of calls were generally much higher in the Mediterranean and North Sea ports than in the Baltic Sea area. The average duration time in the entire EEA was 28 hours. Some cruise vessels often visit places that do not have ports that are large enough for them to call at and are instead tendering passengers ashore. The regional cruise hubs, where changes of passengers take place, are normally larger cities with adequate port and airport facilities. The average call duration in these ports is generally much higher than in other ports.

Of the calls, 85% were made by vessels arriving from, or leaving for, another EEA port, 10% arriving from or leaving for a Mediterranean/Black Sea port, 2% arriving from or leaving for Russia (Baltic) and another 3% to and from other countries outside the EEA.

Table 31: Top 20 port calls, cruise ships

Port Name	Country Code	Calls	Dwt ('000)	Gt ('000)	Avg Duration, h	Avg Age, yrs	Share of total portcalls:									
							From EEA	Next EEA	From EU	Next EU	From Russia	Next Russia	From Med/Black Sea			
Civitavecchia	I	792	5 457	54 540	17	12.5	95%	93%	95%	93%						4%
Barcelona	E	727	5 630	55 672	16	11.9	93%	90%	93%	90%						6%
Piraeus	GR	713	3 596	34 075	40	16.9	60%	65%	60%	65%						35%
Naples	I	530	4 163	40 871	12	12.3	94%	94%	94%	94%						6%
Venice	I	479	3 039	29 923	26	11.9	55%	52%	55%	52%						45%
Livorno	I	438	2 882	27 930	17	14.5	92%	92%	92%	92%						8%
Palma	E	390	2 859	27 607	14	11.2	94%	94%	94%	94%						6%
Copenhagen	DK	304	1 850	18 044	14	11.9	94%	95%	71%	77%	5%		4%			
Marseille	F	303	2 084	18 627	56	17.2	93%	88%	93%	88%						6%
St Petersburg (Russia)	RU	301	1 658	15 701	40	14.9	98%	98%	98%	97%	1%		1%			
Southampton	GB	283	2 377	23 449	16	12.9	81%	74%	72%	64%						6%
Lisbon	P	263	1 506	14 445	45	16.6	71%	79%	71%	79%						11%
Bergen	N	246	1 247	10 602	12	19.5	97%	94%	58%	66%						
Valletta	MLT	246	1 623	15 486	12	13.1	81%	92%	81%	92%						17%
Tallinn	EST	243	1 409	13 507	9	13.5	56%	46%	56%	42%	44%		54%			
Helsinki	SF	239	1 289	11 718	12	16.3	47%	57%	46%	56%	53%		43%			
Genoa	I	228	1 845	17 685	43	13.2	93%	91%	93%	91%						5%
Malaga	E	221	1 421	13 739	12	12.8	66%	69%	66%	69%						15%
Limassol	CY	214	804	5 485	53	30.5	56%	57%	56%	57%						28%
Cadiz	E	205	984	8 690	21	11.0	80%	82%	80%	82%						10%
Other	OTH	4 149	20 744	183 118	36	17.9	90%	90%	81%	81%	1%		1%			6%
		11 514	68 466	640 915	28	15.5	84%	85%	80%	80%	3%		3%			10%

Of all cruise ship calls, 64% were made in the 20 largest ports or 71% measured in gt. Four of the seven largest ports are Italian, two are Spanish and one Greek. This underlines the importance of the Mediterranean countries in international cruise vessel traffic, followed by ports in the Baltic Sea area.

The top three cruise ports registered an average number of two calls by cruise vessels each day during the report period.

The average age of the cruise vessels calling at the 20 largest ports was 14.7 years and the average age of the others 17.9 years. The only exception was Limassol, with an average of 30.5 years.

- **A carbon fee for shipping activities could lead to cruise operators changing their itineraries and locating ships in other areas of the world. However, many of the cruise passengers in Europe are cruising in order to visit the destination (ie sightseeing), making this rerouting option limited.**

## Yachts

At the end of 2010, the fleet of yachts stood at 1,509, which was 115 more than at the start of the year. Deliveries in the next five years will clearly be lower than in the previous five, which means that fleet growth will slow down to 4.2% on average/year.

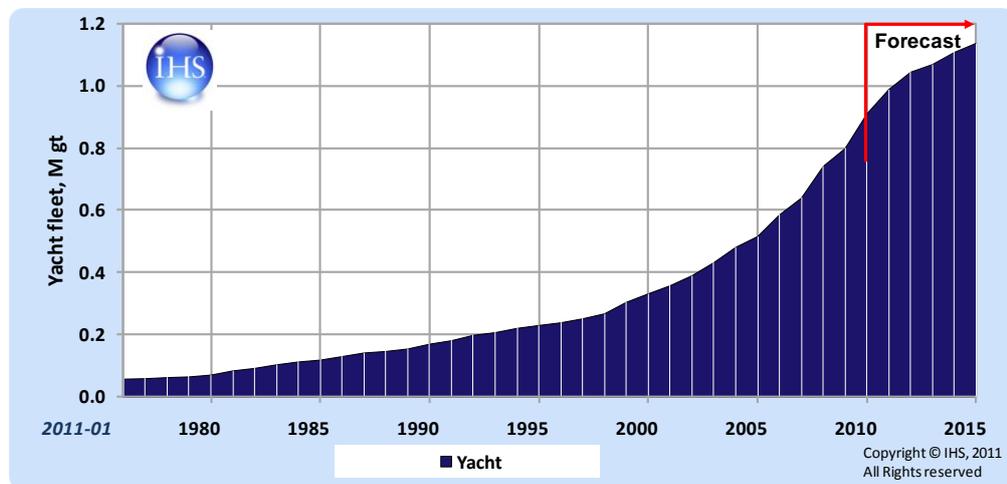


Figure 40: Yacht fleet, M gt

The yacht market is very small, with an extremely low concentration on the operational side. Even the largest company only has a fraction (under 3%) of the total fleet of yachts. Traditionally, yacht owners ran them on their own.

Last year, 3,300 port calls were registered by yachts in the EEA. Of these, 92% were 2,000gt or smaller.

One-third of all calls by yachts were made in Italy during the report period. Spain and France together accounted for another third of the calls. In the

North Sea area, Germany registered around 200 calls and Sweden, the UK and the Netherlands registered around 100 calls each.

Most yachts enter specialised leisure boat marinas that offer services for this vessel type. Since call duration is on average 374 hours and the yachts are connected to local grids and systems for electricity and water supply, few additional measures can be implemented to improve environmental indices.

## Offshore

In this report the offshore sector is made up of both support and drilling ships. Drilling platforms are also included in the drilling segment.

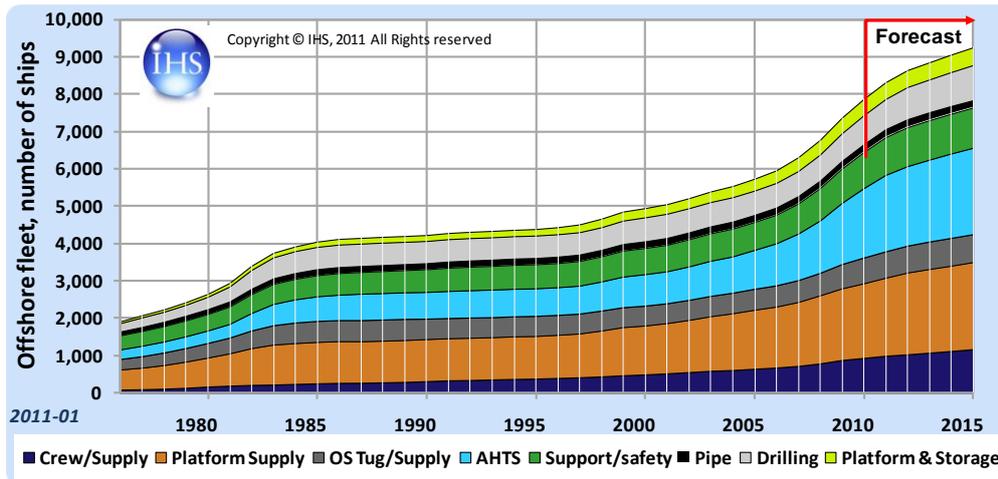


Figure 41: Offshore fleet, number of vessels

The fleet of offshore service vessels has grown rapidly in the past five years and is expected to continue to grow at a high rate in the next five.

