OCEAN SHIPPING CONSULTANTS

a company of

Royal HaskoningDHV
Enhancing Society Together

Business Briefing

ETS maritime extension: Impact analysis

MAY 2023

Executive summary

In April 2023 the European Parliament approved legislation to include maritime shipping emissions under the EU Emission Trading System (ETS). Shipping companies will need to surrender allowances for CO_2 emitted by commercial cargo and passenger ships of 5000 gross tonnage (GT) and above. A gradual phase-in will be applied between 2024-2026. This Royal HaskoningDHV Business Briefing investigates the expected impact of ETS on shipping costs for shipping companies and whether there exists a risk of shifting trade routes to ports outside Europe to avoid ETS related costs[1].

Estimation of ETS costs

We have quantified the financial impact of the ETS obligation for two example cases for container ships: a typical Westbound voyage and a typical Eastbound voyage. The results shows that the estimated ETS costs for shipping companies, based on a future ETS price of 95 euro, will be around 17% of the shipping costs[2]. Naturally, this percentage will be higher in case the ETS price would increase. A sensitivity analysis based on an ETS price of 125 euro shows that the estimated ETS costs will grow to around 21% of the shipping costs.

Potential impact of ETS

The risk that container shipping companies will try to avoid the ETS obligation will depend on different variables including the ETS price, (alternative) fuel prices and the existence of alternative shipping routes using ports outside the EU. Figure 1 provides an overview of large EU container ports and geographically nearby non-EU ports. RHDHV notes that the risk of shifting trade routes towards ports outside Europe is particularly relevant for transhipment activities; import/export cargo is less likely to be rerouted.

Figure 1: Large container ports (>2mln TEU); red is EU, blue is non-EU

Source: eeSea, RHDHV

[1] Please note that apart from the ETS legislation, the Carbon Border Adjustment Mechanism could also affect future shipped volumes and patterns; this potential effect has been excluded from this analysis.

[2] For the sake of simplicity, in this study shipping costs are defined as charter costs, fuel costs and ETS compliance costs. E.g. port costs are excluded as these costs differ across different ports.

Generally speaking, the lower the geographical distance towards an alternative non-EU transhipment port, the larger the risk of shifting trade routes. RHDHV has estimated the 'tipping point' where the avoided ETS allowance costs outweigh the increased charter and fuel costs. The analysis shows that shifting a trade route could be financially attractive when the alternative non-EU port is located at a maximum geographical distance of 650 nautical miles from the original port of call. Beyond that point, the additional fuel and charter costs are likely to outweigh the avoided ETS costs.

Stakeholder impact

At this stage it is hard to predict to what extent the additional ETS costs will be transferred to customers (i.e. higher cost per TEU) and to what extent shipping companies will intensify their efforts towards clean fuels as a result of the ETS regulation. RHDHV notes that reliable access to alternative fuels will help making the shift, which underpins the importance of initiatives like the Green Corridor between Singapore and Rotterdam. An important take away from this analysis is that European regulators should closely monitor potential evasive behaviour to make sure the desired decarbonization efforts of the maritime sector are to be achieved.

Please reach out to RHDHV in case you would like to further discuss the potential impact of the ETS regulation on your business or market segment.

Introduction

In April 2023 the European Parliament approved legislation to include maritime shipping emissions under the EU Emission Trading System (ETS). The inclusion of the maritime sector into the EU ETS intends to boost decarbonisation of the maritime sector, which is welcomed by Royal HaskoningDHV.

Under the new legislation[3], shipping companies need to surrender allowances for CO_2 emitted by commercial cargo and passenger ships of 5000 gross tonnage (GT) and above. A gradual phase-in will apply between 2024-2026. By 2026 the European Commission will review whether ships between 400 and 5000 GT will also be included in the EU ETS. In addition to CO_2 emissions, the legislative bodies agreed to include methane and N_2O in the EU ETS from 2026 onwards. As further details are still awaited, this Business Briefing focusses on CO_2 emissions. Box 1 explains how the ETS allowance system will work in practice.