In the report period, offshore vessels made 18,860 calls in the EEA. The UK is by far the largest hub for offshore traffic, with 43% of all calls in the EEA, followed by Norway with 22%, the Netherlands 14% and Denmark 6%.

Less than 4% of the calls were made by vessels arriving from, or leaving for, a country outside the EEA.

Offshore vessels are generally small compared to cargo-carrying vessels. Of the calls, 65% were made by vessels in the 2,000-10,000gt size segment and 28% in the 400-2,000gt size segment. The fleet is young, with the average age of the vessels calling 12.2 years.

Average call duration time was 93 hours but in the most frequently visited ports the average duration time was lower. In the UK and Norway, the average duration time was 60 hours.

- **The land organisation supporting offshore activities leaves very few options for offshore operators to change hub ports regardless of charges for carbon.**

## Service

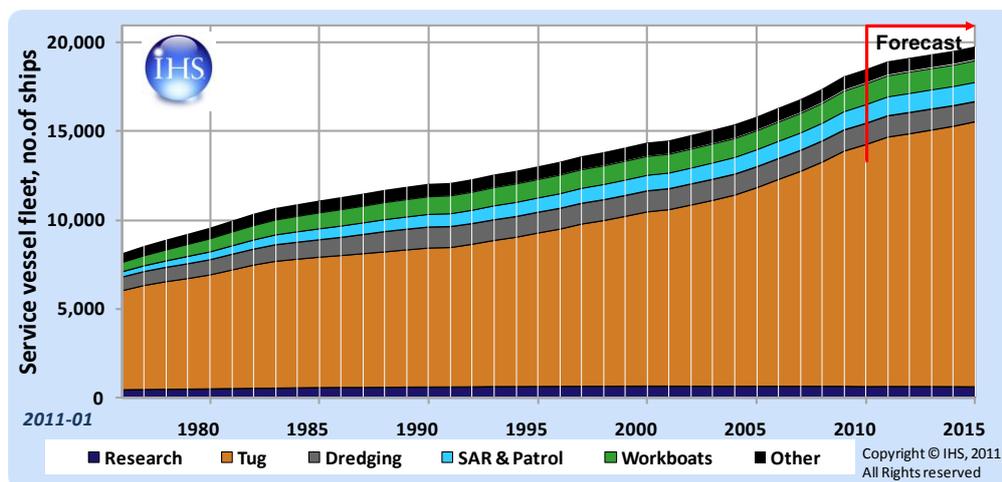


Figure 42: Service vessels, number of vessels

In the next five years, deliveries in the service sector will be fewer than in the previous five. Even though deliveries will decline, the forecast for the service fleet is still positive and stands at a total growth of 7.5% for the next five years.

Almost 40,000 calls were made by service vessels in the report period, of which tugs represented the overwhelming majority.

The average age of the tugs was 18 years.

- **Since tugs operate in local markets from their own terminal, placed near the mouth of the ports, their option to call at other ports depends entirely on where their clients operate. If the clients move, service providers will follow and thus carbon leakage could occur – but this will be very limited in extent.**



## Domestic

- Domestic calls are to a large extent dominated by ferries and port related activities that are performed by vessels in the service segment.
- For cargo carriers domestic calls are more common in the smaller ship size segments.
- A significant number of smaller general cargo and container ships are involved in part loading and discharging cargo by calling several ports in a region. These cargoes are transhipped to long haul carriers in hub ports.

In general, domestic calls mean that cargoes or passengers are transported between ports in the same country. In the following figures we have documented the movement of ships between ports. If the previous port was located in the same country as the current port then the current call is defined as a domestic call. From this it does not follow that cargo need to have been transported between these two ports.

Many container feeder vessels go to several ports one after the other in one country without transporting anything between those ports. The ports themselves are operation areas for certain types of vessels, such as service vessels, tugs and a large number of small ferries. Other ferries, offshore vessels and yachts call at specialised terminals or marinas rather than at regular ports.

For that reason, these vessel types are not included in the tables below describing the number of calls by vessels that had previously called at another domestic port.

**Table 32: Port calls in the EEA with the previous port being in the same country, domestic**

Type	IRL	GB	DK	S	SF	EST	LAT	LIT	PL	D	NL	B	F	E	P	I	GR	CY	MLT	BG	R	SLO	IS	N	RU	TOT		
01 Oil Tanker	142	3 194	237	843	32	545	50			290	920	309	185	417	347	65	339	1 646	41	736	139	10		12	236	8	10 743	
02 Chemical Tanker	23	1 600	414	759	848	36	24	2	17	665	3 273	250	2 187	1 442	499	1 353	1 643	13	182	9	28			13	567	5	15 852	
03 LPG	11	199	8	38	5					6	198	27	77	174	101	471	113									133	1 561	
04 LNG	6										1					2										6	15	
05 Other Tanker	15	24	22	28			2			3	2 107	18	7	55	1	380	96	1				1					6	768
06 Bulker	12	225	242	368	74	3	5	2	38	68	182	17	48	520	144	294	89				4	13	4	3	270	9	2 634	
07 General Cargo	89	4 241	1 029	1 078	909	114	64	1	220	1 859	2 629	381	399	1 873	389	1 338	354	53	6	67	56	6	69	771	49	18 044		
08 Other Dry	12	22	5	11	1				2	9	105	15	29	42	4	97	1				3			6	21	6	391	
09 Container	291	791	130	371	542				264	1 347	2 163	110	574	2 782	684	2 721	204	4	16	43				158	255	3	13 453	
10 Vehicle		125	3	28	30					259	4	122	32	233		96										9	1 942	
11 Roro	12	597	13	336	563	2			5	136	183	67	87	247	38	1 374	146	20				1		1	104	38	3 970	
13 Cruise	39	79	12	15	33				2	120	34		42	710	32	1 354	107	31				1				92	2 703	
<b>Total</b>	<b>619</b>	<b>11 084</b>	<b>2 134</b>	<b>3 863</b>	<b>3 075</b>	<b>701</b>	<b>145</b>	<b>5</b>	<b>841</b>	<b>5 391</b>	<b>9 188</b>	<b>1 192</b>	<b>3 899</b>	<b>8 425</b>	<b>1 957</b>	<b>9 819</b>	<b>4 399</b>	<b>163</b>	<b>940</b>	<b>265</b>	<b>110</b>	<b>10</b>	<b>262</b>	<b>2 470</b>	<b>119</b>	<b>71 076</b>		
12 Ferry	4 116	55 048	37 133	23 220	8 337	2 883	500	74	2 027	15 181	4 500	145	8 594	37 598	1 925	68 085	23 530	6	436	32	119	1	1 138	43 500	119	338 247		
14 Yacht	0	42	13	95	23	0	0	0	0	152	70	0	120	399	5	489	36	5	17	0	2	0	0	0	24	0	1 492	
15 Offshore	65	7 557	856	98	51	2	1	1	152	144	2 179	47	67	255	1	841	29	48	131	1	254	0	2	3 705	1	16 488		
16 Service	170	7 499	2 137	1 837	703	279	143	160	407	3 863	6 335	819	1 315	2 498	136	1 650	1 048	76	207	26	112	6	34	1 944	151	33 555		

Table 32 shows that general cargo vessels, oil and chemical tankers and container carriers dominate the number of calls made by vessels previously calling at a domestic port. Of the total number of domestic calls, 83% were made in Great Britain, the Netherlands, Italy, Spain, Germany and Greece, France Sweden and Finland.

Table 33: Share of port calls in the EEA with the previous port being in the same country, domestic

Type	IRL	GB	DK	S	SF	EST	LAT	LIT	PL	D	NL	B	F	E	P	I	GR	CY	MLT	BG	R	SLO	IS	N	RU	TOT
01 Oil Tanker	35%	55%	30%	49%	19%	65%	15%	0%	48%	58%	13%	22%	27%	30%	23%	20%	50%	20%	66%	45%	6%	0%	28%	24%	3%	40%
02 Chemical Tanker	4%	22%	21%	20%	40%	6%	3%	1%	3%	24%	29%	7%	33%	28%	40%	25%	48%	11%	25%	3%	7%	0%	21%	27%	1%	26%
03 LPG	11%	9%	8%	9%	6%	0%	0%	0%	0%	1%	13%	3%	7%	20%	23%	35%	30%	0%	0%	0%	0%	0%	0%	15%	0%	14%
04 LNG		3%		0%	0%					0%	11%	0%	0%	0%	0%	4%	0%								17%	1%
05 Other Tanker	0%	4%	14%	17%	23%	0%	15%	0%	6%	2%	21%	21%	9%	24%	3%	48%	60%	6%	0%	0%	8%		0%	4%	0%	25%
06 Bulker	7%	14%	35%	49%	22%	3%	1%	1%	8%	5%	8%	2%	4%	27%	26%	16%	13%	0%	0%	2%	3%	2%	4%	39%	2%	15%
07 General Cargo	6%	26%	20%	14%	20%	9%	2%	0%	7%	21%	20%	7%	7%	18%	13%	19%	14%	8%	1%	4%	2%	1%	20%	19%	2%	16%
08 Other Dry	0%	2%	16%	5%	38%	4%	0%	0%	1%	3%	13%	3%	12%	9%	3%	17%	1%	0%	0%	8%	0%	0%	17%	8%	1%	7%
09 Container	24%	12%	11%	18%	35%	0%	0%	0%	22%	17%	23%	2%	14%	29%	31%	37%	15%	1%	1%	17%	0%	0%	50%	28%	0%	20%
10 Vehicle	0%	6%	4%	6%	15%	0%	0%	0%	0%	14%	1%	7%	4%	14%	0%	14%	0%	0%	0%	0%	0%	0%	0%	9%	1%	8%
11 Roro	3%	9%	3%	17%	26%	2%	0%	0%	4%	10%	6%	2%	7%	15%	27%	44%	21%	8%	0%	0%	4%	0%	50%	18%	17%	14%
13 Cruise	29%	11%	3%	8%	11%	0%	0%	0%	2%	21%	18%	0%	7%	35%	10%	43%	12%	12%	0%	0%	2%	0%	0%	19%	0%	23%
<b>Total</b>	<b>13%</b>	<b>22%</b>	<b>20%</b>	<b>20%</b>	<b>26%</b>	<b>20%</b>	<b>3%</b>	<b>0%</b>	<b>13%</b>	<b>20%</b>	<b>21%</b>	<b>5%</b>	<b>17%</b>	<b>24%</b>	<b>23%</b>	<b>30%</b>	<b>32%</b>	<b>7%</b>	<b>21%</b>	<b>9%</b>	<b>2%</b>	<b>1%</b>	<b>27%</b>	<b>22%</b>	<b>2%</b>	<b>20%</b>

Among the 25 countries, the share of domestic calls relative to the total number of port calls was 20%. It was highest for oil tankers, with 40% of the total number of calls, followed by chemical tankers, ‘other tankers’ and container carriers, and lowest for LNG, vehicle carriers and ‘other dry cargo’ vessels.

The share of domestic calls relative to the total number of port calls was highest in Greece and Italy, where they represented 30% or more of the total number of calls. In the remaining countries (except for Romania, Slovenia, Cyprus, France, Belgium, Poland, Latvia, Lithuania and Ireland), the share of domestic calls was between 20% and 29% of the total number of calls.

The share of domestic calls is relatively higher among the smaller size vessels (-20,000gt) than among the larger ones. Out of the 71,076 calls, 87% (62,049) were made by smaller vessels.

Table 34: Share of domestic port calls in the EEA, ships smaller than 20,000gt

Type	IRL	GB	DK	S	SF	EST	LAT	LIT	PL	D	NL	B	F	E	P	I	GR	CY	MLT	BG	R	SLO	IS	N	RU	TOT
01 Oil Tanker	39%	73%	32%	57%	32%	85%	24%	0%	59%	74%	22%	31%	67%	47%	45%	65%	54%	20%	71%	67%	8%	0%	29%	43%	19%	59%
02 Chemical Tanker	4%	23%	22%	21%	40%	8%	4%	0%	3%	25%	30%	7%	36%	31%	44%	29%	52%	3%	35%	4%	7%	0%	22%	29%	1%	28%
03 LPG	11%	9%	8%	10%	7%	0%	0%	0%	0%	1%	13%	3%	8%	20%	23%	35%	30%	0%	0%	0%	0%	0%	0%	16%	0%	14%
04 LNG		0%		0%	0%					0%	11%	0%	0%	0%	0%	0%	0%								17%	9%
05 Other Tanker	0%	4%	14%	17%	23%	0%	15%	0%	6%	2%	21%	9%	9%	24%	3%	48%	60%	6%	0%	0%	8%		0%	4%	0%	25%
06 Bulker	8%	20%	39%	53%	27%	4%	2%	1%	8%	4%	10%	2%	5%	36%	38%	18%	12%	0%	0%	2%	4%	3%	4%	41%	2%	21%
07 General Cargo	6%	26%	20%	14%	20%	9%	2%	0%	7%	22%	20%	7%	7%	18%	13%	18%	14%	8%	1%	4%	2%	1%	21%	20%	2%	16%
08 Other Dry	0%	2%	16%	5%	38%	4%	0%	0%	2%	3%	13%	3%	12%	9%	3%	17%	1%	0%	0%	8%	0%	0%	17%	8%	1%	7%
09 Container	24%	21%	12%	17%	33%	0%	0%	0%	24%	25%	32%	4%	20%	35%	36%	36%	19%	1%	1%	18%	0%	0%	50%	29%	0%	25%
10 Vehicle	0%	11%	10%	3%	12%	0%				0%	10%	2%	0%	6%	17%	0%	7%	0%						9%	0%	9%
11 Roro	4%	14%	2%	8%	26%	4%	0%	0%	5%	17%	9%	4%	8%	16%	7%	58%	25%	6%	0%	0%	4%	0%	50%	20%	0%	20%
13 Cruise	28%	18%	15%	14%	26%	0%	0%	0%	4%	42%	39%	0%	13%	42%	25%	32%	19%	18%	0%	0%	3%	0%	0%	19%	0%	24%
<b>Total</b>	<b>14%</b>	<b>27%</b>	<b>21%</b>	<b>21%</b>	<b>27%</b>	<b>25%</b>	<b>3%</b>	<b>0%</b>	<b>14%</b>	<b>24%</b>	<b>24%</b>	<b>7%</b>	<b>21%</b>	<b>25%</b>	<b>26%</b>	<b>31%</b>	<b>36%</b>	<b>8%</b>	<b>29%</b>	<b>10%</b>	<b>3%</b>	<b>1%</b>	<b>30%</b>	<b>24%</b>	<b>2%</b>	<b>23%</b>

Domestic calls represented 23% of the total number of port calls within this size category of vessels but only 11% of the total number of calls in the 20,000+ dwt size segment.

The biggest difference between the two size categories was registered for tankers, dry bulkers, ro-ro and container vessels.

Domestic calls by oil tankers were dominated by small bunker fuel tankers serving other merchant vessels.

Small chemical tankers generally dominate the total chemical trade and small dry bulkers the dry bulk trade, and thus also the domestic calls.

Domestic calls by ro-ros and container carriers are also dominated by smaller vessels, while calls by gas tankers, vehicle carriers and cruise vessels are dominated by large vessels.