The proposed ETS obligation differs between CO_2 emitted on intra-EU voyages (100% allowances) and extra-EU voyages (50% allowances). An intra-EU voyage is defined as a voyage where both the origin and destination of the voyage are within the EU. If either the origin or the destination is outside the EU, the voyage is defined extra-EU. The distinction is relevant as it can create a financial incentive for shipping companies to reduce intra-EU voyages[4].

This Royal HaskoningDHV Business Briefing investigates two questions:

- What is the expected financial impact on shipping companies?
- What is the risk of shifting trade routes to ports outside Europe?

The study includes a sensitivity analysis to assess to what extent different assumptions regarding a future ETS price or fuel price will impact the results.

Box 1: ETS allowances in practice

Under the ETS regulation, shipping companies must, on an annual basis, surrender a quantity of ETS allowances to their administering authority. The quantity of allowances is equivalent to their annual greenhouse gas emissions; each allowance represents 1 tonne of greenhouse gas emissions. The administering authority is determined based on where the shipping company is registered. Each EU Member State has its own authority. If the shipping company is not registered in an EU Member State, it is attributed to the Member State where it had the highest number of port calls in the two previous monitoring years.

As of 2024, the Commission will publish and regularly update a list of shipping companies and their respective administering authority. The EU ETS system sets an absolute limit or 'cap' on the total amount of certain greenhouse gases that can be emitted each year by the entities covered by the system. This cap is reduced over time so that total emissions fall.

[3] As the legislative text has not been published yet in the EU Official Journal, this Business Briefing is based on the publicly available information about the agreement.

[4] To avoid evasive behaviour, the new legislation includes a specific clause for container ships calling at non-EU transshipment ports (which have >65% transshipment activity) which are located less than 300 nautical miles from an EU port. Although the leg from origin to the transshipment port technically can be considered a voyage between a non-EU port and another non-EU port, still 50% of the ETS allowances are required for this voyage.

Methodology

This study uses a financial cost-benefit analysis to assess the financial impact on shipping companies and the risk of shifting trade routes. The building blocks of the financial cost-benefit analysis are fuel costs, charter costs and the expected costs as a result of the obligation to surrender ETS allowances, referred to as "ETS costs". On the one hand, a shift of a trade route towards a port outside Europe is expected to lead to lower or zero ETS allowance costs. On the other hand, a shift is expected to lead to higher charter costs and fuel costs.

RHDHV has developed own regression models to estimate charter and fuel costs for different vessel types based on historical data of among others Seaweb and Clarksons.

In addition, RHDHV has used the following main assumptions:

- VLSFO price: 532 USD / ton
- Charter price: February 2023 Clarksons charter price index
- ETS price: 95 EUR / ton CO_2
- Carbon emission factor: 3.114 ton CO_2 / ton VLSFO[5]

The financial cost-benefit analysis will be set up for two cases:

1. Eastbound (Asia-Europe): 20k TEU ship from Suez to Algeciras (2002 nm)
2. Westbound (Transatlantic): 10k TEU ship from New York to Rotterdam (3383 nm)

For the sake of simplicity, this study uses the following assumptions:

- The analysis is based on container transshipment;
- The analysis is based on ETS allowance costs after the gradual phase-in period;
- The analysis assumes similar port costs in EU port and non-EU port;
- The analysis takes into account a specific leg of a larger container routing. The effects on the total routing (e.g. Asia – Europe) are not part of this analysis.

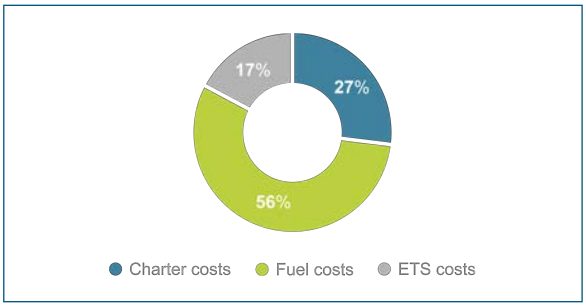
[5] The applied carbon emission factor is 3.114 ton CO_2 / ton HFO as published in the EC Delegated Regulation 2016/2071.

Results

What is the expected financial impact on shipping companies?

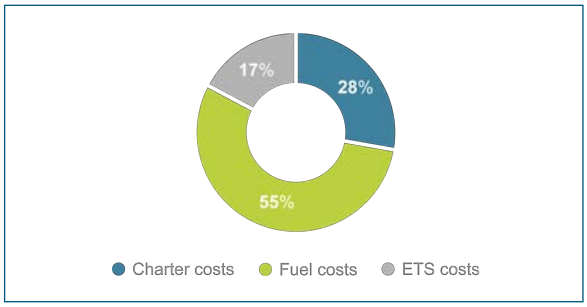
The financial impact of the ETS obligation is quantified in relation to the charter costs and fuel costs for container ships in the two cases. In both the Eastbound case and the Westbound case, the estimated ETS costs for shipping companies will be around 17% of the shipping costs. Naturally, this percentage will be higher in case the ETS price would increase. A sensitivity analysis based on an ETS price of 125 euro shows that the estimated ETS costs will be around 21% of the shipping costs. At this stage it is hard to predict to what extent the additional costs will be transferred to customers (i.e. higher cost per TEU) and/or efforts towards clean fuels will be intensified as a result of the ETS regulation.

Figure 2: Cost estimate ETS: Eastbound voyage



Source: RHDHV

Figure 3: Cost estimate ETS: Westbound voyage

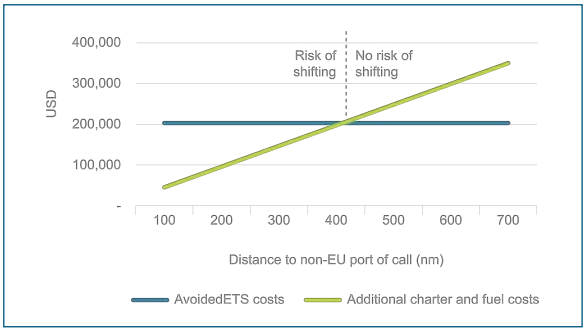


Source: RHDHV

What is the risk of shifting trade routes outside Europe?

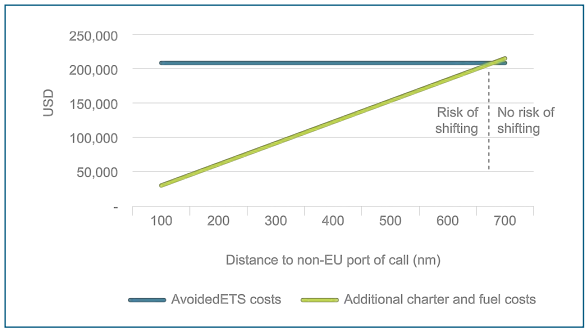
The risk that container shipping companies will try to evade the ETS obligation will depend on different variables including the ETS price, (alternative) fuel prices and the existence of alternative shipping routes outside the EU. Generally speaking, the lower the geographical distance towards an alternative non-EU port of call, the larger the risk of shifting trade routes. RHDHV has estimated the 'tipping point' where the avoided ETS allowance costs outweigh the increased charter and fuel costs. On the Eastbound case, the tipping point is estimated at a geographical distance around 400 nautical miles from the original EU port of call. On the Westbound case, the tipping point is around 650 nautical miles. The difference between the Eastbound and Westbound case is due to multiple factors including the distance of the original trade route and ship size assumptions. As expected, the risk of ETS evasion will be higher if the original trade route (e.g. New York to Rotterdam) is longer and the geographical distance towards an alternative non-EU port is lower. A sensitivity analysis included in the Annex shows that the 'tipping point' can decline to around 300 nm (Eastbound) and 500 nm (Westbound) in case of higher fuel prices.