**Table 35: Share of domestic port calls in the EEA, ships larger than 20,000gt**

Type	IRL	GB	DK	S	SF	EST	LAT	LIT	PL	D	NL	B	F	E	P	I	GR	CY	MLT	BG	R	SLO	IS	N	RU	TOT
01 Oil Tanker	0%	8%	25%	1%	16%	0%	0%	0%	1%	1%	10%	0%	1%	6%	1%	3%	3%	17%	13%	0%	0%	0%	0%	3%	0%	6%
02 Chemical Tanker	0%	4%	3%	4%	0%	1%	0%	1%	0%	3%	24%	0%	7%	18%	4%	12%	11%	33%	9%	0%	3%	0%	0%	4%	0%	12%
03 LPG	19%			0%	0%	0%	0%			0%	11%	0%	5%	23%	0%	0%	0%							12%		10%
04 LNG	4%												0%	0%	0%	0%	4%	0%	0%	0%						1%
05 Other Tanker										0%	0%	39%			0%											25%
06 Bulker	7%	5%	5%	14%	4%	2%	0%	1%	9%	6%	8%	2%	4%	12%	1%	12%	16%	0%	0%	0%	1%	0%	8%	0%	0%	6%
07 General Cargo	20%	1%	0%	19%	25%	0%	0%	0%	6%	5%	12%	5%	1%	13%	5%	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%
08 Other Dry		6%							0%	0%	15%	0%	6%		0%				0%	0%						6%
09 Container	1%	0%	25%	56%	0%	0%	0%	0%	6%	1%	1%	11%	22%	4%	38%	8%	0%	1%	0%	0%	0%	0%	0%	0%	0%	12%
10 Vehicle	0%	1%	2%	7%	16%	0%	0%	0%	0%	15%	1%	9%	2%	13%	0%	14%	0%	0%	0%	0%	0%	0%	0%	14%	1%	8%
11 Roro	0%	5%	4%	19%	25%	0%		0%	0%	4%	2%	1%	2%	13%	36%	9%	1%	10%	0%	0%	0%	0%	4%	37%	8%	
13 Cruise	29%	9%	0%	5%	5%	0%	0%	0%	4%	2%	0%	5%	33%	4%	46%	8%	0%	0%	0%	0%	0%	0%	0%	18%	0%	23%
<b>Total</b>	<b>8%</b>	<b>4%</b>	<b>7%</b>	<b>14%</b>	<b>23%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>3%</b>	<b>7%</b>	<b>9%</b>	<b>3%</b>	<b>7%</b>	<b>20%</b>	<b>5%</b>	<b>27%</b>	<b>7%</b>	<b>4%</b>	<b>3%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>	<b>1%</b>	<b>9%</b>	<b>3%</b>	<b>11%</b>

Great Britain, the Netherlands, Italy and Spain dominated domestic calls by smaller vessels, each with 10% of the total number, while Italy, Spain and the Netherlands were the largest countries in number of calls by 20,000+ dwt vessels.

In percentage terms, of the total number of domestic calls made by 20,000+ dwt vessels, Sweden, Finland, Spain and Italy were above average, while calls by <20,000dwt vessels were above average for Great Britain, Finland, Estonia, Germany, the Netherlands, Spain, Portugal, Italy, Greece, Malta, Iceland and Norway .

The difference between the two groups reflects differences in trade patterns.

## Frequency of ship visits

Table 36 illustrates that most ships visit the EEA many times in a year. The columns show the share of all calls made by ships that returned once, two to six times etc in a year.

The ferry sector is, of course, extreme with almost 100% of the ferries calling here more than 25 times. Yet, several other vessel types had a high frequency of calls.

Table 36: Frequency of port calls in the EEA area

Percentage of calls							Percentage of calls						
Vessel Type	1	2-6	7-12	13-24	25+	Total	Vessel Type	1	2-6	7-12	13-24	25+	Total
<b>01 Oil Tanker</b>	1%	8%	7%	12%	73%	100%	<b>09 Container</b>	0%	2%	4%	13%	81%	100%
A 50'+ gt	2%	16%	16%	29%	37%	100%	A 50'+ gt	0%	5%	11%	42%	42%	100%
B 20'-50' gt	3%	34%	21%	23%	19%	100%	B 20'-50' gt	0%	3%	6%	17%	74%	100%
C 10'-20' gt	2%	7%	10%	28%	52%	100%	C 10'-20' gt	0%	1%	1%	7%	90%	100%
D 2'-10' gt	0%	1%	1%	3%	95%	100%	D 2'-10' gt	0%	0%	1%	3%	96%	100%
E 400-2' gt	0%	1%	1%	3%	95%	100%	<b>10 Vehicle</b>	0%	3%	9%	14%	73%	100%
F 100-400 gt	0%	1%	1%	4%	94%	100%	A 50'+ gt	0%	6%	18%	35%	40%	100%
<b>02 Chemical Tanker</b>	0%	4%	5%	9%	82%	100%	B 20'-50' gt	0%	3%	7%	5%	85%	100%
A 50'+ gt	0%	36%	64%	0%	0%	100%	C 10'-20' gt	0%	0%	0%	0%	100%	100%
B 20'-50' gt	1%	15%	19%	27%	37%	100%	D 2'-10' gt	0%	0%	1%	1%	98%	100%
C 10'-20' gt	0%	5%	8%	10%	77%	100%	<b>11 Roro</b>	0%	1%	1%	4%	94%	100%
D 2'-10' gt	0%	1%	2%	5%	92%	100%	A 50'+ gt	0%	0%	0%	0%	100%	100%
E 400-2' gt	0%	1%	3%	3%	94%	100%	B 20'-50' gt	0%	0%	0%	4%	95%	100%
<b>03 LPG</b>	0%	2%	3%	8%	86%	100%	C 10'-20' gt	0%	0%	1%	3%	96%	100%
B 20'-50' gt	2%	13%	25%	19%	42%	100%	D 2'-10' gt	0%	2%	3%	6%	88%	100%
C 10'-20' gt	1%	8%	3%	28%	60%	100%	E 400-2' gt	1%	1%	10%	17%	72%	100%
D 2'-10' gt	0%	1%	1%	6%	91%	100%	F 100-400 gt	33%	67%	0%	0%	0%	100%
E 400-2' gt	0%	0%	0%	3%	97%	100%	<b>12 Ferry</b>	0%	0%	0%	0%	99%	100%
F 100-400 gt	0%	20%	80%	0%	0%	100%	A 50'+ gt	0%	0%	0%	0%	100%	100%
<b>04 LNG</b>	3%	26%	24%	16%	31%	100%	B 20'-50' gt	0%	0%	0%	0%	100%	100%
A 50'+ gt	5%	37%	34%	19%	6%	100%	C 10'-20' gt	0%	0%	0%	0%	100%	100%
B 20'-50' gt	0%	2%	4%	14%	80%	100%	D 2'-10' gt	0%	0%	0%	0%	100%	100%
C 10'-20' gt	100%	0%	0%	0%	0%	100%	E 400-2' gt	0%	0%	0%	0%	99%	100%
D 2'-10' gt	0%	0%	0%	0%	100%	100%	F 100-400 gt	0%	0%	0%	1%	99%	100%
E 400-2' gt	0%	100%	0%	0%	0%	100%	<b>13 Cruise</b>	0%	1%	1%	4%	94%	100%
F 100-400 gt	0%	9%	24%	67%	0%	100%	A 50'+ gt	0%	0%	0%	1%	98%	100%
<b>05 Other Tanker</b>	0%	2%	4%	7%	87%	100%	B 20'-50' gt	0%	0%	1%	2%	96%	100%
B 20'-50' gt	0%	18%	0%	82%	0%	100%	C 10'-20' gt	0%	0%	1%	6%	93%	100%
C 10'-20' gt	0%	23%	78%	0%	0%	100%	D 2'-10' gt	0%	2%	2%	16%	80%	100%
D 2'-10' gt	0%	1%	4%	9%	85%	100%	E 400-2' gt	1%	11%	8%	7%	74%	100%
E 400-2' gt	0%	1%	2%	2%	95%	100%	F 100-400 gt	0%	1%	8%	7%	84%	100%
F 100-400 gt	0%	9%	24%	67%	0%	100%	<b>14 Yacht</b>	3%	39%	31%	12%	14%	100%
<b>06 Bulker</b>	4%	28%	18%	11%	38%	100%	C 10'-20' gt	0%	100%	0%	0%	0%	100%
A 50'+ gt	8%	54%	22%	6%	10%	100%	D 2'-10' gt	2%	38%	34%	26%	0%	100%
B 20'-50' gt	6%	50%	27%	12%	5%	100%	E 400-2' gt	3%	44%	35%	11%	7%	100%
C 10'-20' gt	3%	33%	27%	15%	23%	100%	F 100-400 gt	4%	32%	24%	11%	29%	100%
D 2'-10' gt	1%	4%	8%	11%	77%	100%	<b>15 Offshore</b>	1%	5%	9%	19%	66%	100%
E 400-2' gt	0%	0%	1%	5%	94%	100%	A 50'+ gt	42%	58%	0%	0%	0%	100%
F 100-400 gt	1%	0%	7%	9%	83%	100%	B 20'-50' gt	12%	88%	0%	0%	0%	100%
<b>07 General Cargo</b>	0%	4%	6%	11%	79%	100%	C 10'-20' gt	3%	23%	25%	26%	23%	100%
B 20'-50' gt	2%	24%	34%	32%	8%	100%	D 2'-10' gt	0%	3%	4%	13%	78%	100%
C 10'-20' gt	1%	17%	19%	25%	37%	100%	E 400-2' gt	1%	6%	17%	30%	46%	100%
D 2'-10' gt	0%	4%	6%	11%	80%	100%	F 100-400 gt	1%	13%	19%	33%	33%	100%
E 400-2' gt	0%	2%	4%	8%	85%	100%	<b>16 Service</b>	0%	4%	6%	16%	74%	100%
F 100-400 gt	1%	5%	10%	22%	63%	100%	B 20'-50' gt	0%	34%	66%	0%	0%	100%
<b>08 Other Dry</b>	1%	18%	17%	21%	43%	100%	C 10'-20' gt	1%	8%	19%	36%	36%	100%
B 20'-50' gt	14%	27%	0%	59%	0%	100%	D 2'-10' gt	0%	3%	5%	11%	81%	100%
C 10'-20' gt	0%	11%	18%	30%	40%	100%	E 400-2' gt	0%	4%	6%	16%	74%	100%
D 2'-10' gt	2%	25%	15%	12%	46%	100%	F 100-400 gt	1%	4%	6%	17%	73%	100%
E 400-2' gt	1%	6%	32%	24%	38%	100%	<b>Grand Total</b>	0%	2%	3%	6%	89%	100%
F 100-400 gt	0%	0%	0%	100%	0%	100%							

Smaller ships generally had a higher frequency than larger. Ferries and cruise ships form the exception to this.

Large cargo carriers such as dry bulk carriers or tankers tend to have fewer port calls per vessel per year. These vessels are to a higher degree long distance traders and thus return fewer times per year. Several of them are employed on a cargo by cargo basis (spot traders) and are therefore global traders.

## Ship-to-ship transfer

A ship-to-ship (STS) transfer operation is the transfer of cargo between seagoing ships positioned alongside each other, either at buoys within port areas or at anchorage at sea. Cargoes typically transferred by STS methods include crude oil, liquefied gas (LPG or LNG), bulk cargo and petroleum products.

These operations are carried out in accordance with guidelines set out by the Oil Companies International Marine Forum and the International Chamber of Shipping with the strictest adherence to safety regulations.

In accordance with MEPC186(59), vessels transferring oil cargo must have an approved STS operational manual that describes the procedure. These manuals should be available on board not later than the first annual, intermediate or special survey after 1 January 2011. These manuals can be prepared either by the shipping company or external consultants.

Compared to STS at sea, STS at buoys/dolphins within port areas has many advantages. People are not dependent on the weather and can work continually. This saves time and provides performance guarantees, which are important factors for the trade sector. Added to this, every facility and form of service is immediately on hand in the port and incidents can be better dealt with and more quickly. Partly in connection with incident control, the rules on transfers at sea are being regulated with increasing stringency.

There are no comprehensive statistics about STS operations in Europe but it seems as if most of the operations are made at buoys/dolphins within port areas. STS operations can be carried out with both dry and liquid bulk, although liquid bulk is more common. Volumes are increasing and ports are investing to be able to handle more cargo. The phenomenon is also seen in more and more ports. Recently, the first STS operation was carried out in the Port of Gothenburg.

The Port Authority of Rotterdam has invested about €15M in four berths at dolphins in the Caland Canal for secure STS transfer. The berths were inaugurated in May 2011. Ships with a length of 70-380m will be able to make STS transfers of liquid and dry bulk in virtually all conditions. The length and depth, up to almost 23m, are sufficient to accommodate the largest vessels in the world. There is a lot of interest in the public berths as an addition to the terminals and an alternative to the difficult process of STS transfer at sea.

The STS market is driven by optimisation of the supply chain – similar to the container market when cargo at hub ports is reloaded to larger mother vessels. Optimisation could also be carried out to build up larger loads of cargo to minimise the use of ice-classed tonnage. Another force for STS is market expectations that crude oil prices in the future will be higher than

today. STS operations give cargo traders greater flexibility. They can use the ships as floating storage units and quickly transfer the cargo to where there is demand. It is not necessary to pay for storage facilities on shore. Sailing one VLCC clearly costs less in energy than if you transport the same amount of oil in two to three smaller tankers. Dry bulk vessels also use STS operations. This could be because, when fully loaded, they have too deep a draught to call directly at other ports in northwest Europe. They can transfer part of their cargo from the mother vessel to smaller freight barges and coasters.

In Europe, STS transfer operations are made outside the Orkney Islands, Shetland and Nigg Bay (Scotland, UK) Southwold (eastern UK), Skaw area (Frederikshavn, Kalundborg and Stigsnaes, Denmark), Mongstad (Norway) and Rotterdam (Netherlands), among other places. Transhipments made outside Denmark are mainly oil from Primorsk in Russia that arrives in smaller vessels and is reloaded to VLCCs.

**Table 37: Ship-to-ship transfers**

Area	Type of cargo	Number of transfer operations					1000 tonnes					
		2005	2006	2007	2008	2009	2005	2006	2007	2008	2009	2010
Scapa Flow (north Scotland coast)	Oil	17	8	7	10	27	1,747	994	9,930	582	2,599	
Sullom Voe (west Shetland)	Oil	3	1	0	1	5	285	138	0	59	298	
Nigg (Moray Firth)	Oil	14	11	16	12	14	1,201	853	1,246	970	1,016	
<b>Total Scotland</b>		<b>34</b>	<b>20</b>	<b>23</b>	<b>23</b>	<b>46</b>	<b>3,233</b>	<b>1,985</b>	<b>11,176</b>	<b>1,611</b>	<b>3,913</b>	
Denmark	Liquid bulk										9,000	5,500
Port of Rotterdam	Liquid & dry bulk							9,500	10,600	15,800	13,500	14,600

## Alternative ports

- Diversion of traffic is likely to concern transshipment rather than import/export traffic.
- Containerised trade is believed to be most exposed to traffic diversion options.
- For local traffic there are only a limited number of realistic options.
- In the longer term could higher cost levels have a negative impact on industrial allocation decisions and could thereby lead to carbon leakage.

In this section the aim is to identify non-EEA ports that are likely to be used as alternatives to avoid any EEA policy measures by rerouting.

The analyses have been made against a background of the port calls and cargo analyses performed both in the OPTIMAR study of 2008, the update from 2010 and in the sections above. Other factors that have been considered are proximity, port capacity, hinterland connections, connections (road, rail, inland waterways and transshipment to other ships) to the EU and costs.

Diversion of traffic from EEA ports to non-EEA ports as a result of the introduction of carbon charges on shipping activities is likely to concern transshipment rather than import/export traffic.