Figure 4: Cost comparison shifted route: Eastbound



Source: RHDHV

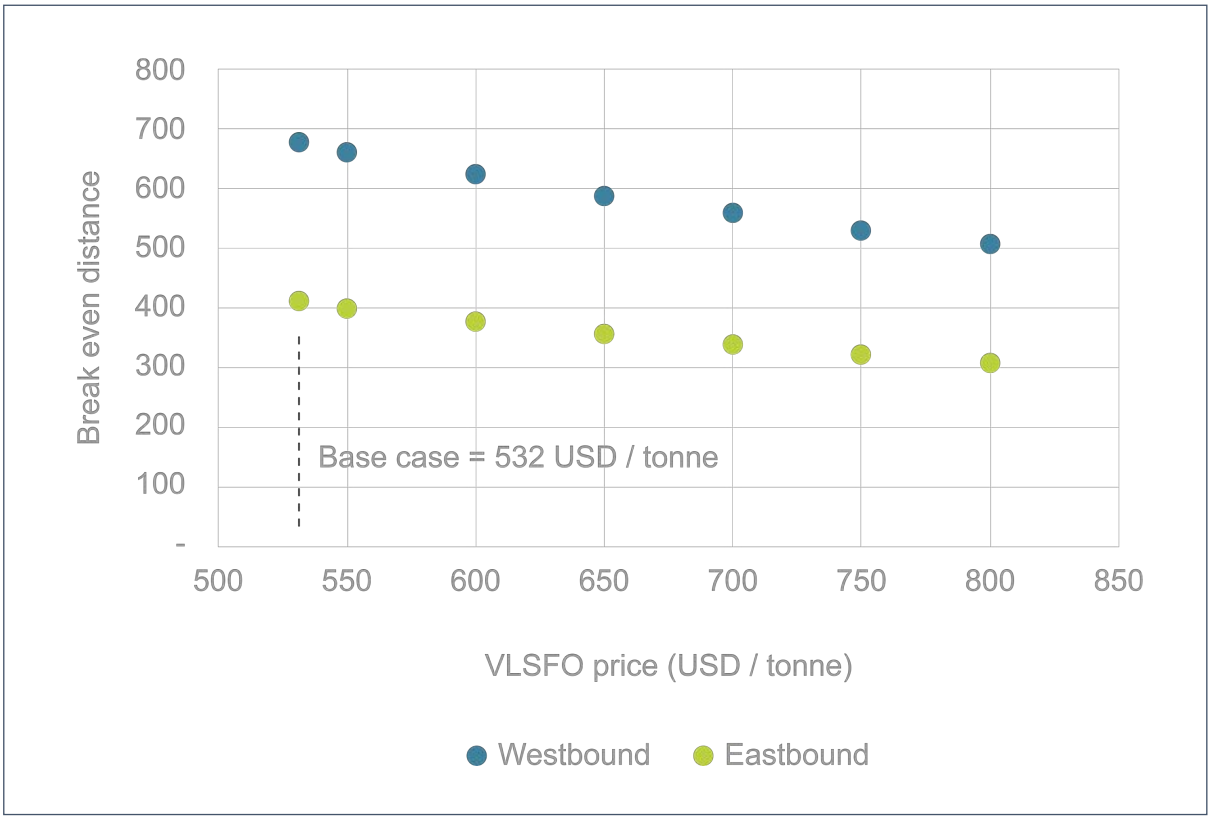
Figure 5: Cost comparison shifted route: Westbound



Source: RHDHV

Annex

Figure 6: Sensitivity analysis: Break even distance at different fuel prices



Source: RHDHV

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