For local traffic to be diverted, the cargo will need to be brought to its ultimate destination by some land mode, meaning there are only a limited number of realistic options. For example, traffic via the ports of Thessaloniki or Igoumenitsa to northern Greece or Epirus could conceivably switch to the Albanian port of Durres, but the likelihood of that happening is lower than of transshipment traffic switching from a major EEA container hub to a non-EEA hub, even if the latter is quite distant from the former.

This means that the sector most likely to be impacted is the container sector, as there are some major EEA container hubs in the Mediterranean and the situation there is fluid. Of course, the potential risk is unknown, for it is clear that factors additional to carbon charges will also have to be weighed up if cargoes switch between ports. These other factors include pricing, infrastructure, hinterland connections, and the political risk situation.

Sectors such as oil, chemical products and dry bulk are less likely to be impacted as port switching would entail the availability of appropriate infrastructure such as storage facilities and hinterland connections including pipelines, which are generally lacking in non-EU countries.

Table 38 shows a complete list of ports that have been assessed for the purpose of identification of potential ports for transshipment of European cargo in order to avoid carbon charges on shipping activities. The inventory identifies 156 ports in 17 countries.



In total, 82,565 port calls were made over the 12-month period. Of these, 39% involved previous calls in an EEA port and the figure is the same for the next port of call.

The most frequent vessel types were ferries and general cargo vessels. Vessel types with a fairly high share of previous calls in the EEA were LNG tankers and ro-ro ships.

Ship types having a high share in the number of calls with an EEA port as the next destination were the same as the above, plus cruise and vehicle ro-ro.

Table 38: Assessment of alternative ports

Country	Port	Country	Port	Country	Port	Country	Port	
AG	Algiers	IR	Bandar Anzali	SYR	Banias Terminal	UKR	Tekirdag	
	Annaba		LY		Abu Kammash		Latakia	Toros
	Arzew				Benghazi		Tartous	Trabzon
	Arzew El-Djedid			Bouri	TKM		Turkmanbashi	Tutuncifilik
	Arzew El-Djedid SBMs			Homs			TN	Ashtart Terminal
	Bejaia			Marsa El Brega	Gabes			Zonguldak
	Beni Saf			Mellitah	La Goulette		Belgorod-Dnestrovsky	
	Delys			Qasr Ahmed	Menzel Bourguiba		Berdiansk	
	Djen-Djen	Ras Lanuf		Rades	Chernomorsk			
	Ghazaouet	Rasco Harbour	Sfax	Dneprovsko-Bugsky				
	Jijel	Tobruk	Sousse	Evpatonia				
	Mostaganem	Tripoli (Libya)	Tunis	Feodosia				
	Oran	Zawia Terminal	Zarzis	Ilichevsk				
	Port Methanier	Zuara	TR	Alanya	Izmail			
	Skikda	Zuetina		Aliaga	Kerch			
	Tenes	MA		Ambarli	Kherson			
	AL			Al Hoceima	Bandirma	Mariupol		
				Durres	Casablanca	Bartin	Nikolayev	
Sarande	Jorf Lasfar			Bosporus	Ochakov			
CRO	Kenitra			Botas Natural Gas Terminal	Odessa			
	Dubrovnik			Mohammedia	Cekisan	Oktyabrsk		
Rjeka	Port Nador			Cesme	Sevastopol			
Sibenik	Tangier			Derince	Skadovsk			
Split	Tangier-Mediterranean	Elyaf Pier		Ust-Dunaisk				
ET	Abu Qir	RL		Eregli	Yalta			
	Alexandria (Egypt)			Selaata	Yuzhny			
	Damietta			Sidon				
	East Port Said Bypass			Tripoli (Lebanon)				
	El Dekhella			Tyr				
	Idku			Zahrani Terminal				
Maadiya Port	RU	Astrakhan		Giresun				
Mersa el Hamra		Azov	Gocek					
Port Said		Gelendzhic	Gulluk					
Sidi Kerir Terminal		Kavkaz	Haydarpasa					
GEO		Batumi	Makhachkala	Hopa				
		Ochamchira	Novorossiysk	Inebolu				
		Poti	Olya	Isdemir				
Sukhumi		Rostov-on-Don	Istanbul					
Supsa		Sochi	Izmir					
GIB		Gibraltar	Taganrog	Izmit				
		Ashdod	Temryuk	Martas				
IL		Ashkelon	Tuapse	Mersin				
		Eilat	Yeysk	Ordu				
		Hadera		Rize				
		Haifa		Samsun				
				Sinop				

Below is the first step of the identification of non-EEA ports that could benefit from traffic diverting from EEA ports as a result of carbon charges on shipping activities. The basic criteria have been the proximity of the non-EEA port to major EEA ports, the current infrastructure of the port and its potential development.

**East Mediterranean:** Damietta, Port Said, Port Said East, Beirut, Haifa, Latakia, Ambarli and Izmir could attract traffic away from Piraeus, Limassol, Malta, Gioia Tauro, Taranto and Naples.

**Black Sea:** It is unlikely that traffic will be diverted to a Black Sea non-EEA port as a result of an introduction of carbon charges on shipping activities but it is possible that Novorossiysk, Ilychevsk and Odessa may gain at the expense of Constanta and Burgas.

**Adriatic/Mid Mediterranean:** Durres, Rijeka and Tunis could be alternatives to Igoumenitsa, Thessaloniki, Koper, Trieste, Venice, Ravenna, Malta and Gioia Tauro.

**West Mediterranean:** Tangier, Casablanca and Algiers are likely to gain at the expense of Valencia, Algeciras, Marseille, Genoa and even Malta and Gioia Tauro.

**Baltic Sea:** Kaliningrad could tranship cargo destined for the entire region. Kaliningrad could also handle import and export volumes to and from neighbouring Lithuania and Poland. The whole of central and eastern Europe, including Russia, is within reach for land transport from Kaliningrad. Time-consuming and bureaucratic border crossing procedures are a constraint, however. Ust Luga is another alternative, primarily for Russian cargo but also for Estonian cargo. The St Petersburg terminals are significantly strained for capacity and are focused on handling Russian cargo.

Ports located in EU candidate countries are less likely to attract investment to become alternative ports since EU membership would cancel the benefit of rerouteing.

In summary, assessment of the inventory of potential alternative ports has resulted in the following that could attract traffic:

- Black Sea
  - Odessa in Ukraine
  - Istanbul in Turkey
  - Novorossiysk in Russia
- East Mediterranean
  - Izmir and Ambarli in Turkey
  - Tartous and Latakia in Syria
  - Haifa and Ashdod in Israel
  - Alexandria, East Port Said and Damietta in Egypt
  - Beirut in Lebanon
- Adriatic/Mid Mediterranean
  - Rijeka in Croatia
  - Tunis, Enfidha in Tunisia
- West Mediterranean
  - Tangier in Morocco
  - Algiers in Algeria
- Baltic Sea
  - Kaliningrad and Ust Luga in Russia.

### **Odessa**

Odessa is located in Ukraine on the north shore of the Black Sea, approximately 150km NE of the Romanian border. The port handles raw

sugar, fruits, non-ferrous and ferrous metals, containers, chemical fertilisers, paper and cereals. The total number of calls in Odessa was 1,609. Calls by general cargo vessels were the most common, followed by container vessels, dry bulk vessels and tankers. Of the calls made by vessels coming from the EEA, 132 were general cargo vessels, followed by container vessels (78) and chemical and oil tankers (66 and 65 respectively).

### **Istanbul and ports around**

Port of Istanbul is mainly a cruise and ferry port. Haydarpasa is the main cargo port of Istanbul, on the east side of the south entrance to the Bosphorus. It serves the Istanbul region and a hinterland that is the most industrialised area of Turkey. It is important in that it is the only container port in the Marmara region. The port handles general cargo, containers, dry bulk and ferries. A total of 1,736 calls were made to Haydarpasa. Most of them were by ferries and container vessels.

### **Novorossiysk**

Novorossiysk is situated in Russia in the north of Novorossiysk Bay in the northeastern part of the Black Sea. The port specialises in handling grain, sugar, metal, scrap, mineral fertilisers, refrigerated products, timber and crude oil cargoes. The total number of calls was 3,545. Most of the calls to the port were made by general cargo vessels, followed by dry bulk, oil tankers, chemical tankers and container vessels. Calls from the EEA were mostly made by general cargo vessels (375), oil tankers (299) and chemical tankers. Calls from Novorossiysk to the EEA were mostly made by general cargo vessels (410), oil tankers (308) and chemical tankers (169).

### **Izmir and Ambarli**

Port of Izmir is situated on the west coast, in the Aegean Sea. It is located at an important point between Europe and North Africa, having a wide agricultural and industrial hinterland. Izmir is primarily a discharge port for tankers, also for imports of machinery and semi-processed materials. It is the only container port in the region. The total number of calls was 2,205. Most of the calls were made by container vessels, followed by general cargo vessels and ferries and cruise vessels. Calls made in Izmir from EEA countries were mostly by container vessels (401), general cargo vessels (226) and cruise vessels (112).

Ambarli port is located on the north shores of the sea of Marmara, 34km from Istanbul. The port handles containers, ro-ro cargo and general cargo. The total number of calls was 1,317. Calls from the EEA were mostly made by container vessels (438). Calls to the EEA were also mostly made by container vessels (369).

## **Tartous and Latakia**

Latakia is located approx 40 km south of the Turkish border. It has a large commercial port with modern facilities to handle most types of vessels including container, ro-ro, general cargo, bulk carriers and tankers. Principal exports include crude oil, tobacco, vegetable products, cotton and wool. Imports include manufactured goods, chemical products, vehicles, machinery, food stuffs and timber. The total number of calls was 486. Coming from the EEA, 48 calls were made by container vessels and 20 by general cargo vessels. Going to the EEA, 40 calls were by container vessels and 25 by general cargo vessels.

Tartous lies approximately 35km north of the Lebanese border. It is a major commercial port with facilities for handling various cargoes including containers, bulk minerals, liquids and grain, general and ro-ro traffic. It is also a naval base and tourist centre. The total number of calls was 1,130. A major part of the calls made to and from EEA countries were by general cargo vessels. Vessels going to and coming from the EEA were container and general cargo vessels.

## **Haifa and Ashdod**

The port of Haifa is located in Israel in the south of Haifa Bay. Haifa handles most cargoes and offers a wide range of services. Exports consist of citrus fruits, chemicals, tyres, textiles and machinery. Imports are mainly grain, raw materials, oil and petroleum products. The total number of calls was 1,320. Container and general cargo vessels accounted for the largest share, followed by chemical tankers. Most of the vessels coming from EEA countries were container ships (194), general cargo (125) and chemical tankers (117). Vessels going to the EEA were of the same types.

The Port of Ashdod is one of Israel's two main cargo ports. The port is located in Ashdod, about 40km south of Tel Aviv. The port handles agricultural exports, citrus fruit, timber, metals, pelletised cargo and other bulk cargo. The total number of calls was 1,322. A major part of the calls were made by general cargo and container vessels. Most of the calls coming from the EEA to Ashdod were made by container vessels (191) and general cargo vessels (162).

## **Alexandria, East Port Said and Damietta**

Alexandria is situated on the north coast of Egypt, approximately 220km from Cairo, and is the principal port of Egypt. The port handles containers, general cargo, dry bulk and petroleum. The principal exports are agricultural products, cotton, onions, garlic, rice, groundnuts, citrons, fruit and cotton yarn. The chief imports are agricultural products, tea, grain, coal, coffee, timber, tobacco, industrial products, machinery and motor vehicles. During the report period, 1,710 calls were made. Half of these calls were made by general cargo

vessels. General cargo vessels and container vessels were most common among the vessels coming from the EEA region (351 and 100 calls respectively). Vessels going to the EEA were also to a large extent general cargo (294 calls) and container vessels (79).

The port of Damietta is situated close to the entrance to the Damietta branch of the River Nile, 70km west of Port Said and 250km east of Alexandria. The port handles exports of agricultural products, fertilisers and furniture. Imports include cement, grain, general cargo and containers. The total number of calls was 1,475, with general cargo and container vessels the most common. The largest share of the ships going to and coming from EEA were general cargo and container vessels.

East Port Said (Suez Canal Container Terminal) is a sub-port of Port Said. It has a favourable location east of the northern entrance of the Suez Canal and thanks to that strategic location is considered as a promising hub centre for international trade between Europe and the Far East. The total number of calls was 1,769. Most of them were made by container vessels and general cargo vessels, followed by bulk vessels. Ships coming from the EEA were to a large extent general cargo (195 calls) and container vessels (157 calls). The largest group going to the EEA was container vessels (157 calls).

### **Beirut**

Beirut is the capital and primary port of Lebanon. The port has facilities for handling most types of vessels, including general cargo, containers, bulk carriers and tankers. Principal exports include cereals, fruit, vegetables, wool, cement and other manufactured goods. Imports include industrial and manufactured goods, timber, iron and petroleum products. Of the 1,030 calls made to the port, the largest part were made by container and general cargo vessels. Most of the calls to and from the EEA were made by container and general cargo vessels.

### **Rijeka**

Rijeka is located in the north of the Adriatic Sea. The port handles a wide variety of cargoes including containers, ore, timber, grain, phosphate, crude and refined petroleum products. All types of vessels are handled, including tankers, bulk carriers, container carriers, general cargo, passenger and ro-ro vessels. The port had 550 calls, most of them by general cargo vessels or ferries. Almost all calls going to or coming from the EEA were made by general cargo vessels.

### **Tunis**

Tunis is the capital of Tunisia and the port is located on the western shore of the lake of Tunis. The principal exports are phosphates, iron and lead ores, dates, olive oil and cereals. The principal imports are textiles, hardware,

provisions, iron and steel. The total number of calls during the period was 883, mostly by ferries and container vessels. Most of the traffic from Tunis to the EEA region consisted of ferry traffic to Mediterranean EEA countries. There were also several container vessel calls.

### **Tanger-Med**

Tanger-Med is 35km east of Tangier, near the town of Dalia. Parts of this new deepwater port are under construction and the first part of the container terminal was opened in 2007. It will be capable of receiving oil tankers, bulk carriers, container ships, passenger ro-ro ferries and high-speed craft. Currently large container vessels can be accommodated at two terminals.

### **Algiers**

DP World Djazair, formerly known as Algiers, is the capital and principal port of Algeria. The principal exports are minerals, wine, cork, fruit and vegetables. The main imports are wood, oil, building materials and dairy products. As of 1 October 2009 all non-unitised cargoes have been banned at the port to reduce shipping and road congestion. This means that most of the calls are made by container, general cargo and ro-ro vessels. The total number of calls was 816. Almost all vessels going to and from the EEA were general cargo vessels.

### **Kaliningrad and Ust Luga**

Kaliningrad is situated on the south shores of the Baltic Sea. Import cargoes are fish products, foodstuffs and containerised cargo. Exports are timber, pulp, rolled metal, scrap metal, grain, coal, coke, oil and fertiliser.

The multi-purpose Ust Luga merchant sea port has been constructed in the Luga Bay of the Gulf of Finland. The port handles general cargo, container vessels and tankers. Ust Luga port is being built as a universal port. The multi-purpose terminals and operating zones will provide transshipment services and additional handling of more than 20 categories of cargo. A container terminal is under construction and will be ready for operation in late 2011.

### **Case study 1: North America – Baltic Sea**

Four case studies will be presented in the following. Much of the conclusions drawn from these are applicable on several of the other alternatives listed above. The first example is for a container vessel that loads cargo in New Jersey, USA, crosses the Atlantic and discharges the entire cargo in Gdańsk, Poland.

Half of the discharged cargo is transhipped to a feeder vessel for further transport to Gävle in Sweden and the other half is transhipped to another feeder vessel for transport to St Petersburg in Russia.



Figure 43: Illustration of case study 1 route assumptions

The alternative route here considered is for the deepsea vessel to continue to the Russian enclave of Kaliningrad where it discharges all of its cargo. From Kaliningrad, half the cargo is transhipped to a feeder destined for Gävle and the other half to a feeder destined for St Petersburg.

Both routes are assumed to pass Skaw instead of passing through the Kiel Canal and both are further assumed to go through the English Channel. The route north of the British Isles is actually significantly shorter, which benefits this route option. On the down side for this route are the weather conditions north of the British Isles which often are quite rough.

The deepsea vessel is assumed to be a 3,000teu and 33,000gt vessel and the feeder is assumed to be a 1,400teu and 15,000gt vessel. The vessels are supposedly too large to pass through the Kiel Canal.

Charter and bunker fuel costs have been estimated for these routes and vessels. These assessments indicate that the cost per teu for a container delivered at Gävle and St Petersburg respectively is almost the same for the two route options.

From this the conclusion can be drawn that if carbon charges on shipping activities are introduced and investments are made in Kaliningrad then this alternative would become a competitive option.

This competitiveness would be boosted if Russia maintains its position of not ratifying the 2015 0.1% sulphur cap on bunker fuels for the North and Baltic Sea sulphur emissions control area. At the time of writing, however, there are

strong indications that Russia will ratify the emissions control area, so this last factor will probably not come into play.

## Case study 2: North America – Mediterranean

The second example also takes its start in New Jersey and this time heads for the Mediterranean. The EEA haul calls at the Port of Algeciras in Spain where the full cargo is transhipped to feeder vessels for further haul to Marseille in France and Genoa in Italy.

The alternative route instead uses the terminal in Tangier in Morocco for transhipment to feeder vessels.

The vessels used in the calculations are the same as in case study 1.



Figure 44: Illustration of case study 2 route assumptions

The cost per teu for the vessel charter and bunker fuel costs are directly comparable for the two routes, on account of the very marginal diversion to Tangier.

From this it follows that if carbon charges for shipping activities are introduced, the use of a North African port for transhipment is a competitive alternative.

Another option is to call at the Port of Algeciras, discharge the entire cargo and transport it by road all the way to Marseille and Genoa. This would not lead to any carbon leakage but would have effects on congestion, noise and accident risks.



### Case study 3: Far East – Mediterranean

Case study 3 looks at a long-haul route from the Far East to South Europe. Shanghai in China is one of the loading ports in the Far East and Gioia Tauro in Italy is the port of discharge. It should be mentioned that it is quite common for ships to call at two to three ports in the Far East and also Singapore on the route. The same often applies for European destinations, where the ship calls at two to three ports. For the sake of simple comparisons it is here assumed the vessel only calls at one port where it discharges all of its cargo.



Figure 45: Illustration of case study 3 route assumptions

The reference case here is that the port of Gioia Tauro is the transshipment hub. It is here assumed that a 6,500teu vessel is employed on the route from Shanghai. In Gioia Tauro the vessel discharges 6,000teu, of which 3,000teu is assumed to be import cargo. Of the remaining 3,000teu, 1,500teu is feedered to La Spezia and 1,500teu to Genoa using 1,600teu vessels.

The alternative case is to use a transshipment port in Tunisia. Tunis is an option, but has limitations. There have been far-reaching plans for the construction of major port facilities in Enfidha and in this case study this is assumed to be in existence with the proper facilities and capacities to handle container vessels and volumes of this magnitude.

The calculation assumes that the feedering to La Spezia and Genoa is catered for with vessels of the same size as from Gioia Tauro. Further, a 3,300teu vessel is employed for the carriage of the 3,000teu destined for Gioia Tauro.

The cost for use of the port of Enfidha as an alternative is marginally higher for the cargo destined for Genoa and La Spezia and slightly higher for the

cargo destined for Gioia Tauro. This is because the distance increases by about 200nm for the Genoa/La Spezia cargo and by close to 500nm for the Gioia Tauro cargo. For the Gioia Tauro cargo, costs for additional port handling should be added.

Should carbon charges on shipping activities be introduced equal to the price for CO<sub>2</sub> as in April 2011 (about €17 per ton CO<sub>2</sub>) and for half the total transport distance for European import/export cargo, then the marginal cost increase per teu would roughly match the extra cost for diversion to an alternative port in Tunisia. This means that given the assumptions above, and assuming there are no major differences in port handling charges, there would not be any incentive for the diversion.

Should the carbon charges be levied for the full deepsea distance, the alternative would become competitive.

The political risks involved for investment in Tunisia are assumed to be moderate, even if the uncertainty is rather high. Over the near to medium term, investment in port facilities in Tunisia is assumed to be realistic.

From the point of view of distance, investment in new port facilities in Libya would be a better alternative. Here the political risk is considered to be high even in the medium term and it is not considered that such investment is likely to materialise.

#### **Case study 4: Far East – Mediterranean**

Yet another viable alternative could be Port Said at the mouth of the Suez Canal. This port is located *en route* to Italy and therefore there is no diversion involved.

The reference case is the same as in case study 3, with Gioia Tauro as the transshipment and import port. The alternative is that the deepsea vessel from Shanghai discharges 6,000teu in Port Said.

From Port Said, one 3,000teu vessel carries cargo to Gioia Tauro and another 3,000teu vessel sails directly to La Spezia and thereafter to Genoa to discharge 1,500teu in each port.

This means that the differences here relate to the variations in cost for the employment of different sized vessels.



Figure 46: Illustration of case study 4 route assumptions

Another element, of course, is the carbon charges. In this comparison, the carbon charges are assumed to be levied on half the deepsea distance for the Shanghai-Gioia Tauro route and the full distance for all feeding, including the feeding from Port Said.

Given the assumptions above, the costs for the option of transshipping in Port Said are only marginally lower than for the reference case. If, however, it is taken into consideration that the import cargo destined for Gioia Tauro is handled one more time in port than in the reference case then the alternative becomes unviable.

## Data quality

This report covers ships of 100gt and above engaged in international traffic. All merchant fleet vessel types are covered, including the service sector, such as tugs. The report also covers yachts and the offshore sector, which are not typically included in the merchant fleet.

Many of the vessels engaged solely in domestic traffic are also included. Some limitations exist in the scope of passenger vessels/ferries that provide only public transport type services across rivers and in archipelagoes.

Most ferries are operating on very short international and domestic routes and we have registered, despite only hourly monitoring, 460,000 port calls during the report period. Supplementary information provided by ShipPax Information has been used to reach a more complete picture of the ferry activities. The numbers from ShipPax Information are much higher than the AIS derived data despite the fact that all small ferry lines (mostly domestic) in cities across rivers and the like are excluded. On the other hand if a ferry is trading solely within a port, remaining at each stop for a minute or less, maybe this type of activity needs to be captured and reported in a different way.

One way to address parts of this shortcoming of ferry port call data is to increase the AIS data recording frequency for all ferry ports from the default value of once every hour to for instance once every six minutes. This would still not capture everything but the scope should increase significantly for ships trading to and from ports.

Another segment that falls outside the scope of this study are vessels solely involved in inland waterways traffic. These vessels are only covered in the IHS Fairplay Register of Ships to a limited extent and are not required to carry an AIS transponder.

Comprehensive data from other sources on inland waterway traffic is not known to the authors. To address this lack of data it is suggested that an effort is done that looks at the availability of data and consults with a number of different sources. Examples of sources are;

- EC DG MOVE,
- Eurostat,
- National statistics agencies,
- Trade organizations.

There have been a number of EC funded projects produced over the years relating to inland waterways. These should also be consulted as well as some of the key partners of those projects.

## Recommendations for further work

It is recommended that a survey is carried out where ship operators from the different cargo and passenger carrying ship segments are interviewed. The survey aims at getting the industry's view on the impact of carbon charges on shipping activities on their business.

The ferry segment is, as described above, a trade with certain characteristics that are unique for shipping. The mix of passengers and cargo is one such factor. The sometimes very quick port turnaround time is another. The suggested measures to bridge the data shortcomings that were described in the previous section of this report are proposed to be addressed in a new project.